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SPECIAL REPORT

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A Strategy to Revitalize the Defense Industrial Base for the 21st Century

Robert Greenway, Jim Fein, Richard Stern, Wilson Beaver, Madison Doan, Rachel Greszler, Jordan Embree, and Robert Peters

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About the Authors

Robert Greenway is Director of the Douglas and Sarah Allison Center for National Security at The Heritage Foundation.

Jim Fein is Research Assistant for National Security and European Affairs in the Allison Center.

Richard Stern is Director of Grover M. Hermann Center for the Federal Budget at The Heritage Foundation.

Wilson Beaver is Senior Policy Advisor for Defense Budgeting in the Allison Center.

Madison Doan is a Policy Analyst in the Center for Education Policy at The Heritage Foundation.

Rachel Greszler is Senior Research Fellow for Workforce and Public Finance in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.

Jordan Embree is Research Associate in the Margaret Thatcher Center for Freedom at The Heritage Foundation.

Robert Peters is Senior Research Fellow for Nuclear Deterrence and Missile Defense in the Allison Center.

This paper, in its entirety, can be found at **https://report.heritage.org/sr314**

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Contents

A Strategy to Revitalize the Defense Industrial Base for the 21st Century

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To ameliorate long-term capacity issues with the defense industrial base, policy must focus on increasing capital flows to industry, reducing costs of production, expanding the available labor pool, and increasing and stabilizing demand. The primary responsibility of any government is the security of its citizens. To provide that security, a government must have a strong military, which is possible only if the underlying economic infrastructure is in place. For decades, the economic infrastructure most relevant to the military—the defense industrial base—has atrophied while the security environment has deteriorated to its worst state since World War II. Policymakers, the Department of Defense, and industry must revitalize the defense industrial base—or risk irreparable damage to America's national security.

Summary

During World War II and throughout the Cold War, America's defense industrial base (DIB) was immensely capable, achieving extraordinary output and providing impressive innovation. It was known—and for good reason—as "the Arsenal of Democracy." America's defense industrial base produced 17 aircraft carriers, 300,000 planes, and roughly 50,000 Sherman tanks from 1942 to 1945 alone.[1]

Today, however, the United States cannot meet its own peacetime needs despite facing the most hostile threat environment it has seen since the Second World War, with adversaries that include Venezuela, Cuba, North Korea, Russia, Iran, and China. First and foremost, a rising China is threatening the United States and her interests through a massive military buildup backed by an economy roughly two-thirds the size of the U.S. economy.[2] As then-Senator J.D. Vance wrote in April 2024, "[f]undamentally, [the U.S.]

lack[s] the capacity to manufacture the amount of weapons Ukraine needs us to supply to win the war."[3] If the U.S. lacks the capacity to produce just part of what the Ukrainian military needs to fend off Russia, which has an economy less than a tenth as large as that of the United States,[4] it certainly cannot match China's ability to sustain a war through production.

As noted, the United States produced 300,000 planes from 1942 to 1945;[5] today, the maximum production capacity for the F-35 fighter is approximately 150 planes per year—a number that is not currently expected to increase.[6]

This degradation of the defense industrial base did not happen overnight. The increased complexity of the most modern, high-end weapon systems is partially to blame for reduced output. Producing a P-38 is not the same as producing an F-35, and producing a Sherman is not the same as producing an Abrams with its depleted uranium armor. Nor can commercial firms aid in production to the same extent as in World War II when Ford, a commercial automaker, began to produce tanks instead of cars.[7] Today, an Abrams tank's depleted uranium armor and classified technologies render it impractical for a commercial firm to build it even if permitting and certification processes were waived.

But more to blame than necessary increases in complexity are policy decisions and processes that create uncertainty for industry, drive up costs, limit incentives to invest, shrink the available labor pool, discourage innovation, and weaken supply chains.

To revitalize the defense industrial base, it is critical that Congress, the Department of Defense (DOD), and industry implement and adopt policies that increase output, encourage innovation, and secure supply chains.[8] Failure to do so will jeopardize America's ability to deter China or, if necessary, go to war.

Current Policy: The National Defense Industrial Strategy

The Biden Administration released the first-ever U.S. National Defense Industrial Strategy (NDIS) in 2024. Recognizing that there are "serious shortfalls in both domestic manufacturing and international supply chains" related to national defense, the NDIS seeks to provide ways to fix some of these shortfalls.[9] Specifically, it identifies four priorities for this effort: resilient supply chains, workforce readiness, flexible acquisition, and economic deterrence. However, although the NDIS generally succeeds at identifying problems, it falls short in providing sufficient solutions and is disconnected from DOD's own budget.

The NDIS fails to prioritize the regulatory reform necessary for revitalization of the defense industrial base. Government is the source of many of the problems in the market space, and by reducing the excessive regulatory burden placed on American companies, the government could go a long way toward revitalizing the industry.

Similarly important is contracting reform, which the NDIS fails to address adequately. Most defense contracts are cost-plus or function as cost-plus, which discourages contractors from innovating and cutting costs. Revitalizing the defense industrial base requires a switch to fixed-price contracting and the removal of profit caps; otherwise, innovation, competition, and output will continue to be stifled.

Without a budget that matches the NDIS's priorities, implementation will fail. The fiscal year (FY) 2025 defense budget[10] does not do this. Instead of reducing uncertainty in defense procurement, it increases it. The President's Defense Budget Request for FY 2025 cut procurement of several critical precision-guided munitions, sending a negative demand signal to industry. Likewise, the Presidential Budget Request ordered only six new ships while cutting 10, both sending a negative demand signal to industry and decreasing the size of the U.S. Navy.

As a result, current economic incentives do not favor investment in new production capabilities. To incentivize investment, procurement orders must be beyond current DIB capacity. This approach will send the appropriate demand signal, reducing uncertainty and enabling industry to plan for the long term, attract capital investment, and invest in infrastructure and long-term labor programs.

Increasing Output

The most important issue facing the defense industrial base is a lack of output. As former Representative (R–FL) and current National Security Advisor Mike Waltz has noted, "[t]he largest shipyard in China could fit every shipyard in the United States inside it."[11] The same is true across the entire DIB.

Perhaps the most intuitive solution to this problem is one currently being used to increase the output of the submarine industrial base. Congress is providing a direct capital infusion of billions of dollars to increase output capacity,[12] but while direct capital investments have short-term advantages that may be worth it in select instances, such as with the submarine industrial base, they fail to change the underlying incentives that made industry investment in new capacity unprofitable. Without altering industry's

long-run return on investment and incentive structure, a one-time investment will degrade in the medium term and long term, leaving the targeted part of the defense industrial base exactly where it was pre-investment. Policies that are sustainable and focused on the long run should focus instead on reducing high levels of uncertainty, lowering government-imposed production costs, shifting funding toward procurement, and increasing the size of the labor pool.

Some economic and administrative policy changes that can increase output include implementing output capacity-based grants, expanding the use of multi-year contracts, implementing full and immediate expensing for all capital investments, implementing full expensing for interest costs, repealing the Davis–Bacon Act, reforming the permitting process, making unused or underused DOD land available for use in defense-specific production, increasing the ratio of procurement spending to RDT&E (research, development, test, and evaluation) in the budget, and increasing foreign military sales by reforming regulations such as the International Traffic in Arms Regulations (ITAR). To increase the size of the relevant labor pool, possible education policy changes include improving SkillBridge, decoupling federal financing from higher education accreditation, allowing tax-preferred college saving plans to fund certificate and apprenticeship programs, expanding Pell Grant coverage to include vocational and training programs, reviving Industry-Recognized Apprenticeship Programs, and shifting schools to a returned-value funding model.

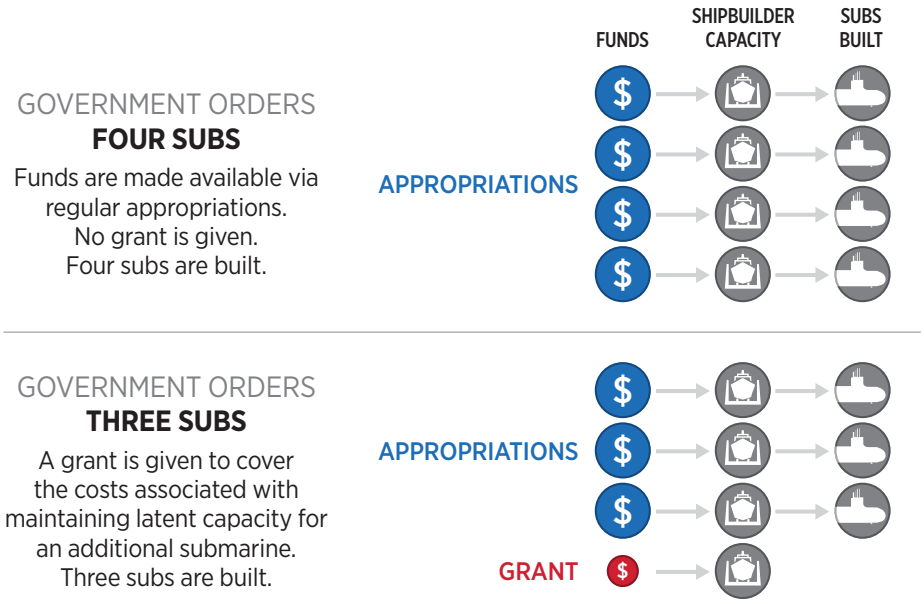
Implement a Program of Output Capacity-Based Grants. Because the appropriations process has routinely fallen short of revitalizing the defense industrial base, Congress could use a budget reconciliation bill to create a mandatory funding stream for a grant program at DOD (or a tax credit version of this program) that is not part of the appropriations process to smooth out uncertainty and ensure that the DIB maintains target levels of productive capacity.

Maintaining the desired level of productive capacity and maintaining productive capacity through uncertain procurement cycles are fundamentally the same problem: DOD's desired level of output capacity is above the level that market conditions will provide funding to establish or maintain. Markets are very good at setting up business parameters to navigate the environment efficiently. However, if Congress's procurement funding does not create a robust and reliable market, DIB producers[13] will have to adapt by reducing their output capacity to the minimum level for which they can be confident that there will be a

FIGURE 1

How Defense Industrial Base Grants Would Work

In this example, the government wants a shipbuilder to maintain the capacity to build four submarines even though the government may not order that many.



SOURCE: Authors' analysis.

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demand. This means that on their own, DIB producers will never possess the level of output capacity that would be required during a war or a period of peak peacetime procurement levels.

Increasing DOD procurement levels to buy excess material simply to justify more output capacity would be incredibly expensive. Moreover, this would waste national resources that could go toward producing products that benefit the nation instead of piling up in a warehouse only to decay. By far, the most efficient way to ensure desired levels of DIB production capacity is to create a DOD directed grant program to fund the gap in the cost of maintaining the excess productive capital.

A portion of all business revenue is used to cover the fixed costs of production. These are largely costs associated with maintaining a certain level of productive capital (equipment, structures, intellectual property, etc.) that is used to produce the final product of the business in question. Remaining revenue, of course, is used to cover variable costs, such as labor and raw

materials, or is turned into profits that are used to expand operations or reimburse shareholders and lenders.

The grant program envisioned here would allow DOD to set target levels of productive capital (and output capacity) for selected DIB producers and sectors. Then, for a selected company, the program would determine the portion of DOD procurement revenues that covers fixed costs. Next, DOD would determine how much that company's fixed costs would increase if the company maintained the target level of output capacity. The grant amount would be sufficient to cover the gap between the two levels of fixed costs if the company builds up to the target level of productive capacity.

For example, imagine a shipyard that can produce three submarines a year and where DOD has a desired production level target of four subs a year. In this case, if the yard builds out the extra capacity to build four submarines instead of three, DOD, through this new grant, would pay the yard enough to cover the extra fixed costs for maintaining the capital to produce the fourth sub if DOD buys three subs instead of four. But DOD would pay for half the capacity (two of four submarines) in a year where it buys only two subs in that year. In this manner, the grant size would increase to fill gaps in comparison to actual levels of DOD procurement.

Conversely, the grant would shrink when DOD procurement levels rise. The grant would be perfectly tailored to use taxpayer dollars efficiently to smooth out demand uncertainty and ensure that DIB companies maintain desired levels of output capacity. Further, these grants can be structured and expanded to include initial amounts to help build up to the new desired level of output capacity.

Additionally, tying these subsidies to timely delivery and successful fulfillment of contract would incentivize companies to solve and improve their own production issues and processes. Under the current cost-plus contracting system, these issues—such as labor shortages (resolved by increasing wages relative to the commercial sector or investing in automation) or supply chain shortages—are often excuses for delays.[14] If a DIB producer risks losing a grant equal to a substantial portion of its profit margin, for example, it will have a tremendous incentive to invest in fixing its production issues.

The grant program would be relatively cheap for taxpayers and, under certain circumstances, could result in cost savings. Taxpayers are currently paying 100 percent of the cost of many infrastructure investments, such as an investment of more than $6 billion in the submarine industrial base.[15] With the grant program in place, government bailouts like this would no longer be justifiable, at least in most circumstances.

Expand the Use of Block-Buys and Multi-Year Procurement. Block-buys and multi-year procurement increase certainty by creating a resourced demand signal. DIB producers see their production level uncertainty reduced, thereby decreasing the risk of investing in production capacity. Block-buys and multi-year procurement can also lead to lower costs by creating economies of scale. According to the Congressional Research Service, programs proposed for multi-year procurement (MYP) can reduce weapon procurement costs by as much as 15 percent.[16] By enabling contractor optimization of workforce and production facilities and enabling economic order quantity (EOQ) purchases of long lead time components, MYP allows manufacturers to take advantage of economies of scale.[17]

Implement Full and Immediate Expensing for Capital Expenditures. Perhaps counterintuitively, the formation of new productive capital—for example, the construction and equipping of new factories—is one of the most taxed activities in which you can engage under the U.S. federal tax code.[18] The current federal tax system, by default, implicitly double-taxes this sort of investment. By taxing expenditures on new productive assets, the tax code also taxes future production from those new productive assets, thereby creating harmful double taxation that discourages investment in new production capacities.

For example, a piece of equipment is used up slowly as it is used to produce a new product such as a blast furnace in a steel mill or a tractor on a farm. These items are used up over time and must be replaced on a regular basis. This replacement cost is embedded in the production costs of each final product that a company makes and sells. Thus, taxes on the final product (steel or crop yields in these examples) are also taxes on capital equipment such as a blast furnace or tractor.

If companies cannot deduct the cost of replacing this capital or the costs of deploying new capital, the tax system will double-tax capital formation, first by denying the deduction and then by taxing the final products. This double taxation serves as a massive roadblock to maintaining and expanding the U.S. industrial base writ large. Allowing immediate and full deduction of the cost of buying capital equipment such as factory equipment stops this chain of double taxation.

This double tax reduces return on investment and therefore reduces the amount of investment made, leading to slower economic growth. This creates a situation in which the incentives are shifted toward immediate resource consumption rather than investment in future productive capacity. Though the current tax code depreciation schedules mitigate this problem, this is far from a full solution. Depreciation schedules require that

deductions be taken over many years, not all in the year the expenditure was made. This means that industrial companies never fully recover the full value of the deduction. Further, our patchwork of depreciation schedules creates enormous paperwork and accounting burdens. It requires these companies to keep track of how great a deduction they have left on a particular piece of capital over exceedingly long time frames.

The construction of a new factory, for example, is treated as a 39-year expense.[19] This means that industry can fully realize the deduction for the cost of the new building only very slowly over a 39-year period. In essence, the government is taxing a company on money that it no longer has, thereby requiring the company to divert other funds to pay the tax. This denies industry access to the use of these funds (the ones repurposed to tax payments), whereas an immediate deduction would allow the company to apply these funds toward the formation of new productive capital, increased worker pay, or a price reduction for the end users of their products. The delay in being able to utilize this money reduces growth rates.

There is only one proper way to address this intrinsic double taxation: Provide full and immediate expensing (deductions) for expenditures on capital formation. This includes purchases of new equipment and the construction of new buildings, but it also includes research and development (R&D) work to develop new techniques and products. The Tax Cuts and Jobs Act (TCJA) temporarily provided these deductions for equipment and R&D.[20] However, it did not extend that tax treatment to construction, has fully phased out R&D, and is in the process of phasing out equipment expensing and returning to current-law depreciation schedules. Permanent full and immediate expensing for equipment, structures, and R&D associated with defense production is essential for DIB development and, if fully implemented across the economy, would likely yield enormous growth generally.

Allow Full Expensing (Deductions) for DIB Producers' Interest Costs. The financing of capital expansion should receive expensing provisions similar to those we propose for physical capital formation. Under the current federal income tax system, companies may only deduct interest costs of up to 30 percent of their Earnings Before Interest and Tax (EBIT).[21] EBIT is a measure of company earnings after expenditures for capital investments, including the replacement of burned-through capital. Using EBIT means that the cap on interest deductions shrinks as firms spend more on expansion—a truly counterproductive measure.

Altering the calculation of the cap to use Earnings Before Interest Tax Depreciation and Amortization (EBITDA) would solve this narrow problem.

Further increasing the percentage cap would also help to alleviate these issues and not double-tax firms on most interest costs related to financing the expansion of their operations. However, we recommend fully removing the percentage cap from the interest deduction for interest costs related to defense industrial base expansion and development as envisioned in this report.

End the Davis–Bacon Act. The Davis–Bacon Act is a 1931 law that requires contractors on federally funded construction projects pay at least the local "prevailing" wage and benefits so that federal projects do not drag down local compensation. In reality, Davis–Bacon uses selective and inflated union compensation that does not reflect market compensation. For example, in areas with low unionization, Davis–Bacon rates are well below market compensation (for example, only $14 per hour[22] for cement masons in Spartanburg County, South Carolina), and in most areas, they are far above market compensation (for example, almost $86 per hour[23] for cement masons/concrete finishers in New York's Nassau and Suffolk Counties). Mandating compensation that does not reflect the market inflates taxpayer costs on federal construction projects by about 10 percent and prevents the overwhelming majority of construction companies and construction workers from participating in federal construction projects.[24]

Davis–Bacon's influence is growing as federal spending grows. The Department of Labor (DOL) noted in its finalization of an 812-page Davis–Bacon Act rule that:

> The Davis–Bacon Act and now more than 70 Related Acts collectively apply to an estimated $217 billion in Federal and federally assisted construction spending per year and provide minimum-wage rates for an estimated 1.2 million U.S. construction workers. The Department expects these numbers to continue to grow as Federal and State governments seek to address the significant infrastructure needs of the country, including, in particular, the energy and transportation infrastructure necessary to mitigate climate change.[25]

Implement Permitting Reforms. An enormous headwind facing manufacturers, especially defense-related manufacturers, is the federal permitting process. Prospective manufacturers must navigate the National Environmental Policy Act (NEPA) process through more than a dozen federal agencies and must navigate through the processes of state agencies as well. This imposes tremendous costs on businesses and often requires duplicative work to go through the same process with several different agencies.

Further, the current process means that these businesses cannot know with any certainty when they will be able to start their projects or even whether they can complete them. There is no firm timeline for the permitting process, no guarantee of a firm answer from the government, and a potential for arbitrary lawsuits even after a company has broken ground on a project.

We could decrease costs and increase efficiency for defense manufacturers by creating a streamlined permitting process that provides a one-stop-shop process in which one agency would shepherd a permitting application through the system. By narrowly defining what constitutes adverse impact, the streamlined process would ensure that this process is expedited with a firm and short timeline and protection from frivolous lawsuits. In the event of government failure to meet the requirements of this expedited process, the default response to a permit application should be approval. Exemption from state-level permitting requirements should be extended to facilities associated with the defense industrial base as they already are for projects on military bases.

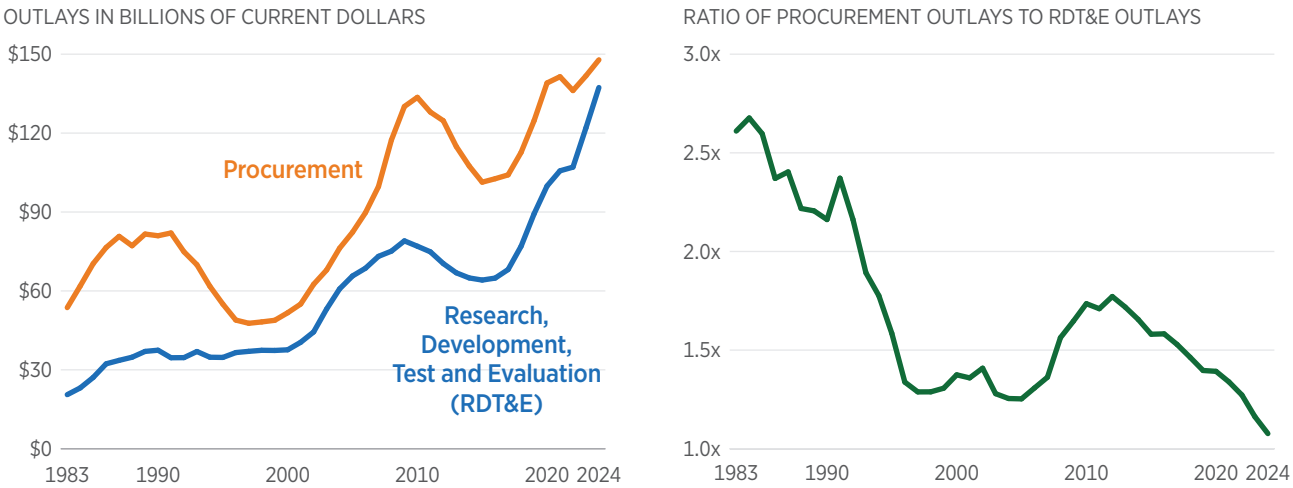
Make Unutilized or Underutilized DOD Land Available for Use by Industry. The U.S. government owns 28 percent of U.S. land, making it the country's largest individual landowner.[26] Much of that land is controlled by agencies within the Department of the Interior such as the Bureau of Land Management. The Department of Defense owns millions of acres of land as well.[27] Some of this DOD-owned land is used for bases and U.S. assets, but other parts have been underutilized or unused.[28]

DOD should conduct an assessment to identify unused or underutilized land and facilities in locations that could be used by industry—such as land near population centers and facilities like transportation infrastructure—and offer that land for industry use at a discounted rate (for example, $1 per year for 99 years). If conditioned on industry use of the land to build production facilities, this would reduce DIB manufacturers' costs at no practical cost to taxpayers. The result would be to increase industry investment by lowering capital requirements for new facilities and to create defense industry jobs in local communities by employing people in both the construction and factory workforces.

A General Services Administration estimate placed the cost of maintaining unnecessary federal government land and facilities at approximately $1.67 billion per year as of 2010,[29] a number that is undoubtedly much higher today due to inflation and DOD's ignorance of how much unused/

CHART 1

Department of Defense Outlays



SOURCE: Table 6-11, "Department of Defense Outlays by Public Law Title," in U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 2025*, April 2024, pp. 162–169, https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2025/fy25_Green_Book.pdf (accessed February 25, 2025).

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underutilized land and facilities it actually owns.[30] Therefore, making unutilized or underutilized land available for industry would likely result in cost savings in addition to land improvements.

Increase the Ratio of Procurement Spending to RDT&E in the Budget. When Congress is looking for money to put toward new initiatives, it often asks for offsets from the military's Operations and Maintenance (O&M) account. Unlike RDT&E and certain procurement programs, O&M spending tends to have no clear advocate in Congress, and this makes it an easy target. However, cutting O&M funding risks significant adverse impacts on the military (personnel must be trained and paid) unless the cuts are narrowly tailored to remove excess bureaucracy. Instead of cutting funding from O&M, Congress should explore cutting money from the Pentagon's RDT&E account and shifting it to procurement.

In 1983, procurement funding equaled more than 250 percent of RDT&E funding. Now procurement is barely more than RDT&E, reflecting an imbalance in priorities between the two.[31] That affects the amount of money available for the generation of defined, useful output from the industrial

base: Fewer dollars for procurement means lower procurement quantities, which in turn disincentivizes investment in new production capacity.

There are times when RDT&E funding should be relatively higher and times when it should be relatively lower. The current moment—characterized by a maximal threat environment, potential conflict with a near-peer state in the Indo-Pacific, and underinvestment in military equipment—calls for a switch to relatively lower RDT&E funding to bolster equipment purchases that can be ready before the Davidson Window closes.[32]

Increase Foreign Military Sales (FMS) through ITAR Reform. The International Traffic in Arms Regulations (ITAR) process currently serves as a significant barrier to entry for companies looking to break into defense contracting for the first time. The process is both byzantine and expensive: In 2017, for example, British companies spent the estimated equivalent of 0.7 percent of their defense budget on ITAR compliance.[33] While some requirements have been streamlined for the U.K. since 2017, the same is not true for almost all other allies. In order to comply, DIB producers must hire expensive law firms and consultants and dedicate huge numbers of working hours to navigating the process, which must be done before contracting.

Compliance with ITAR also constrains the ability of the United States to compete in international markets and enable burden-sharing by quickly providing critical weapons technologies to close allies. In some cases, non-American DIB producers looking to outbid American companies abroad will market their product as "ITAR-free,"[34] knowing that the prospective buyer could save time and money by choosing to purchase from a country with a less onerous process. Increasing foreign military sales by removing overly onerous barriers creates a demand signal that encourages industry to increase production capacity. It also increases interoperability, depriving adversaries of opportunities to improve their own defense industrial bases by filling the gap. By reforming ITAR to ensure that weapons go to American allies more easily while preserving security, we can both ensure that our allies are well-armed and create additional DIB capacity that is funded by other countries rather than by U.S. taxpayers.

The ITAR process should be streamlined for key allies. The Five Eyes intelligence grouping,[35] which was established to expand intelligence collaboration and distribute the burden of collection efforts, can serve as a model. Intelligence-sharing within Five Eyes requires an immense amount of trust and information security. If the U.S. trusts Five Eyes with our most valuable intelligence, creating a defined, streamlined process for ITAR compliance that better balances risks serves U.S. interests in arming allies and

strengthening U.S. and allied defense industrial bases by creating a common framework that strengthens supply chains and enables additional codevelopment, coproduction, and technology transfers. If Five Eyes or other select allies have trusted supply chains and put in place regulatory and compliance frameworks that meet U.S. expectations, some ITAR requirements should be waived.

Another improvement to the ITAR process could be system-level approval.[36] If a foreign company is contracted to build a U.S. weapon system, the ITAR process should be completed before the contract is signed rather than having individual components approved after-the-fact. If there are certain systems for which the U.S. is unwilling to waive requirements or that it does not want to approve, they can be specifically written out. If a company is contracted to build something for the U.S. military, it should have all the approvals necessary before it starts.

Ensuring that sensitive U.S. weapons and systems are not compromised is important, but creating a process so onerous that allies turn to American adversaries such as China or Russia for weapons also creates risk. The U.S. has already seen China's willingness to exploit opportunities to control critical infrastructure—as Huawei has done with telecommunications networks.[37] Similarly, Turkey purchased air defense systems from Russia, benefiting the Russian defense industrial base and creating risk to NATO and to such U.S. systems as the F-35.[38]

Making certain that American companies can compete with foreign suppliers on an equal basis is an important way to reduce the risk of such encroachment. Foreign military sales encourage the expansion of DIB capacity by increasing the demand signal for production.

Increasing Output: Education Policy

The defense industry's capital deficit parallels a labor shortage. There currently are not enough workers in key positions, including in defense manufacturing[39] and naval shipbuilding.[40]

There are three ways to mitigate this problem. The first is automation. In most circumstances, reducing workforce requirements[41] reduces workforce deficits, causing increases in capital investments. The second solution is to reallocate workforce from the commercial sector into the defense space, which can be achieved by increasing the profitability of the defense sector relative to the commercial sector. The third is to increase the overall size of the shipbuilding and manufacturing workforce. This can be achieved through changes in the educational system, including (among other things)

decoupling federal financing from higher education accreditation, shifting state school funding to a returned-value model, and improving SkillBridge. Leaders like Representative John Carter (R–TX) are working to ensure that education policy aligns with national security needs, but others need to join in support if we are to implement effective change.[42]

Decouple Federal Financing from Higher Education Accreditation. The only way for a student to access federal student aid is to attend an accredited school. Accreditation initially started as a voluntary measure of quality assurance but evolved into a mandatory requirement for colleges to access Title IV funds. This is a problem because it does not allow students to explore atypical forms of higher education by, for example, taking individual classes and courses that are more applicable to the job market. It also hinders innovation, making it difficult for new education models to emerge whenever the current "accreditation" system favors existing expensive business models for higher education. Additionally, as federal student aid and subsidies have grown to represent a significant portion of university budgets over the past five decades, most institutions have been left with little option but to pursue accreditation.[43]

Federal lawmakers should adjust the Higher Education Act to separate accreditation from federal funding, removing the requirement for colleges to be accredited by the government-sanctioned system. They should consider adopting policies that are similar to the Higher Education Reform and Opportunity (HERO) Act, which would separate federal higher education financing (such as student loans and grants) from the federal accreditation process and empower states to develop their own accrediting bodies to accredit institutions of higher education, along with individual courses within colleges, apprenticeship and vocational training programs, and other curricula.[44] They should also consider adopting policies similarly related to the College Cost Reduction Act, which also would provide much-needed accreditation reform, create a pathway for new accreditors, grant states the flexibility to designate accreditors tailored to specific industries, and require all accreditors to establish outcomes standards for student achievement.[45]

Allow Tax-Preferred 529 College Savings Plans to Fund Postsecondary Certificate and Apprenticeship Programs. Federal lawmakers should consider adopting policies similar to the American Workforce Empowerment Act, which would permit 529 savings accounts to be used for non-degree technical training, certification, and apprenticeship programs.[46] For far too long, federal policy has placed greater emphasis on four-year college degrees than it places on obtaining vocational skills and trades. This

proposal would support career and technical options, whether through vocational trades, technical education, or technology training programs.

Expand Student Eligibility for Pell Grants to Cover Vocational and Training Programs. Increasing costs and declining quality in many degree programs have resulted in students and taxpayers funding numerous credentials that offer little to no return on investment. Federal policymakers should consider adopting policies similar to the Professional Pell Education Learning (PROPEL) Act, which would expand student eligibility for Pell Grants by allowing students to use these funds for enrollment in vocational or technical training, flight training, apprenticeship, or other on-the-job training programs.[47] Under this proposal, programs would no longer have to be accredited, and taxpayer dollars would be aligned with educational opportunities that meet workforce needs.

Revive Industry-Recognized Apprenticeship Programs. The Trump Administration created a new Industry-Recognized Apprenticeship Program (IRAP) model so that traditional apprenticeships could expand into new high-demand industries. IRAPs were designed to align more precisely with industry needs, including greater employer involvement and a simpler pathway to the creation of new apprenticeship programs. Even without access to the federal funding that is available to traditional RAPs, more than 130 IRAPs were created, primarily in professions with significant worker shortages.[48] The Biden–Harris Administration cancelled those new IRAPs and ended the entire IRAP model, which the Administration viewed as competing with traditional union apprenticeships.[49]

The reality is that apprenticeships are an excellent way for individuals to gain the skills they need for a successful career while getting paid instead of paying for an expensive college education, and there simply are not enough of them. A 2017 Harvard study estimated that the number of occupations commonly filled through apprenticeships could nearly triple from 27 to 74, that the number of job openings filled through apprenticeships could expand eightfold to 3.2 million, and that the occupations ripe for apprenticeship expansion could offer wages that are 20 percent higher than wages for traditional apprenticeship occupations.[50]

Policymakers can make it easier both to meet the workforce needs of the defense industrial base and to create well-paying jobs that do not require expensive college degrees by expanding instead of restricting apprenticeships. The Apprenticeship Freedom Act[51] and Training America's Workforce Act[52] would revive IRAPs so that DOL-approved entities like trade associations and educational institutions can recognize and oversee apprenticeship programs.[53]

Shift State Schools to a Returned-Value Funding Model. In 2013, Texas became the first state to implement a returned-value funding model based on graduates' employment outcomes. Instead of relying on student enrollment, tuition, and fees, Texas State Technical College crafted a funding formula that focuses programs on in-demand fields in the Texas economy.[54] The returned-value funding formula determines the economic value of a graduate's wages over a five-year period. This value is equally shared between the state and TSTC with a portion of the "returned value" allocated for funding instruction and administration.[55] Programs that have not met graduate placement and salary standards are phased out. Some other programs offer a "Money-Back Guarantee" that allows students who do not get jobs in their chosen field within six months of graduation to receive either a refund of out-of-pocket tuition or a student loan reimbursement.[56]

State leaders have a role to play in reforming higher education and responding to the needs of the defense industrial base. They should consider shifting state schools to a returned-value funding model similar to TSTC's.

Improve SkillBridge. SkillBridge is a DOD program designed to help servicemembers transition from the military to the private sector. Specifically, it allows servicemembers to work for an approved private firm toward the end of their service, enabling them to gain the skills they need to work in a private-sector industry while on the DOD payroll.[57] However, SkillBridge is biased toward firms near military bases because the Department of Defense cannot pay for temporary housing closer to a company that is not located near a base and in most circumstances will not pay for employee travel costs associated with SkillBridge participation. Similarly, in most cases, employers are unable to pay housing or travel costs.[58]

The legislation authorizing SkillBridge[59] should be altered to clarify that industry may reimburse servicemembers for housing, travel, and other reasonable expenses associated with their participation in SkillBridge.

Increasing Innovation

As the U.S. defense industrial base's output has declined, so has the innovation that it generates. Despite an $18 billion effort, the Future Ground Combat Systems project yielded no new combat vehicles.[60] The Littoral Combat Ship program is perhaps the Navy's most notorious failure, with no clear role in great-power competition.[61] Why is it that the same institutions that built the atomic bomb in less than three years have struggled to such an extent to develop new capabilities? Two of the most important reasons are a cost-plus contracting system that reimburses industry's research and

development costs and the "requirement overload" that is caused when the military imposes too many requirements on how and what the DIB can build.

Increase Use of Fixed-Price Contracting. Unlike consumers who go to the store and pay the label price for whatever they are buying (a fixed price), most DIB producers work on a cost-plus system under which all expenses related to fulfilling the contract are reimbursed by the government with additional agreed-upon funds (usually a percentage of the contract value) paid to the contractor as profits.[62]

As Palantir executive Shyam Sankar explains, although cost-plus contracting is meant to limit costs for the government and does reduce risk for contractors, it ends up driving costs up and causing delays that hurt the taxpayer. For example, taxpayer-reimbursed R&D is extremely inefficient because companies are not incentivized to spend money efficiently: They are spending taxpayers' money, not risking their own capital.[63] In a fixed-price system, the purchase price of a product includes the company's R&D costs, so the company is incentivized to keep those costs as low as possible to maximize the amount of net profit.

Cost-plus contracting also discourages innovation in the manufacturing process because it means that more efficient production is not strongly associated with profits. In a fixed-price system, contractors assume more risks: If they are unable to find ways to limit costs, they will not be profitable. In exchange, their profit is capped only by their revenue. In other words: more risk, more reward, and more innovation.

With limited exceptions (such as first-in-class warships, which inevitably will involve numerous design changes throughout their construction), fixed-priced contracting should become the default DOD contracting mechanism.

Reduce the Number of Requirements. Switching to fixed-price contracting provides an incentive structure for companies to reduce costs. In many cases, however, excessive design and contract requirements will get in the way of successful implementation. The most prominent example is naval shipbuilding. Designs take considerable time for approval but then frequently change, including during construction, and those designs often include significant numbers of immature technologies, which leads to still more delays and cost overruns.[64] Some of these requirements pertain not only to function, but also to micromanagement of that function's construction. For example, while requiring the integration of certain weapon systems into a warship or requiring a specific hull strength is perfectly appropriate, as is requiring a vessel to reach a certain speed, requiring that a certain type of screw be used or that pipes be laid off the left side of the engine room rather than the right side of the engine room should be avoided where it makes no functional difference.

In other words, DIB producers should be given mission orders and then allowed to implement their own solutions as long as those solutions meet functional requirements. Contractors should also have increased opportunities to develop and pitch their own developed products to the Department of Defense with suitable contracting conditions including for their intellectual property.

Increase Competition. Since the end of the Cold War, the defense industrial base has consolidated to the point where there now are only eight major defense producers.[65] Consolidation originally occurred because of a reduction in defense spending,[66] but bureaucratic barriers have increased the relative burden of compliance costs, which in turn discourages new market entrants. Contracting with the Department of Defense is a cumbersome multi-phase process that takes years. This prevents timely returns on investments, creating capital flow challenges, especially when paired with procurement uncertainty.

Furthermore, the difference in business models between many new market entrants and the existing primes exacerbates systemic barriers to entry. Many smaller DIB producers, such as Palantir and Anduril, conduct their own research and development[67] and then shop their product to the government instead of waiting for an R&D contract awarded by DOD. This increases their initial costs but allows them to move from idea to production more rapidly than established firms can. However, the Pentagon is not used to working with contractors who use such business models and therefore struggles to leverage this model's ability to move fast.

This indicates a bureaucratic and structural bias within DOD toward large existing companies, despite DOD's acknowledgment that increasing the number of DIB producers would improve the defense industrial base.[68] Fixing these problems may ultimately require legislative changes, such as changes in the degree to which the federal government funds R&D. However, most important is an attitude change at the Pentagon: A willingness to change and speed up bureaucratic processes must come first. For this to happen, a significant number of high-level Pentagon positions need to be occupied by disruptors who are willing to make the necessary decisions and challenge the bureaucracy.

Securing Supply Chains

While increasing output and innovation in the defense industrial base is critical, so is increasing the resilience of supply chains. Currently, U.S. DIB producers sometimes utilize materials from adversary countries like

China. For example, the CEO of America's largest missile producer has stated that "decoupling" from China while maintaining production is not possible because of the industry's reliance on Chinese firms for key components.[69] Reliance on such sources for materials could easily jeopardize the U.S. defense industrial base, especially if the U.S. were ever to go to war with China. Onshoring and friendshoring critical components and minerals (and increasing the utilization of dual-use technologies) are therefore imperatives.

Put Greater Emphasis on Access to Onshore/Friendshore Critical Components and Minerals. Critical minerals play a crucial role in (among other things) missile systems, military aircraft, ammunition, and semiconductor production.[70] According to DOD's *Securing Defense-Critical Supply Chains* report, our military relies on imports for several critical minerals needed in the production of these systems, including cobalt, rare earth elements, gallium, arsenic, and antimony.[71] Preferably, the United States would be able either to produce these minerals within its territory or, at the very least, to source them from friendly countries instead of adversaries.

The Biden Administration's Environmental Protection Agency and Department of the Interior blocked multiple key mining projects within the United States, preventing industry from sourcing minerals necessary for the defense industrial base (and, for that matter, for so-called green initiatives like electric vehicles) within the United States. After one mining project was blocked in Minnesota, Representative Pete Stauber (R–MN) said that "America needs to develop our vast mineral wealth...instead of continuing to send American taxpayer dollars to countries like the Congo that use child slave labor. The only winner here is China."[72]

Increase the Utilization of Dual-Use Technologies. One of the most impactful ways to leverage the commercial sector is to increase the use of dual-use technology in military procurement. When delivered defense articles use defense-specific components that are not used in commercial end products, the production of those parts depends solely on DOD. This has several adverse impacts.

First, it limits the ability to increase defense production quickly. Because production capacity is based solely on DOD's needs, companies have no ability to shift parts from commercial use to defense use. For example, if a company producing drones uses the same motor for both commercial and military drones, then in times of increased demand for military drones, it can shift some of the motors used in commercial drones instantly to military drones. But if a company produces a motor that is used only in military drones, it is harder to shift commercial capacity to produce additional

motors for military drones from commercial drones. Therefore, to increase production, the company will need to invest in new facilities and workforce development, which takes time and requires a degree of market certainty that is not often present.

Second, increasing the utilization of dual-use technology reduces single points of failure. When a defense end product's components utilize defense-specific components, there is often only one supplier;[73] there is limited demand, so there is not much market desire to compete for that demand. When dual-use technology is incorporated into end products, however, there generally are multiple commercial off-the-shelf products that can fulfill component needs. Thus, if one company goes out of business, another exists that can supply the necessary component. This also implies competition, which limits the potential for cost inflation.

Interim Measures to Improve Defense Procurement Through Coproduction

In recent years, the United States has focused increasingly on buying American when it comes to producing the capabilities the Defense Department needs to conduct its mission. The United States can and must prioritize revitalization of its defense industrial base, but some exemptions (which should be authorized on a case-by-case basis) are needed to ensure military readiness.[74] An exemption might be warranted, for example, to meet an immediate need for additional defense manufacturing capacity that a different nation has and the U.S. is not close to establishing—in which case foreign industry is therefore not competing directly with U.S. firms.

In January 2025, President Trump stated as much when he said that "[the United States] used to build a ship a day. We don't build ships anymore. We want to get that started. And maybe we'll use allies, also, in terms of building ships. We might have to."[75] If the U.S. is incapable of building something that is critical to her national defense, it may be necessary to coproduce with allies.

Enhance Indo-Pacific Coproduction. Most importantly for coproduction, several allies can build precision-guided munitions for American and allied militaries. The recent 2+2 announcement with Japan on missile coproduction—particularly of such systems as the Joint Air-to-Surface Standoff Missile (JASSM) and, potentially, the Advanced Medium-Range Air-to Air Missile (AMRAAM)—is welcome.[76] Moreover, there is precedent for this type of coproduction. During the Cold War, the United States

partnered successfully with Germany to produce the AIM-9 Sidewinder missile.[77] The German branch of European defense company MBDA currently builds components of Patriot missiles in Bavaria and plans to expand production.

This practice should be extended to other allies. For example, South Korea's robust shipbuilding industry could be leveraged to augment U.S. shipbuilding capacity and produce components or auxiliary vessels necessary to revitalize the U.S. fleet.

Australia is another crucial partner. In addition to serving as a force multiplier and key partner in the Southwest Pacific, Australia has a vital role to play in revitalizing the DIB. This could include providing a location for forward maintenance and production of SSN-AUKUS subs, which could prove to be a long-term source of additional fast attack submarines.[78] Finally, as noted in a recent Heritage Foundation study, "the most crucial aspect of this will be the ability of the Australian defense industrial base to deliver precision-guided munitions (PGM) both for itself and for the U.S. (in whole or as components). The United States' inventories of PGMs are low, which creates a dangerous deterrence gap in both the Taiwan Straits and the South China Sea."[79]

Focus on Coproduction with Europe. Coproduction with European allies also should (and to a large extent already does) focus on precision-guided munitions. The United States coproduces the National Advanced Surface-to-Air Missile System (NASAMS) at home and abroad, and expansion facilities are in progress thanks to a partnership between Norway's Kongsberg and America's Raytheon.[80] NASAMS is a key part of the answer to securing allied airspace in Europe and the Indo-Pacific,[81] and the coproduction arrangement has facilitated the development of enhanced capabilities.[82]

But while the NASAMS coproduction and codevelopment arrangements are encouraging, missile demand continues to soar across systems: The backlog for the GEM-T variant of the Patriot Missile family alone is approximately five years.[83] Thanks to production expansion for the GEM-T and other Patriot variants in the United States and Europe, opportunities exist to diversify the supplier base for components like solid rocket motors in a way that will expand U.S. production while leveraging allied expertise. For example, policymakers should support efforts such as those underway at Lockheed Martin to "bring anti-fragility into our own supply chain" by broadening suppliers, perhaps with Nammo or other experienced companies from America and our NATO allies.[84]

The United States needs to focus on rebuilding its own munitions stocks and arming Indo-Pacific allies and partners like Japan and Taiwan to deter Chinese aggression. However, several European countries have recently

purchased the F-35 and will be looking to order relevant munitions from the United States. To help the United States prioritize its own munitions needs and munitions needs in the Indo-Pacific, Lockheed Martin should move quickly to certify European-produced munitions on the F-35.

Meteor, a Beyond Visual Range Air-to-Air Missile (BVRAAM) developed by six NATO allies through European multinational defense contractor MBDA, is already in service as part of the arsenal of Typhoon, Rafale, and Gripen jets. The United Kingdom Ministry of Defence noted in its *Defence Equipment Plan 2021–2031* that "Meteor was assigned a place in the Follow-on Development Programme by the F-35 Joint Programme Office and contracts were awarded to Lockheed Martin in the early summer. However, entry into service is not anticipated to be until 2027 and there is a possibility that integration pressures in the programme may incur further delays because of challenges in the wider F-35 programme."[85] Since publication of this report in February 2022, the F-35 has experienced further delays related to the Technology Refresh 3 upgrade. However, the U.S. successfully lifted the F-35 delivery halt in July 2024, and Block 4 capabilities upgrades are now proceeding while the program is restructured to concentrate on priority capabilities.[86]

Given this opportunity, American policymakers should support allied calls for the Meteor's F-35 integration to be completed and certified on priority status within the Block 4 upgrades. By leading the defense industry to increase interoperability in this manner, NATO allies' magazine depth for cross-platform air-to-air combat will increase. This is especially critical as transition to the F-35 continues due to preexisting service stockpiles of Meteor missiles[87] and a diversified production base for air-to-air missiles as Raytheon confronts maxed out production of AMRAAMs "for years to come."[88] Once the METEOR is certified, Pentagon planners should interface with their NATO colleagues to identify additional comparable allied munitions for F-35 platform certification.

Increase Icebreaker Cooperation with Finland and Canada. The United States' position far behind other Arctic nations—particularly its adversary, Russia—on icebreaker capabilities has been dubbed the "icebreaker gap." With Russia steaming ahead with plans to field weaponized icebreakers, it is critical that America support deterrence and peace in the Arctic through the assured access and presence that are possible only with additional icebreakers.

Formally sited within the U.S. Coast Guard, America's icebreaker fleet has dwindled to only two active icebreakers.[89] This eviscerated capacity has drawn the attention of Congress, which has funded construction of a new generation of icebreakers, but these efforts continue to confront massive

delays and cost overruns.[90] These difficulties drew the attention of the first Trump Administration, whose 2020 Arctic Strategy demanded that the feasibility of leasing icebreakers be explored as a short-term stopgap measure.[91]

The Biden Administration likewise recognized the issue; it announced an ICE Pact[92] and signed a related MOU[93] in coordination with Canada and Finland to improve industry connections for best practices and support allied icebreaking capacity. The incoming Administration should leverage these arrangements to negotiate favorable terms for a lease of icebreaker capacity from Finland until America's newest generation of icebreakers are complete. Meanwhile, the State Department should follow President Trump's lead[94] and work with Canada and Finland to arrange for U.S. shipbuilders to collect and apply best practices from allied firms to improve ongoing domestic production efforts.

Continue Missile Defense Codevelopment with Israel. Long the United States' closest partner in the Middle East, Israel has pioneered innovative missile defense capabilities such as the Arrow-3, David's Sling, and Iron Dome systems with American support and cooperation.[95] As Iran continues to turn up the heat regionally,[96] U.S. cooperation with Israel has intensified.

This long cooperation between the U.S. and Israel has benefited the American defense industrial base not only by providing export contracts for missiles and interceptor systems to Israel, but also by ensuring bridge air defense capability for U.S. military services as future U.S. capabilities are developed.[97] Additionally, NATO air defense has been strengthened through purchases of these codeveloped capabilities, including a German contract for the Arrow 3,[98] a Finnish contract for David's Sling,[99] and a British contract for elements of the Iron Dome technology.[100]

Consistent with historical practice, the United States should continue to fund joint development and production of Israeli missile defense systems that are currently in use.[101] However, this funding category should formally include the Iron Beam system and related efforts by Lockheed Martin and Rafael to develop defensive laser systems,[102] which help to reduce the cost differential between attack and defense. Currently, attackers possess a favorable cost differential, as defending against inexpensive drones and cheap missiles requires interceptors that can each cost millions of dollars.[103] However, with the Iron Beam's cost per shot coming in at only $3.50 (according to former Israeli Prime Minister Naftali Bennett), the calculation flips.[104] Additional formal engagement with Israel's Iron Beam program will both reinforce the groundbreaking development partnership between the United States and Israel and provide the foundation for later production and provision of similar capabilities to strengthen other allies' defenses.

Conclusion

The U.S. defense industrial base must be revitalized to meet today's needs. Output is insufficient, innovation is lagging, and supply chains are brittle—and it does not appear that current efforts will be effective enough to ameliorate these issues.

To ameliorate long-term DIB capacity issues, policy must focus on increasing capital flows to industry, reducing costs of production, expanding the available labor pool, and increasing and stabilizing demand. Increasing innovation requires changes in procurement methods, a smaller role for government in design and production (fewer requirements), and a change in congressional and Pentagon mindsets. Strengthening supply chains requires onshoring or nearshoring production capacity and eliminating single points of failure. While the U.S. defense industrial base is undergoing revitalization, coproduction should be utilized where possible to procure key instruments of national defense the lack of which would cause a readiness gap.

The first and foremost responsibility of any government is to provide security for its citizens. To provide that security, a government must have a strong military, which is possible only if the underlying economic infrastructure is in place. For decades, the economic infrastructure most relevant to the military—the defense industrial base—has atrophied while the security environment has deteriorated to its worst state since WWII. The choice before policymakers, the Department of Defense, and DIB producers is clear: Either take immediate steps to revitalize the defense industrial base or risk irreparable damage to America's national security.

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