NDIA

VITAL SIGNS 2025

The Health and Readiness of the Defense Industrial Base

The new Administration has inherited the political conditions conducive to breaking up and reforming a centralized, sclerotic acquisition system that prioritizes reducing risk to the government over speed and innovation, but doing so will require a balanced public policy approach across the DIB.

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Introduction

There has been a profound, welcome shift in the policy discourse in Washington regarding the importance of a strong, resilient, and diverse U.S. Defense Industrial Base (U.S. DIB) over the last several years. Most importantly, there is more directed, bipartisan attention focused on **the interdependent link between a strong defense industrial base and effective national deterrence.** This will strengthen the hand of the current Administration to both deter aggression and maximize its range of credible response options if conflict erupts.

And yet.

Currently, there are several major policy and political trends that will test the nascent work to re-posture the U.S. DIB for great power competition. For example, the transition to the new Administration has emphasized bipartisan agreement on the need to more efficiently acquire and scale commercial technology with defense applications, and both traditional and nontraditional defense contractors agree that the current focus on increasing the speed and efficiency of the Department of Defense's (DoD) acquisition system is desirable.

However, while the incoming Administration will inherit the political conditions conducive to breaking up a centralized, sclerotic acquisition system that prioritizes reducing risk to the government over speed and innovation, doing so will require a balanced public policy approach. Rather than creating exceptions to policies, regulations, and authorities that give quick starts to nontraditional contractors – but will not help them as they grow – the policy conversation needs to focus on reducing the regulatory burden on all contractors and sharing more risk between the government and contractor to allow for more open competition. In addition, as policymakers emphasize solutions to rapidly scale and field cutting-edge technological capabilities, it will be equally important to continue to address the known barriers to scaling hardware capabilities and capacity, including the capabilities identified in the Executive Order 14186 to implement a next-generation missile defense shield for the United States[1] and to correct the current inventory levels of precision-guided munitions.

In addition, both traditional contractors and nontraditional contractors agree more funding for DoD is essential to rebuilding the resilience[2] of the U.S. DIB. As highlighted in the last several *Vital Signs* reports, while defense spending is sizable, it is not the driver of U.S. national debt and is currently at a near-record low as a percentage of the U.S. economy. This is why industry strongly endorses current congressional efforts to increase defense spending, with an emphasis on increasing DoD procurement accounts. At the same time, budget stability will be equally important, and the Administration and Congress are encouraged to enact the Fiscal Year 2025 Defense Appropriations Act as soon as possible. As documented later in this report, **by March 14, 2025, the U.S. government will have hit the grim milestone of operating under a continuing resolution for a total of 1,925 days over the last 16 years, which is over five full years of slamming on the brake.**

These policy and political debates are occurring within the context of **a profound shift in the security assessment that the U.S. homeland is no longer a sanctuary and the potential for any of the multiple conflicts in different regions around the world tripping into direct great power conflict.** In the rapidly evolving character of modern warfare, DoD will need to continue to focus on solutions to protect the U.S. homeland from both kinetic and non-kinetic threat vectors, the challenges of preparing U.S. industry for the potential need for sustained surge capacity under protracted conflict, and the policies and authorities industry needs to operate under conditions in which the lines on the battlefield are erased.

The National Defense Industrial Association (NDIA) continues to emphasize that time and consistency are immutable factors for both military readiness and defense industrial readiness. The U.S. must simultaneously wisely manage the clock, strategically and consistently invest its funding, and appropriately balance risk between government and industry to ensure the U.S. military and the U.S. DIB achieve and maintain the readiness levels required to deter aggression. The consequences of losing the current global competition will negatively impact the values, standard of living, and security of every American. **We can afford to be ready.**

Executive Summary

It will take time, financial investment, and changes in systemic behavior patterns to reshape the U.S. DIB into a threat-informed defense ecosystem with the capacity to grow its output, fulfill a surge in military demands, and reconstitute during a major conflict. **The *Vital Signs 2025* report focuses on the key areas where government and industry can partner together to better manage time and money in support of current national objectives of strengthening the lethality and readiness of the Joint Force and restoring the resilience of the U.S. DIB.**

In addition to emphasizing the importance of effectively managing time and money in restoring defense industrial readiness, **the *Vital Signs 2025 Survey* and report continue to highlight another tension – shared risk – that U.S. policy objectives are struggling to balance.** Examples include:

- Traditional U.S. DIB companies are operating under increasing scrutiny and oversight by both the executive and congressional branches but are weighed down with government policy, statutory, and regulatory requirements that both increase cost and stifle speed and innovation.
- Over the horizon, nontraditional defense contractors are also aware that successfully producing and fielding capabilities for the U.S. warfighter will graduate them into the same costly regulatory requirements weighing down traditional contractors.
- Policymakers want to attract and retain small and nontraditional companies into the U.S. defense ecosystem, but they are struggling to reduce significant barriers to entry and retention, including increasing regulatory compliance costs and concerns regarding intellectual property (IP) rights.
- Policymakers are working on innovative offensive and defensive strategies as part of global technological competition, but Cold War-era frameworks around export and technology releasability controls continue to drive status quo outcomes in defense trade.
- Policymakers expect the U.S. DIB to rapidly expand production capability before contract vehicles are awarded, but DoD continues to struggle with building acquisition strategies that incentivize business decisions and effectively manage workforce talent required for sustained surge capacity.
- Policymakers expect companies to de-risk their supply chain strategies, built during the last 35 years for consumer convenience and cost efficiencies, without sufficient government financial incentives or consistency.

The next 12 months will test the U.S. defense ecosystem. **Many pending policy and political debates could result in suboptimal zero-sum solutions that bias toward producing and fielding certain technologies over the holistic suite of capabilities the Joint Force requires.** The *Vital Signs 2025* report highlights for the current Administration and the 119th Congress the key challenges confronting the U.S. DIB and – more importantly – identify short-, medium-, and long-term solutions to provide more flexible response options to policymakers.

Methodology

In this report, NDIA uses three primary data sources: public financial data, DoD contract data, and proprietary NDIA polling data. This polling data is based on a survey of NDIA membership conducted between July 8, 2024, and August 27, 2024. The poll closed with 1,273 responses.

Of the 1,273 respondents, 403 were government employees and 870 worked in industry, or at a university, research center, or other non-government organization.[3] For the purposes of clarity in this report, industry, university, research center, and non-government organization respondents will be denoted as private sector respondents. Of these 870 private sector respondents, 376 were from small businesses, which NDIA defined in the *Vital Signs 2025 Survey* as companies receiving between $0 – $25M in defense revenue in the prior fiscal year (FY) and/or registered as a small business with the government. There were 212 medium-sized businesses, which the survey defined as companies reporting annual defense revenue of more than $25M but less than $1B. Finally, the survey had 282 respondents representing large-sized businesses, which reported an annual defense revenue greater than $1B.[4]

The financial data collected for the report is all publicly available information. DoD contract data was downloaded from the USAspending.gov Award Data Archive, which has DoD transaction data going back to FY2001. This data was used to formulate this report's financial calculations and to calculate the size of the U.S. DIB.

In addition, NDIA pulled information from the annual Form 10-K reports filed by publicly traded companies with the U.S. Securities and Exchange Commission (SEC). This year, NDIA expanded the pulled financial data for all relevant companies to cover the time period from 2019 – 2023. Consistent with last year, NDIA gathered this data across four groups of publicly traded companies for each respective year:

1. The top companies in the U.S. DIB
2. Companies in the Standard and Poor's (S&P) 100
3. Tech-related companies in the S&P 500[5]
4. Industrial Companies in the S&P 500[6]

Identifying the top U.S. DIB companies required additional research and analysis. NDIA started by pulling the 100 largest public contractors based on DoD prime contracts for each year.[7] However, many of the 100 largest publicly traded DoD contractors rely on DoD revenue for a smaller percentage of their total revenue, which make these companies much more comparable to purely commercial companies than members of the traditional U.S. DIB. Therefore, because U.S. DIB companies are subject to DoD rules and regulations that do not apply to purely commercial companies, an additional analysis filter was applied.

Specifically, NDIA calculated the ratio of DoD transactions to total company revenue and set a threshold of 20% for DoD transactions. NDIA's further financial analysis of the U.S. DIB included any U.S. domestic company with a higher percentage of revenue from DoD transactions than the 20% threshold. NDIA chose the 20% threshold because any company sourcing one-fifth or more of its annual revenue from DoD contracts would be significantly impacted by DoD policies and regulations.

Finally, to make a better comparison to the S&P 500, NDIA limited the list of top DoD contractors to U.S.-based companies. These companies were combined to form the "Top U.S. DIB" category.

Evolving Strategic Environment

The United States is managing a period of profound transition, both domestically and internationally. Domestically, during the past several decades, the U.S. economy has transitioned from primarily a manufacturing- and goods-based economy to a digital- and services-based economy. Since 2008, the country has grappled with the social and economic consequences of parts of the country not fully recovering from the Great Recession. In addition, the global pandemic of 2020 caused significant shifts in population demographics and the commodities Americans buy and consume. These trends have changed how Americans work, connect, and communicate with each other and have shifted the demand for and supply of education and training pipelines designed to prepare new entrants for the workforce. Government officials at both the federal and state levels are in the process of responding to this significant reorientation of American society.

The magnitude of the transition and its associated disruptions have caused the U.S. to look inward. Polling from the 2024 presidential election and the 2022 congressional midterms both showed national security challenges continue to rank below economic concerns.[8] One of the organizing themes of the three most recent presidential election cycles continues to be the focus on rebuilding American domestic resiliency with specific emphasis on American workers and economic sectors that have not benefited from the transition to a digital- and services-based economy. As will be discussed further, **critical components of the U.S. DIB, including the manufacturing sector and skilled trade employment, have atrophied during this economic transition.**

Internationally, while national strategy documents and bipartisan policymakers in both the executive branch and congressional branch pivoted from a post-Cold War and post-September 11th security framework mindset to focus on the return of great power economic and technological competition against near-peer competitors, national policymakers are not necessarily acting in those terms. In most cases during the last several years, and across two different administrations, specific policy, regulatory, and funding discussions quickly clarify that what the **United States is really focused on is a bilateral economic, technological, and military competition with the People's Republic of China (PRC).**

Among the many risks of treating a global competition as a bilateral one is the risk of the U.S. missing critical geostrategic players on the chess board. These risks are discussed further in the report under the Foreign Military Sales (FMS) and Technology Cooperation Pillar and the Resilient Supply Chain Pillar. Without bold change and significant financial investment, U.S. allies and partners may continue economic activity antithetical to U.S. policy preferences and at the expense of U.S. companies. This is not the policy result the U.S. seeks, and the U.S. cannot afford to cede its economic and technological competitive advantages on the global stage.

Malign forces are also testing U.S. national deterrence and resolve. The global security environment continues to grow more dangerous and complex. In the last year, U.S. policymakers have had to lead through serious challenges, including the fall of a major regime and threats to the flow of open global commerce in the Middle East, the ongoing aggression against Ukraine amid calls from some quarters for strategic autonomy in Europe, and persistent efforts to re-shape the security architecture and an escalating fight in the information space in the Indo-Pacific. **Senior civilian and military leaders are also emphasizing the convergence of interests between global competitors and potential adversaries that are incompatible with U.S. values as well as economic and security interests.** In a saturated 24-hour news cycle, it is important to maintain focus on the aggregate big picture amid global chaos and violence.

The consequences to human life in the conflicts described above offer significant and stark reminders of why a strong alliance of democracies that protect and respect individual lives has been the U.S.' guiding principle and an integral part of the global security framework for almost 80 years. This values-based security architecture was born out of the devastation of a 35-year period of two global wars resulting in the loss of human life on a scale that recent generations struggle to comprehend.

In addition to the values-based consequences, **these tests are forcing policymakers to evaluate the duration of modern conflict in the context of the ability of the U.S. military and U.S. DIB to sustain supporting simultaneous contingencies in different regions**.[9] In the rapidly evolving character of war, DoD is also increasingly focusing on solutions to protect the U.S. homeland from both kinetic and non-kinetic threat vectors, the challenges of preparing U.S. industry for the potential need for sustained surge capacity under protracted conflict, the policies and authorities industry needs to operate under conditions in which the lines on the battlefield are erased, and the requirements for both personnel and materiel under mass mobilization conditions.

The U.S. is also working through how to balance the requirements for expanding its competitive advantage in capabilities required for the future character of war and ensuring sufficient capacity for the enduring nature of war. The Department must continue to accelerate the development and employment of new technologies essential to rebuilding our military's technological competitive advantage using both traditional U.S. DIB companies and nontraditional commercial companies. At the same time, neither government nor industry can afford to ignore the enduring nature of war, which is the direct and brutal contact with adversarial forces that U.S. military personnel will encounter if conflict erupts. This necessitates continuing to make disciplined investments to expand capacity in strategic platforms and munitions. As highlighted recently, this is an area of focus in the 2023 National Defense Industrial Strategy (NDIS) line of effort for Indo-Pacific Deterrence,[10] and munition stockpiles are of particular concern to the Commander of U.S. Indo-Pacific Command.[11]

This is all happening within the context of political division, budget instability, credit downgrading, tightening credit markets, and the effects of historically high inflation rates[12] making capital expensive. This strategic environment is therefore creating uncertainty for U.S. DIB companies trying to discern future DoD acquisition priorities. **During this transition phase to great power competition and the Department's focus on the future character of war, many in the U.S. defense companies, including their fiduciary boards, are trying to interpret how these future requirements should inform strategic investment decisions** regarding everything from independent research and development (IRAD) funding for the development of new capabilities to planned, long lead time capital expenditures (CapEx) to expand existing production lines or to add new production lines.

The capacity of the U.S. DIB to grow its output, fulfill a surge in military demands, and reconstitute in a major conflict stands as a key test of its health and readiness. Currently, U.S. policies and financial investments are not oriented to supporting a defense ecosystem built for peer conflict. Today's policymakers inherited the defense industrial base the executive and congressional branches collectively shaped over the last three decades. This report focuses on ways to rebuild a resilient U.S. DIB postured for strategic competition.

The Importance of Managing the Clock

Time and consistency are immutable factors for both military readiness and defense industrial readiness.

"For almost twenty years we had all the time and almost none of the money; today we have all the money and no time." [13]

- General George C. Marshall,
15th Chief of Staff of the United States Army

What is at Stake

While the U.S. talks about the re-emergence of great power competition, its global competitors actively work to erode U.S. economic and military competitive advantage. In 1985, at the height of the U.S. military build-up for peer competition against the former Union of Soviet Socialist Republics (USSR), the PRC had a gross domestic product (GDP) that was 15% of the U.S. In 2016, the PRC surpassed the U.S., and by 2021, the PRC's GDP was 118% of U.S. GDP (adjusted for purchasing power parity (PPP)).[14] From this position of economic strength, the PRC is taking a disciplined approach to re-order the international system – its rules, norms, standards, and values – on terms favorable to itself.

The Chinese Communist Party (CCP), which controls the PRC government, also shifted its economic and national security policies under an ideological reorientation back to the CCP's official ideology promulgated in 1949. President Xi Jinping departed from his predecessors by pursuing a more forceful approach to achieving the party's vision for both its domestic affairs and its regional and global security posture. Under his leadership, across all dimensions of diplomatic, economic, informational, and military power, the PRC is more assertive and less risk-averse.

As part of this effort, the CCP is focused on comprehensive national power, a term the CCP uses to quantify the PRC's combined military, economic, and technological power as well as its foreign policy influence. President Xi also revitalized the phrase "the rise of the East and the decline of the West" as a euphemism for the PRC surpassing the United States.

As part of the CCP strategy, the PRC is steadily increasing its defense spending and advancing its military capabilities. **With strategic discipline, the PRC is using those financial investments to steadily modernize its nuclear capabilities; hone sophisticated strike, space, and cyber capabilities; and build out its navy in "one of the most remarkable and strategically disruptive global defense spending trends in the last two decades."[15]** Publicly available measurements of PRC defense spending provide only one part of the story. The PRC also demonstrates its intentions by harnessing its significant investment in industrial power, which provides it with formidable capacity. Financial investments in its defense industrial base jumped from $10B in 1999 to $296B in 2023.[16] As part of this financial strategy, the CCP has worked to erase the line between the government and the private sector through state-owned enterprises, government equity in private firms, and opaque but troubling purges of government and business leaders. These facts are why the pattern of year-over-year growth of PRC overall defense capabilities is of grave concern to U.S. policymakers.

The CCP leadership is also focused on building internal resiliency and decreasing dependence on external entities, with attention and investment given to the country's "productive forces," especially in the sectors of industry, infrastructure, human capital, and technology.[17] **Through its dual circulation policy,[18] the CCP is determined to reduce its vulnerability to being interconnected with and dependent on an international economy. Simultaneously, the CCP also intends to increase the vulnerability of other countries, especially those in its region,** by deepening their economic dependence on the PRC in the ultimate expression of national self-protection. The CCP strategy has profound implications for U.S. export control policies and U.S. DIB supply chains.

Synergistic Partnerships

Current U.S. policymakers inherited the U.S. DIB that government policy and funding decisions shaped during the past 35 years of U.S. strategic hegemony, followed by counterterrorism and counterinsurgency campaigns. **The present U.S. DIB reflects a premium policymakers place on just-in time supply chains, lowest-price technically acceptable contract awards, a sclerotic acquisition system, significant increase in the regulatory burden on**

commercial supply chains, and outdated assumptions regarding workforce availability. It is a U.S. DIB built for convenience and predictability, and it is a U.S. DIB the U.S. government resourced for low-intensity conflict. To foundationally transform the U.S. DIB, which is operating in an increasingly unpredictable global environment, the government and the private sector must embrace a synergistic partnership and disruptive thinking.

Assessing the Challenges

DoD and the U.S. DIB need to create a synergistic partnership to operationalize a common endeavor to achieve a desired end state. Fully realizing a healthy, synergistic partnership will involve strengthening areas of alignment, constructively addressing areas of misalignment, and taking bold steps to change systemic patterns of behavior. A significant first step occurred in 2024.

In January 2024, the Department released its inaugural NDIS, designed as a framework to "coordinate and prioritize actions to build a modern defense industrial ecosystem that is fully aligned" with the 2022 National Defense Strategy (NDS).[19] **The strategy will require time, resources, a shared understanding of managing risk, and disciplined alignment between government and industry on implementation to achieve its intended outcomes**. The strategy clearly identifies the challenges facing the U.S. DIB and describes the history and the events that drive these challenges. Most importantly, the NDIS highlights the dangerous gaps between the robust and resilient industrial base called for in the 2022 NDS and the current capability and capacity of the U.S. DIB.

Areas of Alignment

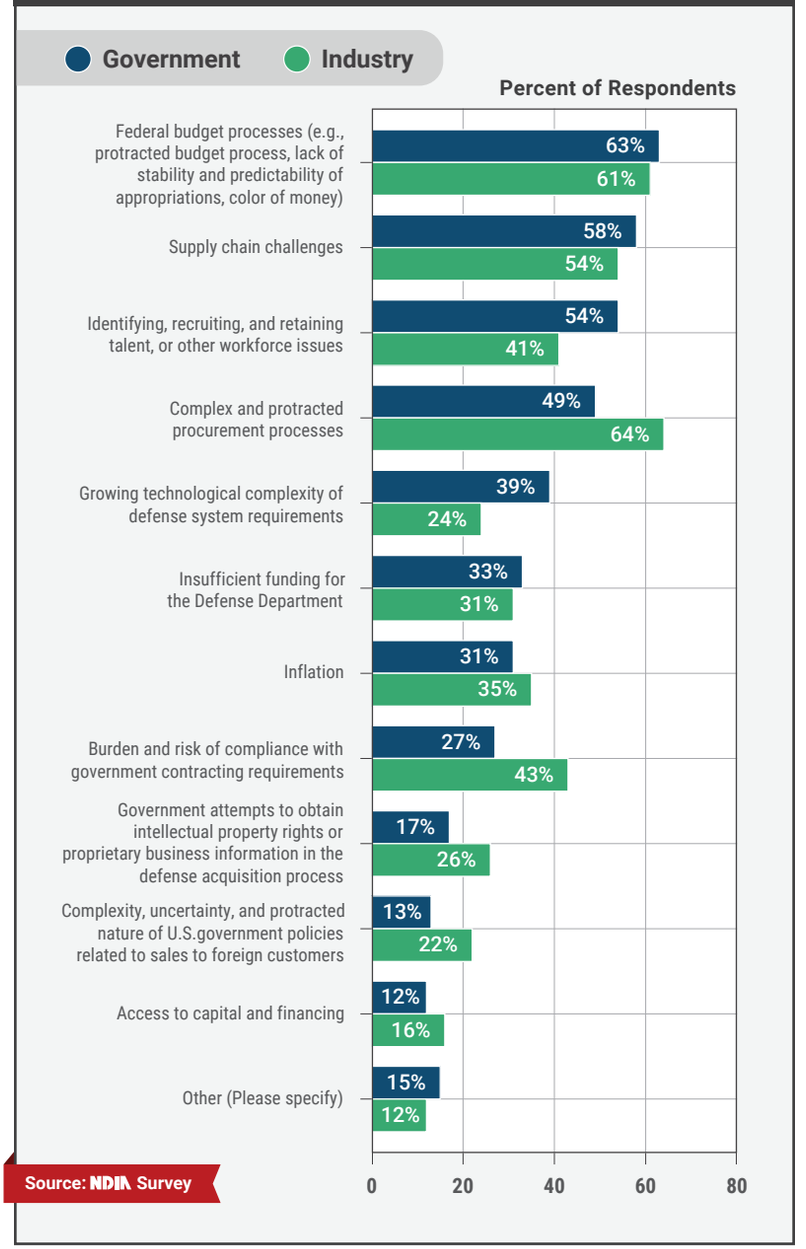
In a synergistic partnership, it is important to identify areas of alignment and areas of nonalignment. Therefore, the *Vital Signs 2025 Survey* included a select number of questions NDIA asked both federal government and private sector respondents. Similar to last year, there was significant alignment by both government and private sector respondents on the most pressing issues facing the U.S. DIB (see Q5/22 Chart):

The private sector identified these top three issues:

- Complex and protracted procurement processes (64%)
- Federal budget processes (61%)
- Supply chain challenges (54%)

Question 5 & 22

What do you think are the most pressing issues facing the Defense Industrial Base? *(Select all that apply)*



These three issues are also found within the government's top four issues:

- Federal budget processes (63%)
- Supply chain challenges (58%)
- Identifying, recruiting, and retaining talent/workforce issues (54%)
- Complex and protracted procurement processes (49%)

The *Vital Signs 2025 Survey* also asked private sector respondents to identify what was most difficult about government processes when working with government. The private sector ranked (see Q29 Chart):

- Unclear or changing requirements (58%)
- Burden of acquisition process and paperwork (57%)
- Budget instability (51%)
- Inflexible contract vehicles (45%)
- Insufficient funding (40%)

Government survey respondents were also asked about what government processes they found most difficult when working with industry and these survey respondents highlighted very similar results (see Q6 Chart):

- Budget instability (53%)
- Unclear or changing requirements (45%)
- Burden of acquisition process and paperwork (44%)
- Inflexible contract vehicles (41%)

The *Vital Signs 2025 Survey* asked private sector respondents what the best steps were for the government to take to improve the ability of industry to work with DoD (see Q7/Q23 Chart on page 13):

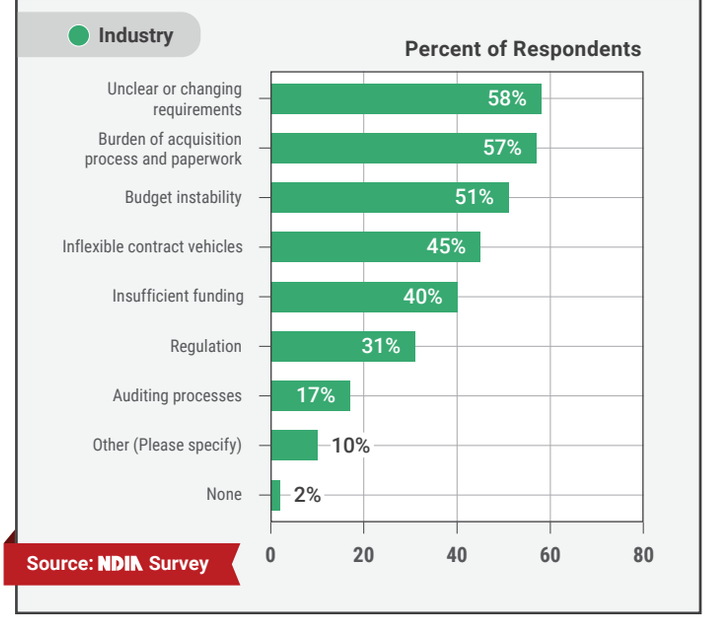
- Provide a clear, consistent demand signal through contract vehicles (65%)
- Increase government investment to strengthen and grow critical supply base (48%)
- Improve requirements discipline (40%)

Government respondents also identified these three answers in their top three issues:

- Provide a clear, consistent demand signal through contract vehicles (53%)
- Improve requirements discipline (46%)
- Increase government investment to strengthen and grow critical supply base (43%)

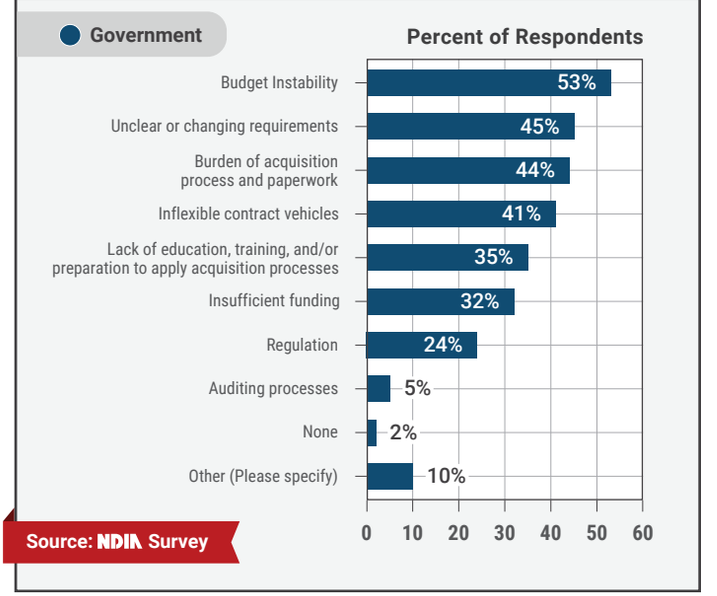
Question 29

What do you find most difficult about government processes? *(Select all that apply)*



Question 6

What do you find most difficult about government processes when trying to work with industry? *(Select all that apply)*



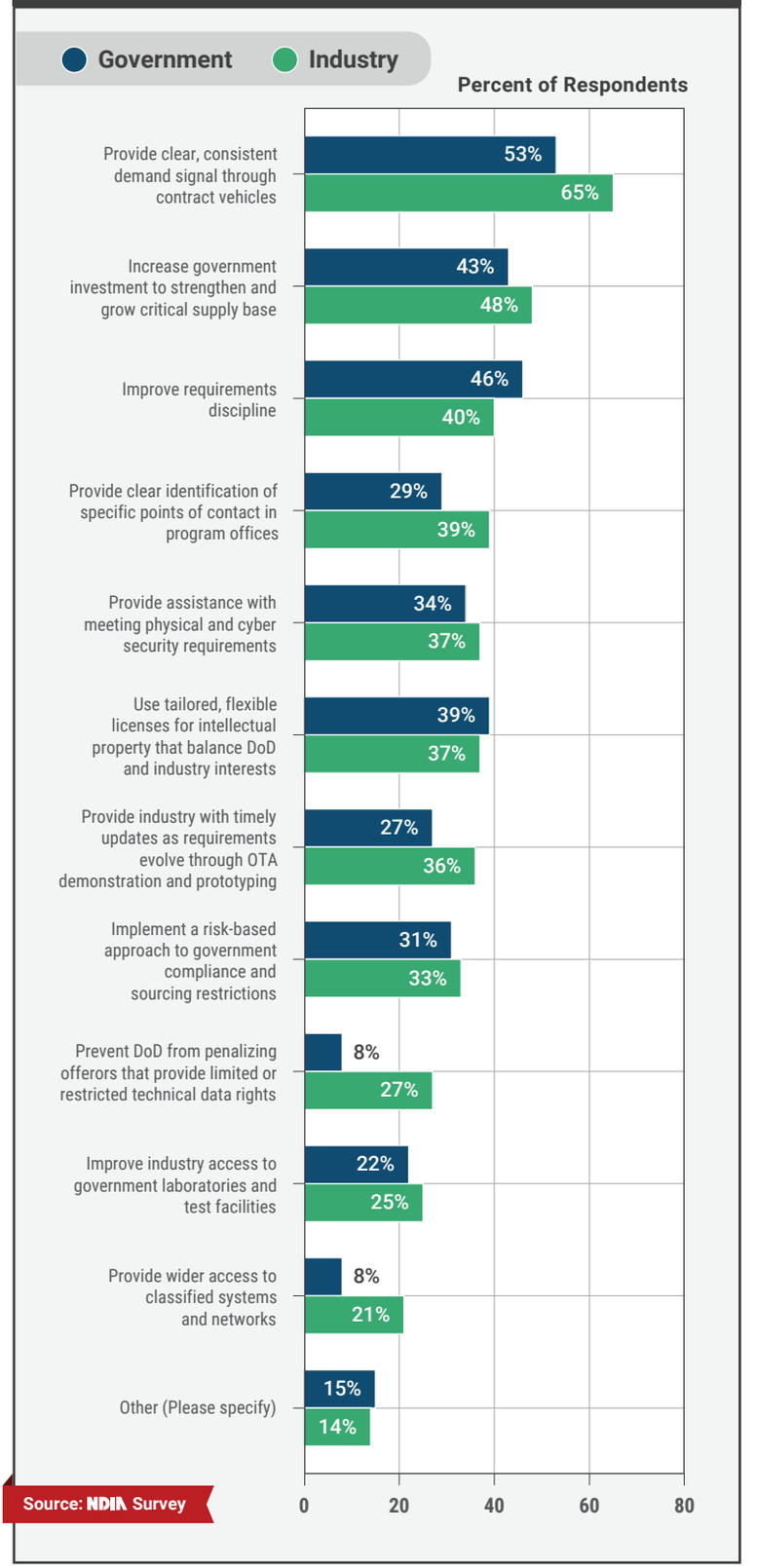
Recommendations:

Short-Term

1. **DoD and Congress must continue to make more substantial, sustained, and predictable financial investments to rebuild the U.S. DIB's strategic endurance and resilience.** As reasserted in DoD's Fiscal Year 2020 Industrial Capabilities Report to Congress, the order of magnitude of financial investment is in the billions, not millions, of dollars.
2. **DoD and Congress must transform the inflexible programming, budgeting, and appropriations process,** as recommended by the Planning, Programming, Budgeting, and Execution (PPBE) Reform Commission.
3. **DoD and Congress must examine the application of cost and pricing data requirements by either raising the threshold or providing contracting officers additional flexibility.** One of the most particularly cumbersome regulations for NDIA member companies of all sizes is the requirement for certified cost or pricing data. The burden of cost or pricing requirements could be ameliorated either by raising the Truthful Cost or Pricing Data Act (formerly known as the Truth in Negotiations Act (TINA)) threshold or by granting contracting officers additional authorities to tailor these requirements to specific procurements, including allowing contracting officers to rely on historical data of recent prices paid in determining costs of a subcontract, a purchase order, or a modification of either.

Question 7 & 23

What are the best steps the government could take to improve the ability of industry to work with the Department of Defense? *(Select all that apply)*



4. **The appropriate contract type must be selected after reviewing the complexity and maturity of requirements and the level of financial and technical risk in the program.** NDIA companies of all sizes note that the Department and Military Services are preferencing firm-fixed price (FFP) contracts, even when it is not the most appropriate contract vehicle.

5. **The Office of the Under Secretary of Defense (OUSD) Acquisition and Sustainment (A&S) must update all policies, guidance, instructions, and training curricula to ensure they reflect the current policy provided by the Adaptive Acquisition Framework (DoD Instruction 5000.85), and the Military Services must also review whether they are following current policy,** consistent with the FY2022 National Defense Authorization Act (NDAA)[20] in which Congress repealed the statutory preference for FFP contracts.

6. **DoD and Congress must review and reform the requirements process.** Experienced DoD acquisition executives note significant work has been undertaken to reform acquisition and PPBE processes. However, the third leg – the requirements process – needs to be reformed. This is an important area for additional work.

Areas of Nonalignment

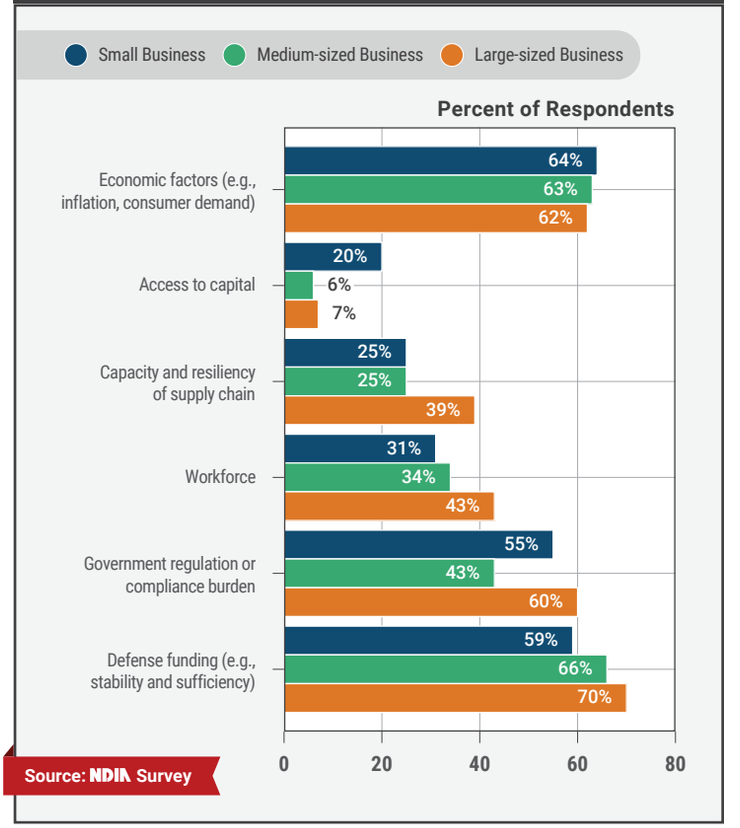
Unfortunately, the *Vital Signs 2025 Survey* questions regarding the private sector's views on business conditions also highlight that there remains nonalignment between the federal government and industry. For example, **only 20% of industry respondents think that defense contracting business conditions will be "somewhat or much better one year from now."** The private sector respondents also gave consistent answers for defense contracting conditions and non-defense federal contracting decisions.

The top three factors cited for influencing their answer mirror last year's responses: stability and sufficiency of defense spending (61%), economic factors, including inflation and consumer demand (59%), and government regulation and compliance burden (50%).[21] The results highlight the consequences of both the ongoing congressional delays in completing the appropriations bills and the Federal Reserve's economic management policies to deescalate historically high inflation levels (see Q25 Chart).

Question 25

What primary factors influence your answer above?

(What primary factors influence your assessment of business conditions in one year?)



U.S. DIB Financial Analysis

In recent years, concerns have been expressed whether U.S. DIB companies are responsibly managing their profits and free cash flow. NDIA members believe these concerns merit a thoughtful response and in-depth examination of the defense sector's profitability and financial decisions in comparison to similar industry sectors.

Vital Signs 2024 initiated this examination by analyzing the top U.S. DIB companies' operating margins, free cash flows, research and development (R&D), and CapEx to compare with the largest non-U.S. DIB companies, tech companies, and industrial companies for FY2022.[22] While an important first step analytically, a one-year analysis shows only a portion of the story. This report builds upon the work of *Vital Signs 2024* and expands the analysis to include the past five fiscal years (2019 – 2023) and adds dividends and stock repurchases (buybacks) to explore shareholder relations. This analytical period explicitly includes fiscal years before, during, and after the global Coronavirus 19 (COVID-19) pandemic, providing an accurate view of the impacts introduced by the pandemic as well as the associated economic recovery initiatives. This expanded analysis clearly shows that **due to operating in a market controlled and regulated by the U.S. government and DoD, the U.S. DIB operates at a disadvantage when competing with private sector competitors to secure capital.**

This analytical period explicitly includes fiscal years before, during, and after the global Coronavirus 19 (COVID-19) pandemic, providing an accurate view of the impacts introduced by the pandemic as well as the associated economic recovery initiatives.

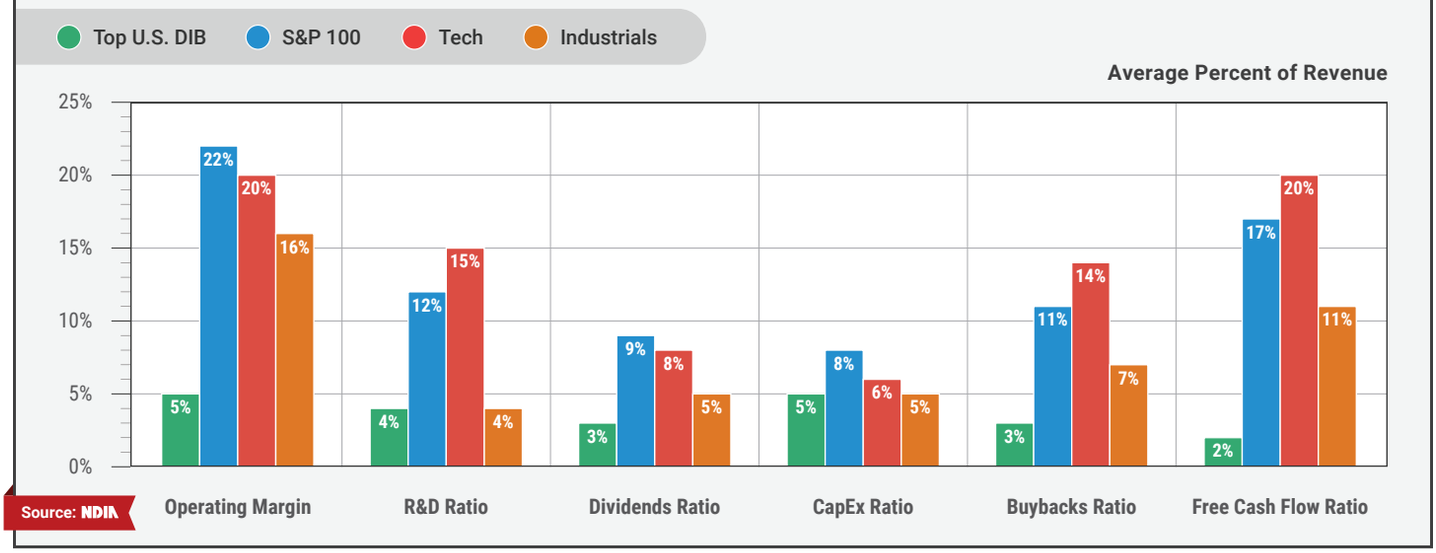
Economic Environment and Operating Margin

Operating margin, also known as return on sales, is used to indicate how efficiently a company generates profit and is calculated by dividing its earnings (revenues minus expenses and cost of goods sold) by its revenue.[23] Despite year-over-year variations, the top U.S. DIB operated with lower average margins over the past five fiscal years than other comparable industrial sectors.

As the chart on page 16 shows, while every other sector posted operating margins between 10 – 25%, since FY2019, the top U.S. DIB companies have not surpassed 10%. Essentially, the leading companies in the U.S. DIB are less profitable for every dollar of revenue than leading companies in the other compared sectors. This is in line with a recent DoD report that showed operating margins for the U.S. DIB between 8% and 10%.[24] Why is this the case? **The U.S. government sets the conditions that drive the U.S. DIB's competitive disadvantages. This is true due to three reasons.**

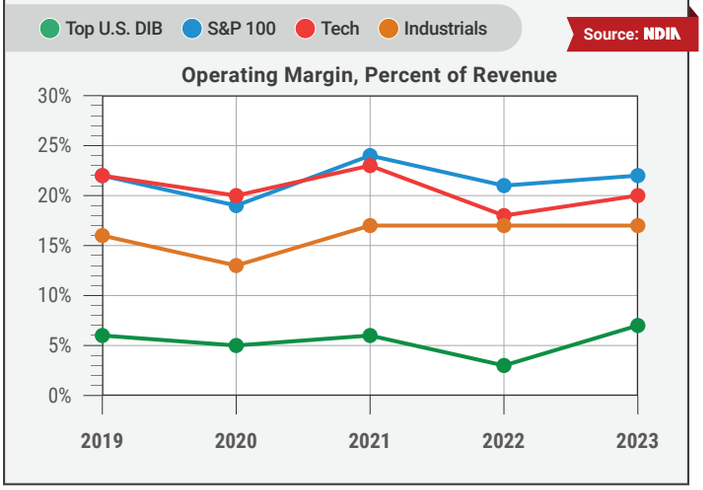
First, the U.S. defense sector is not primarily driven by market forces. The U.S. government is usually the U.S. DIB's only major customer and therefore traditional market forces do not control the demand, pricing, and design of the goods and services it buys from defense contractors in the U.S. DIB.[25] As an example, government contractors face restricted profits in a way that commercial industry does not. When commercial goods are sold in the commercial sector, company profits can be driven by several factors including utility of the goods, cost of production, or innovativeness of the product. The commercial customer can balance the cost of the good versus the value it brings. On the other hand, regardless of the value added by the product, federal contracting strictly limits the price of any good or service based on the cost of production and other allowable expenses (such as R&D).

Top U.S. DIB companies operated at a disadvantage from FY2019 - FY2023



Second, the U.S. DIB is highly regulated. Federal regulations are not inherently bad. They are intended to help ensure the U.S. DIB continues to deliver the goods, platforms, and services needed by our warfighters and to help protect the government and taxpayer money from misuse. However, analyzing their impact is key to understanding the economic realities facing U.S. DIB companies. Regulations limit how much contractors can profit from government contracts. They also require specific accounting and regulatory practices that drive increased operating costs for U.S. DIB companies.

The U.S. DIB's lower operating margin limits reinvestment



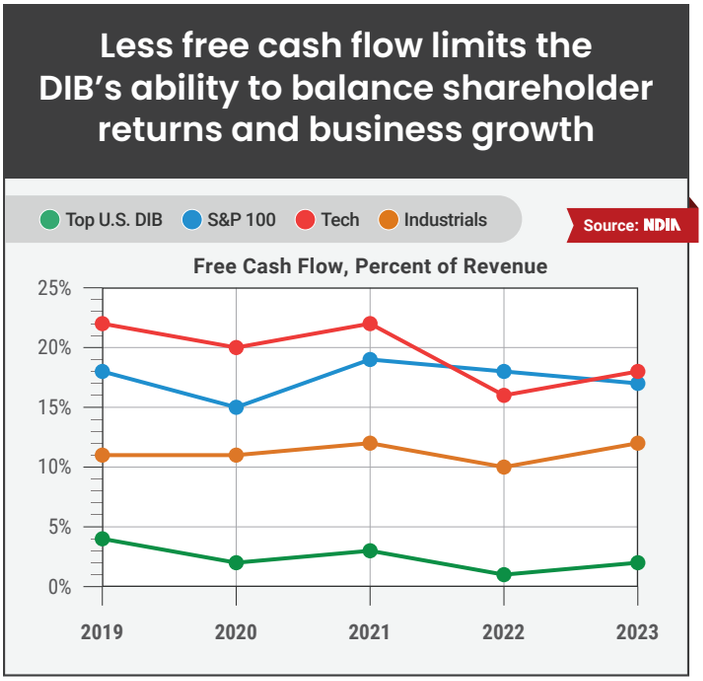
In addition, companies in the U.S. DIB "have invested in specialized accounting systems, cyber and information security systems" to comply with federal regulations.[26] Additionally, many workers in the U.S. DIB are required to acquire and hold security clearances. This reduces the size of available talent pools while increasing the cost to hire and retain the necessary workforce.

Finally, the U.S. DIB is heavily influenced by the U.S. government's complicated and bureaucratic budget and acquisition processes. While DoD and Military Services set their own priorities and requirements, all spending authorities – authorization and appropriation – reside with Congress. Congress utilizes these authorities on an annual basis, and only a limited number of contracts are funded for multiple years.[27] In addition, changes in presidential administrations often increase budgetary uncertainty and instability by introducing significant changes to budgetary directives and priorities. This complexity creates demand uncertainty, increasing the business risk U.S. DIB companies accept if they invest in new products, technologies, or capital before a contract is awarded.

All told, the conditions set by the U.S. government place the U.S. DIB at a disadvantage when compared to commercial counterparts. This operating margin disadvantage reduces the U.S. DIB's financial flexibility and its ability to match the financial performance of other economic sectors.

Incentives for Resource Allocation

Examining a company's free cash flow helps reveal how it allocates limited resources to balance the needs of shareholders and future business growth. From FY2019 through FY2023, the top U.S. DIB companies posted lower average free cash flow as a percent of revenue compared to other industry sectors. Specifically, the top U.S. DIB companies were never within 5% of free cash flow as a percent of revenue to the closest sector – S&P 500 Industrials.

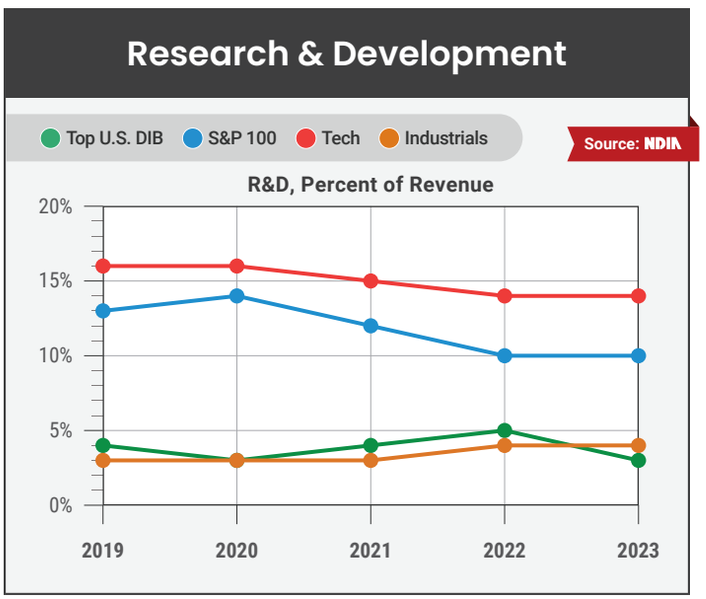


Greater free cash flow enables a company to better balance investing in its business (CapEx, R&D, IRAD, and mergers and acquisitions) with securing reasonable shareholder returns (dividends, stock buybacks, and debtor equity).[28] Companies also need to balance their relationships with their suppliers and employees, among other interests, but for this analysis, NDIA focused on business investments and shareholder returns.

By investing resources into its business, a company positions itself for greater future success and drives innovation. For example, a company can invest in R&D to develop new technologies to outcompete their market competitors. Through CapEx, it can expand or maintain their facilities and other capital assets essential to produce and deliver enough products and services to meet the demand of their customers. Investment in business growth is essential to the continued success of a company and the U.S. DIB's ability to meet warfighter needs with advances in tech. With less free cash flow, the U.S. DIB is relatively constrained in the breadth and scale of investments they can make compared to the other industry sectors included in this analysis.

Research & Development

As the chart below shows, the top U.S. DIB's reported R&D expenditures as a percent of their revenue mirrors the largest companies in the industrials sector and exceeds the percent of revenue industrials invested in R&D across four of the last five years studied. However, even though the top U.S. DIB companies are dedicated to delivering cutting-edge technologies to the warfighter, their R&D expenditure as a percent of revenue is lower than the leading tech companies. There are three reasons for this discrepancy.



First, as mentioned elsewhere in this report, competitive rates are limited by the policies and regulations of the U.S. government and DoD as well as competition from other contractors. In the private sector, companies can pass on the cost of all R&D into the prices for their products. A defense contractor can include reasonable costs for related R&D as indirect costs paid back to the contractor on a government contract.[29] However, allowable costs are limited legally and, more impactfully, competitively (see IRAD box on page 19).

Second, the tech sector's business model is centered on identifying and bringing the newest technology to the market before their competitors. That creates a shorter-term business cycle where rapid R&D is essential to a company's success.

Conversely, for the U.S. DIB, while innovation and technologies are still central to the success of the company, investing decisions are based on meeting contract requirements, not increasing commercial sales or other market forces. The result is a business model that tends to center around products with decades-long contracts instead of rapid innovation.

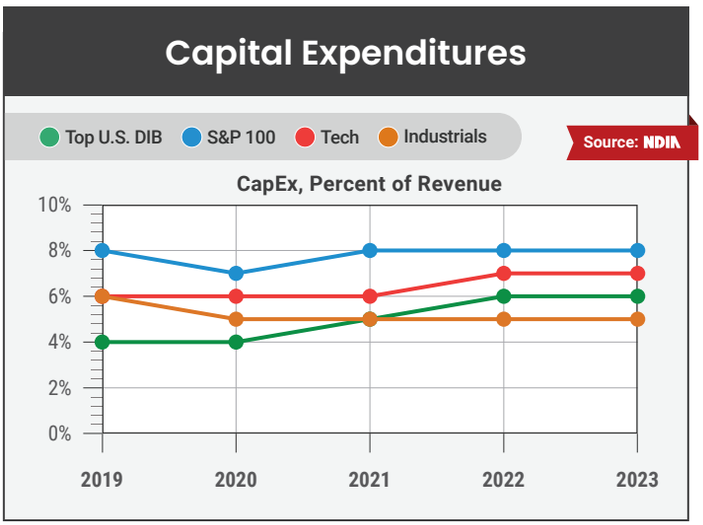
Finally, the U.S. DIB's lower operating margins continue to impact its resourcing decisions. If a business has greater profits, it can cover expenditures and investments using a smaller percentage of its revenue and can then allocate a greater percentage to R&D. With lower operating margins, top U.S. DIB companies can only devote a limited percentage of revenue to R&D.

Capital Expenditures

CapEx represents the smallest gap between the top U.S. DIB companies and other economic sectors. **In fact, despite increased risks, the top U.S. DIB companies committed a higher percentage of revenue to CapEx than the Industrials sector in FYs 2021, 2022, and 2023.**

U.S. DIB companies are often faced with the difficult choice to either invest in CapEx ahead of a contract award or lose the competition on the grounds that they would be unlikely to achieve accelerated schedule requirements. However, making the investment is not a guarantee that the company will prevail in the competition, placing the company in the position of carrying the financial loss of the invested CapEx along with the cost of any excess capacity created through the investment.

Additionally, CapEx is still constrained by regulations. Idle capacity is not an allowable cost on government contracts, disincentivizing the U.S. DIB from acquiring capital that cannot be used on existing contracts to meet tangible demand signals.

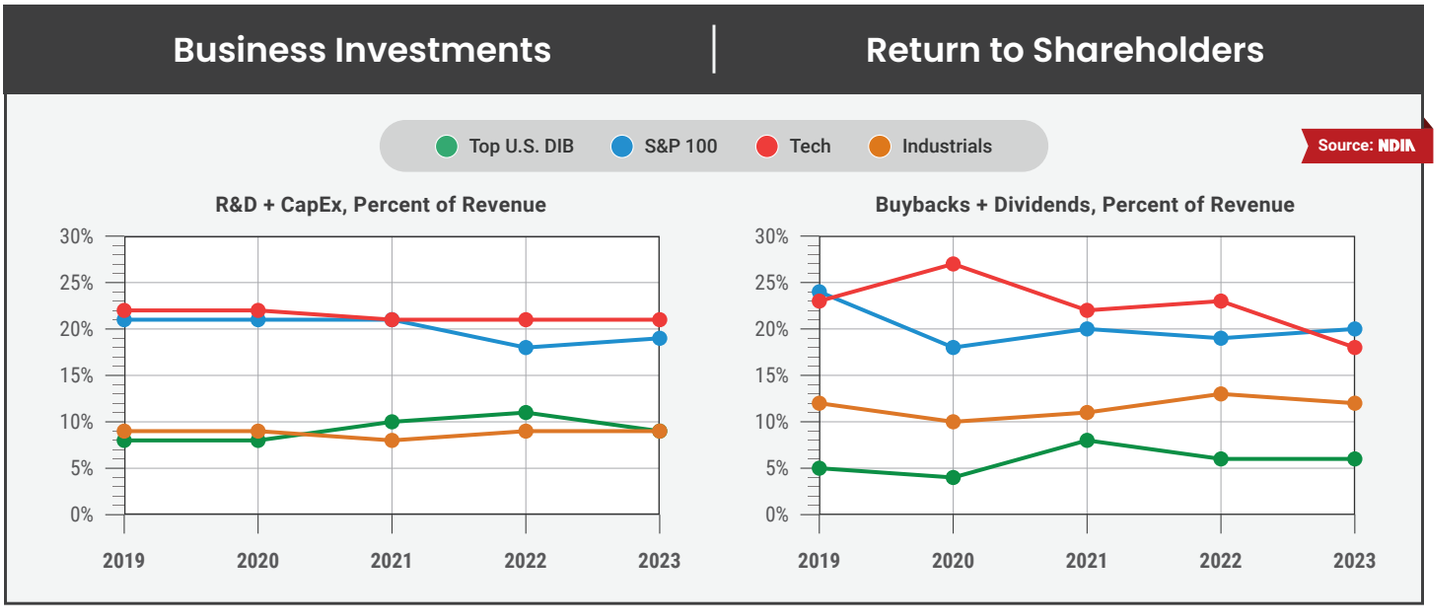


Shareholder Returns

All publicly traded companies, including those in the U.S. DIB, compete for access to capital. As the owners of a public company, shareholders have a significant influence on public companies' management teams and business strategy decisions. Within the traditional U.S. DIB, most shareholders are now institutional investors who own between 64 – 100% of the larger U.S. defense companies' shares.[30] Institutional shareholders typically invest globally and across multiple market sectors, and their focus is on measuring positive returns on invested capital. As a result, **publicly traded defense companies are in competition not just with each other, but with purely commercial companies for capital**. Many of the institutional investors have target rates of return, otherwise known as "hurdle rates," they must attain to stay invested. In addition, institutional investors are more likely to sell their equity holdings if the company is performing below annual return target rates.

In this context, the executive management teams of U.S. DIB companies are evaluated by their fiduciary boards and investors not only by how the company is performing against peers within the defense sector, but also by how the company is performing financially compared with other sectors. U.S. DIB companies' business strategies are driven by their legal fiduciary responsibilities to shareholders. Publicly traded companies' management teams utilize multiple tools to maintain a competitive return on investment to meet investors', especially institutional investors', expectations, including two of the financial measures highlighted in NDIA's analysis: stock buybacks and dividends.

Finally, companies in the U.S. DIB cannot pass along the cost of debt needed for production to the customer the same way non-U.S. DIB customers are able to do so in the consumer market, further reducing their options to increase attractiveness to investors.[31] Therefore, to continue to attract investors against non-U.S. DIB companies in the competition for capital, U.S. DIB companies must rely on satisfying shareholders with dividends and stock buybacks, among other actions.



Following the 2020 – 2021 global COVID-19 pandemic, top U.S. DIB companies increased the percentage of revenue returned to shareholders in stock buybacks and dividends. However, this increase did not impact the percentage of revenue allocated to R&D or CapEx. In fact, top U.S. DIB companies still return less to shareholders compared to other sectors. Both their return to shareholders (stock buybacks and dividends) and business investments (R&D and CapEx) are lower than both the top U.S. companies and top tech companies. As the charts show, the top U.S. DIB companies operated similarly to the industrial sector.

Across the board, these six key financial metrics present a clear view about the impacts of the market realities facing the U.S. DIB and the impacts of those realities on its profitability and allocation of financial resources. **Any examination of the financial health and profitability of the U.S. DIB requires an examination of the economic and regulatory realities contractors must operate under and the influence of the non-defense commercial markets, specifically in relation to the competition for capital.** With both factors considered, NDIA's analysis shows the U.S. DIB is working within constrained profitability to continue delivering the goods and services U.S. warfighters need in an era of increased great power competition.

Independent Research and Development

The National Science Foundation has done extensive work tracking the trends in R&D expenditures. Over the last 60 years, there has been a significant shift in R&D investments made by the federal government and the private sector. In 1964, federal R&D expenditures accounted for 67% of all domestic R&D investment and private sector R&D accounted for 31% of the investments.[1] By 2020, the roles had reversed, with private sector business accounting for 73% of domestic R&D and federal government investment accounting for 21%.[2]

This significant shift in R&D investments to the private sector has renewed public policy interest regarding U.S. DIB IRAD investments. The chart on page 17 shows the data regarding how the largest U.S. DIB companies compare with the largest non-U.S. DIB

1 National Center for Science and Engineering Statistics. *National Patterns of R&D Resources: 2021–22 Data Update*. NSF 24-318. National Science Foundation. Accessed December 11, 2024. https://ncses.nsf.gov/data-collections/national-patterns/2021-2022#data.

2 Ibid.

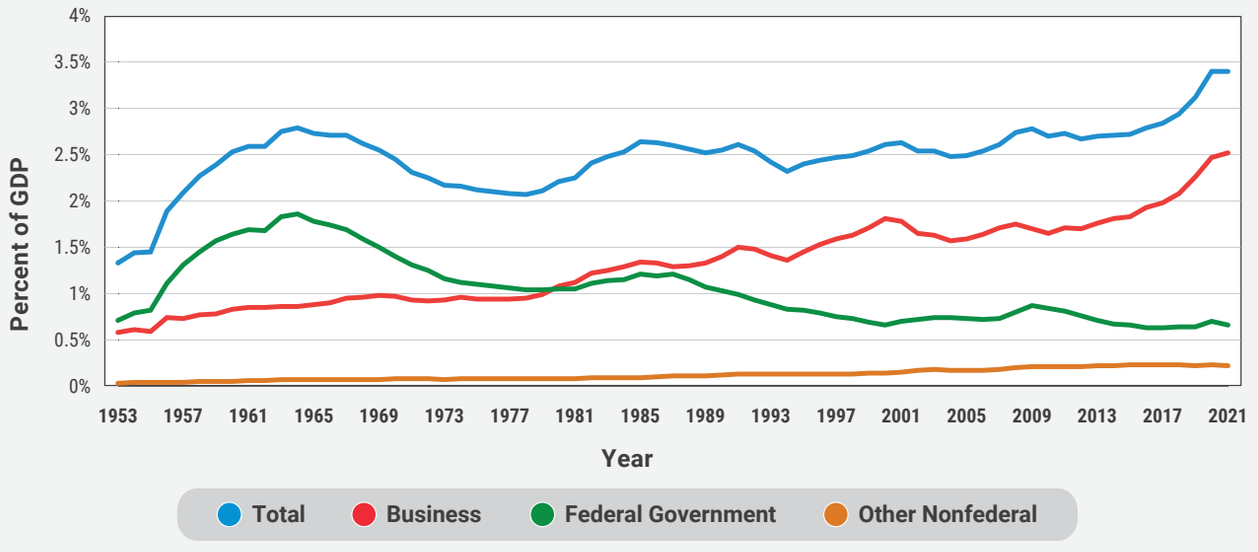
companies, non-U.S. DIB technology companies, and non-U.S. DIB industrial companies. The data shows a very different research & development strategy for top U.S. DIB companies compared to the top non-U.S. DIB companies and the top non-U.S. DIB technology companies. Taken out of context, inaccurate or incomplete conclusions could be drawn.

IRAD is work that companies invest in with their own funding to pursue strategic projects that have been identified as having high potential interest to DoD. There are two important factors that influence how and the extent to which U.S. DIB companies make IRAD investment decisions: (1) DoD, not the commercial market, is the customer, and (2) there are legal and competitive constraints.

First, U.S. DIB companies' IRAD investment decisions are tethered to DoD, their primary customer. Specifically, when searching for R&D opportunities, the U.S. DIB references the Defense Technical Information Center (DTIC), which identifies the top defense research priorities. Unlike the purely commercial sector, U.S. DIB companies' R&D investment decisions are driven by its customer, not by market forces. More directly, from a business perspective, U.S. DIB companies will only pursue the research opportunities their government customer identifies. This not only limits the research options, but it also in most cases precludes the ability to recoup R&D costs by selling the realized development to the commercial sector.

Dating back to 1970, Congress recognized the validity of defense companies' business decisions regarding IRAD, which is why current law provides for reasonable costs for certain IRAD to be charged as indirect costs on a government contract.[3] But there are legal and competitive boundaries on the invoiced costs. To protect taxpayer interests, U.S. DIB companies operate under regulations governing these invoiced costs. Legally, the invoiced costs must be found to be "allocable and reasonable" by both the contracting officer and the relevant audit authorities.[4]

R&D Investment Trends



Source: National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

3 P.L. 91-441. Covered activities include: basic research; applied research; development; and systems and other concept studies that has a potential relationship to military function or operations. For further information, see: FAR 31.205-18. *Independent research and development and bid and proposal costs.*

4 FAR 31.205-18(c). *Independent research and development and bid and proposal costs.*

In addition, there are also competitive factors that influence how much U.S. DIB companies invoice IRAD costs. Specifically, IRAD is recovered through the price U.S. DIB companies charge the government. Therefore, even if the contracting officer and audit authorities deem the invoiced costs "allocable and reasonable," there is an upper limit to stay cost compliant.

The combination of government oversight and competitive restraint provides effective governance in the application of the decades-old IRAD authority.

Novel Approaches and Flexible Pathways

The rapid deployment of the latest advancements in technology and capabilities with military applications to deter and, if necessary, prevail in conflict is critical. To maintain the U.S.' technological asymmetric advantages, **DoD must utilize all the authorities at its disposal, including novel contracting vehicles and flexible pathways with a balanced approach that spurs additional capability and capacity and promotes innovation across both traditional and nontraditional companies of all sizes.**

Attracting Nontraditional Contractors, Clearing Pathways for Traditional Contractors

Despite DoD's efforts and reforms in recent years to attract more innovative companies into its ecosystem, it is still challenging for companies outside the traditional U.S. DIB to do business with the Department.[32] **Attracting and retaining new entrants, academic institutions, and small businesses – along with the innovative technologies and capabilities they bring to the Department – is a critical element to building a modern, diverse, and resilient U.S. DIB**. While DoD and Congress have signaled through various reforms the importance of increasing business opportunities for small companies and nontraditional contractors, the majority of contract dollars still go to the top defense contractors. With the new Administration and 119th Congress, policymakers are expected to focus on ways to attract additional nontraditional defense contractors (NTDC) into doing business with DoD.

A NTDC is defined as an entity that "is not currently performing and has not performed, for at least the one-year period preceding the solicitation of sources for DoD...any contract or subcontract that is subject to full cost accounting standards (CAS) coverage."[33]

When a company is classified as a NTDC, numerous government regulations are not required in comparison to a traditional defense contractor (TDC). These differences ultimately affect costs, flexibility, innovation, and how quickly acquisition solutions can be fielded.

Major regulatory differences between TDCs and NTDCs include:

- **CAS:** TDCs must follow CAS, which place significant requirements beyond Generally Accepted Accounting Principles (GAAP) and, therefore, require separate and costly systems to maintain. NTDCs do not have to follow CAS.
- **FAR and DFARS:** The Federal Acquisition Regulation (FAR) and the Defense Federal Acquisition Regulation Supplement (DFARS) contain thousands of pages of regulation that drive significant cost, personnel, and infrastructure requirements on TDCs in order to comply. NTDCs' FAR and DFARS requirements are greatly reduced and, in some cases, completely eliminated.

- **OTA:** Other Transaction Authorities (OTAs) reduce regulatory requirements for both TDCs and NTDCs, but the requirements are not the same. For example, NTDCs do not have cost-sharing requirements. While a TDC can utilize an OTA, it needs to cost share (33%) unless its product team includes an NTDC who "participates to a significant extent." NTDCs do not have cost-sharing requirements.
- **Commercial Determination:** NTDC products and services can be deemed commercial[34] and thereby avoid significant regulation, including regulations restricting profitability. This does not apply to TDC products and services.
- **Cost and Pricing Data Requirements:** NTDCs are not subject to cost and pricing data requirements once their products or services are deemed commercial. This accelerates acquisition timelines and reduces costs.
- **Software:** Software solutions can be purchased more easily when under commercial procedures that apply to NTDCs.

DoD, Congress, and the defense ecosystem are at a critical juncture. One area of common agreement between government and private sector companies – both TDCs and NTDCs – is that it is time to shake things up. **The current system is too slow, too burdensome, and antithetical to the speed and flexibility innovation requires.** At the same time, one of the most important lessons of the last few years has been internalizing the opportunity costs of allowing major sectors in the U.S. DIB, that were not the priority over the last 35 years, to atrophy. **The danger with the emerging policy debates is the potential for framing a zero-sum approach that pits established defense contractors against nontraditional contractors.**

Such an approach would be a fallacy. A better approach is to tackle the current paradigm, which is deeply flawed. **It is counterintuitive to criticize TDCs mirroring the sclerotic acquisition process and government regulations with which they must comply.** Over time, as they become more successful, the current FAR and DFARS will force NTDCs to take on similar infrastructure of TDCs to be compliant. **Rather than creating exceptions to policies, regulations, and authorities that give quick starts to NTDCs – but not help them as they grow – the conversation needs to focus on reducing the regulatory burden, sharing more risk between the government and the contractor, and allowing for more open competition**. The current acquisition paradigm requires a seismic shift to create an unencumbered pathway accessible to all U.S. DIB participants: TDCs and NTDCs alike. **Failing to create this accessible pathway will eventually subject the NTDCs, as they become TDCs, to the same morass of requirements that policy exceptions have been created to bypass**.

The tools that DoD uses to attract NTDCs into the defense market work equally well to retain TDCs of all sizes and clear a path for them to innovate and compete.

Finally, **to best safeguard and attract new entrants and unleash the innovation of the U.S. DIB, DoD must take a fuller account of the acquisition authorities already available to it, as many flexibilities exist in statute.**[35] DoD senior leaders must track and confirm the use of these authorities, examine compliance requirements, and enable the application of novel concepts to disrupt the reliance on default approaches.

Failing to create this accessible pathway will eventually subject the nontraditional defense contractors, as they become traditional defense contractors, to the same morass of requirements that policy exceptions have been created to bypass.

Recommendations:

Short-Term

7. **DoD and Congress must rethink the approach to acquisition strategies to ensure the most streamlined and appropriate contract vehicles are offered to all offerors.** It is counterintuitive that traditional contractors should be subject to less favorable terms and conditions because they have an established history of compliance with policy, statutory, and regulatory requirements.
8. **DoD must employ the full range of contract vehicles, including cost contracting. While there is a temptation to focus on firm-fixed price and commercial contracts, these contract vehicles are not necessarily the most effective approach for complex and exquisite platforms and munitions.** In recent years, not only have traditional and nontraditional contractors been adversely impacted by DoD awarding the wrong contract vehicle for the desired acquisition, but, more importantly, DoD and the warfighter do not benefit when the wrong contract vehicle leads to delays in schedule, increased costs, and suboptimized performance.

Medium-Term

9. **DoD must commence a focused review to harmonize and streamline the layers of compliance requirements.** This must start with an industry engagement to nominate compliance requirements to target. While a review of acquisition processes that do not require a change in statute can start quickly, the biggest regulatory changes will require Congress to act.
10. **In the FY2026 NDAA, Congress must direct DoD to analyze the differing requirements placed on traditional contractors and nontraditional contractors** to determine where aligning requirements would result in more rapidly fielding advanced capabilities and increasing capacity and innovation while balancing the needs to attract and retain non-traditional, small business, and academic contractors.

Long-Term

11. **DoD must examine and implement the best practices of the Adaptive Acquisition Framework.** A&S is currently collecting data concerning the appropriate use of the framework and should leverage the current congressional authorities that have already been provided.

Pillar 1: Prioritizing Sufficient and Stable Budgets

While defense spending is sizeable, it is not the driver of U.S. national debt and is at a near-record low as a percentage of the U.S. economy and declining. Since the conclusion of the Cold War, the U.S. has significantly decreased defense spending as a percent of the U.S. federal budget[36] and U.S. GDP.[37] For example, observing the trend line, national defense spending as a percentage of U.S. GDP dropped 50% from 6% to 3% from 1986 to 2023 and is projected to drop to 2.8% by 2029.[38]

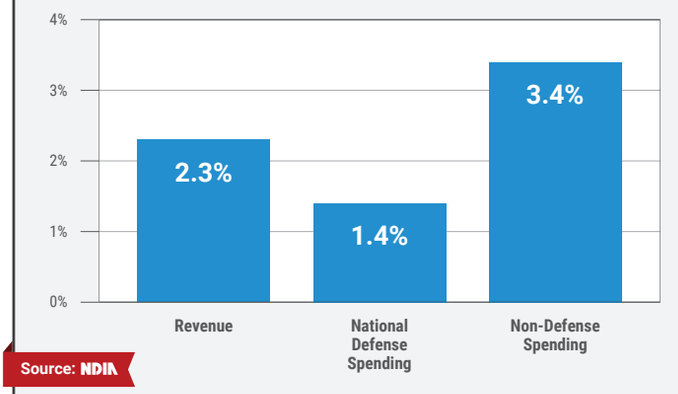
Compounding the challenge, the Fiscal Responsibility Act (FRA) also placed spending caps on the federal departments and agencies, including DoD, for FY2024 and FY2025. Therefore, the FY2025 budget request of $849B for DoD represented a less than 1% increase in funding over FY2024, as the request aligned to the FRA caps.[39] In addition, the budget request did not account for inflation. The result, with inflation considered, represents an actual reduction in defense funding. **This is why NDIA members strongly endorse congressional efforts to increase defense spending during the FY2026 appropriations process.**

Unlike their peers in the commercial sector, U.S. defense companies are tethered to annual congressional funding and defense resourcing decisions. Stable funding is critical to DoD and the federal acquisition process, including its ability to attract and retain private sector investments in R&D, advancing technological innovation, needed production capacity, supply chains, and a skilled workforce. Stable funding is also critical to ensure our warfighters have the platforms, equipment, and services they need to conduct their missions and to maintain their competitive advantage against any potential adversary.

Average Annual Growth Rate of Revenue & Spending from 1979 to 2023[40]

Constant FY2017 Dollars

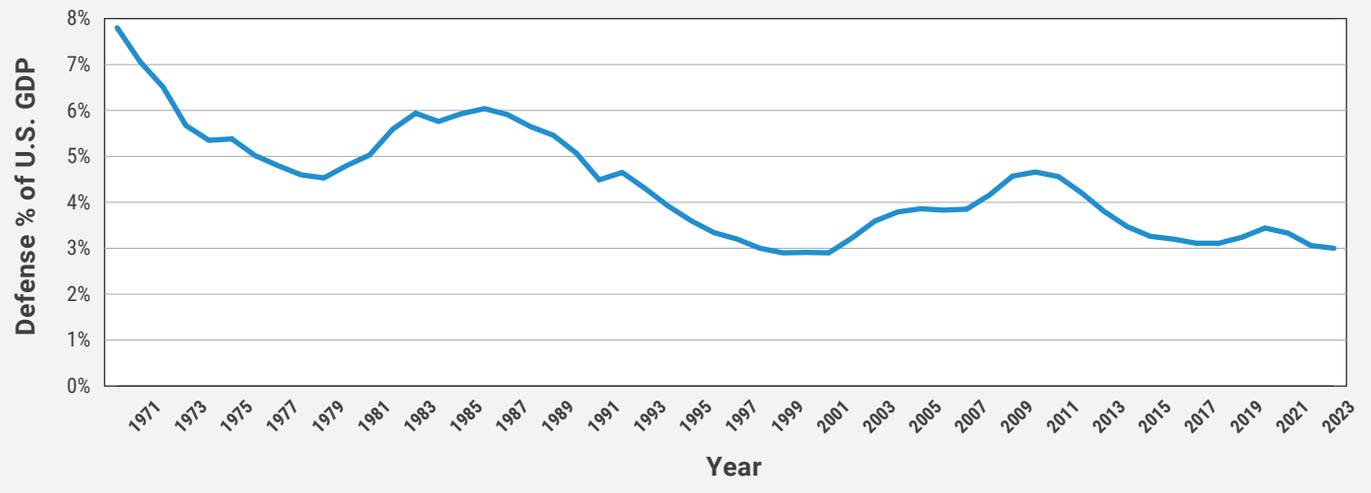
In 2023, there would be a surplus of $570B versus the actual deficit of $1.7T if federal spending had grown at the rate of defense spending (in current dollars).



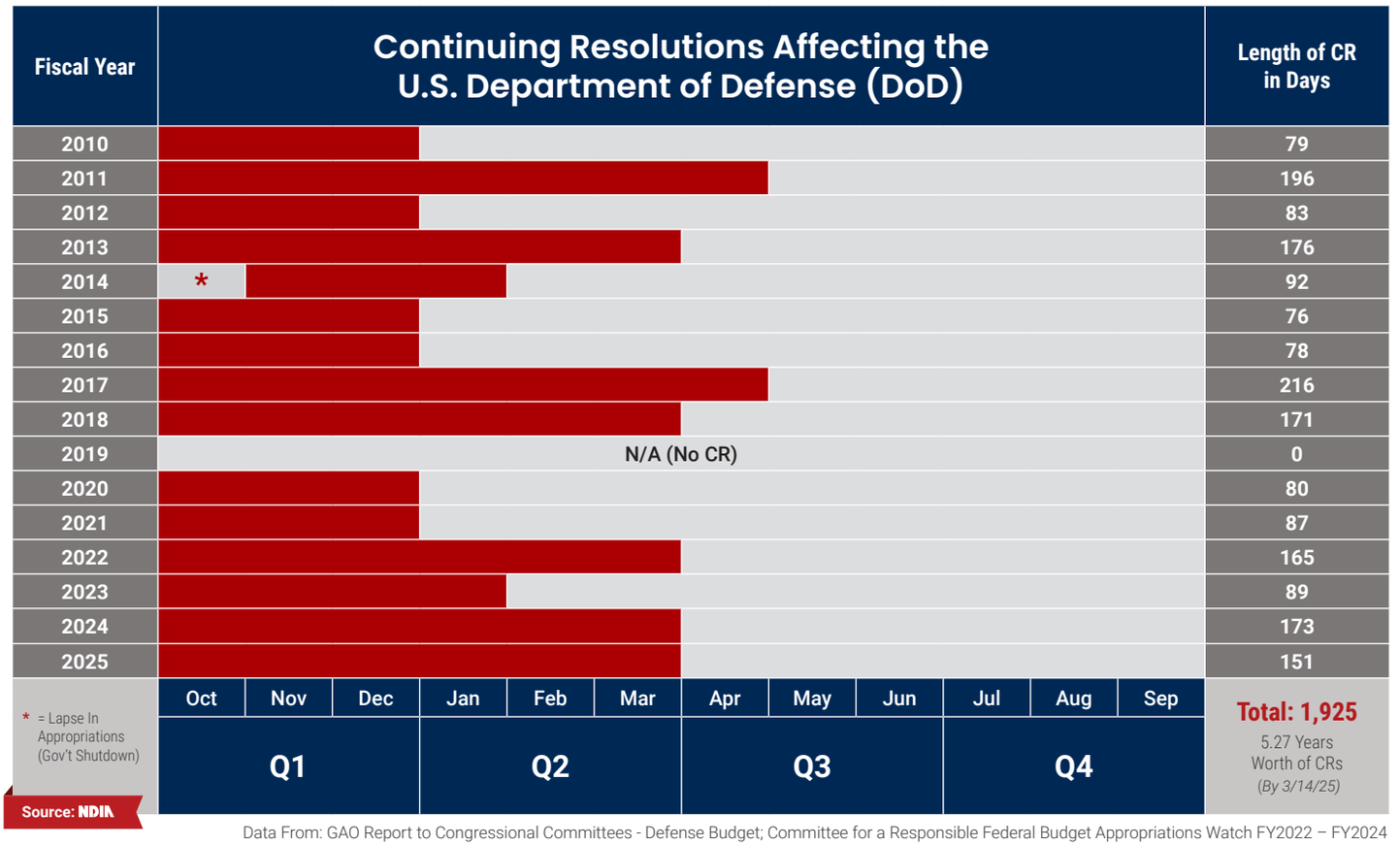
Source: NDIA

Data from: OMB Historical Tables 1.1, 1.3, 3.1, 8.6, & 8.8.

Decades of Declining DoD Spending (1970 - 2023)



Data from: OMB Historical Tables 1.2 & 3.1



Data From: GAO Report to Congressional Committees - Defense Budget; Committee for a Responsible Federal Budget Appropriations Watch FY2022 – FY2024

Conversely, continuing resolutions (CRs) and government shutdowns have a significant negative impact on our national security. **Every week DoD is under a CR or shutdown is an additional week the United States provides the PRC and other near-peer competitors with uncontested time to erode the U.S. military's operational competitive advantage.** CRs and funding disruptions have a significant negative impact on our national security and the U.S. DIB as they inhibit U.S. innovation by prohibiting new starts, disrupt production of strategic platforms (including ships, submarines, and aircraft), exacerbate shortfalls in munitions, and cancel or curtail essential training and equipment maintenance and sustainment.

Unfortunately, DoD and the U.S. DIB have endured budget instability for 15 of the last 16 years as the federal government operated under a CR for part of the year. **On December 4, 2024, the U.S. government hit the grim milestone of operating under a CR for the equivalent of five years since FY2010.**

Impact of Funding Disruptions and Stop-Work Orders on U.S. DIB Companies

Under a CR, the federal government's resourcing authority, including DoD's, is limited to maintaining the same rate of spending for current activities and provides no authority, without explicit congressional authority,[41] to begin new programs or initiatives. A CR puts pressure on the entire defense ecosystem, especially for technology start-ups, small businesses, and middle-tier suppliers, as DoD's planning assumption under CRs is to build a six-month delay into contract obligations after the final budget is approved.

> "The CR stopgap measures are wasteful to the taxpayer ... [and] damage the gains our military has made in readiness and modernization. Ultimately, a CR is good for the enemy, not for the men and women of the U.S. military."[42]
>
> - The Honorable David L. Norquist, 34th Deputy Secretary of Defense

The combination of CRs and unstable DoD planning assumptions creates unpredictable free cash flow situations for U.S. DIB companies, requiring them to stretch their reserves to pay their employees and to keep critical nodes of their supply chains viable. In addition, post-pandemic interest rates due to inflation are still elevated,[43] making the cost of capital more expensive and limiting options for U.S. DIB companies seeking loans. **While companies prefer a CR to a government shutdown, the hidden cognitive trap is while government institutions, including the Pentagon, have adjusted their processes to insulate themselves – to the extent possible – from instability, the impact on the U.S. DIB remains acute.**

Therefore, the current appropriations environment complicates decision-making for many U.S. DIB companies. These circumstances leave companies with little flexibility in resolving their cash flow challenges other than to temporarily or permanently lay off employees. The challenges are compounded when companies receive stop-work orders from DoD. While some companies can shift employees to other work or to assign them to complete paid training requirements, not all companies can do so, and no company can do so indefinitely.

For these reasons, for the last three years, **NDIA has tracked the number of industry respondents that have received a stop-work order during a CR or shutdown in its annual *Vital Signs* report series. It should come as no surprise that this number increased from 22% in the *Vital Signs 2024 Survey* to 31% in the *Vital Signs 2025 Survey*, a 9-percentage point increase reflecting a time when the government was under a CR for nearly six months**. In addition, government respondents reported the same increase in issuing stop-work orders over the two years.

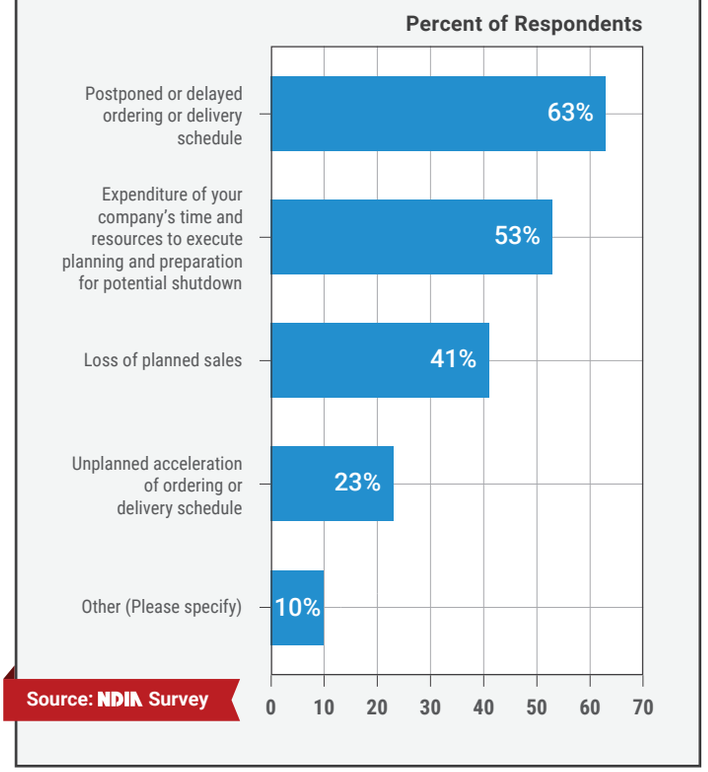
NDIA also asked industry respondents about the challenges their companies experienced as a direct result of preparing for government shutdowns. The top challenges reported in the *Vital Signs 2025 Survey* were (see Q27 Chart):

- Postponed or delayed ordering or delivery schedule (63%)
- Expenditure of your company's time and resources to execute planning and preparation for potential shutdown (53%)
- Loss of planned sales (41%)
- Unplanned acceleration of ordering or delivery schedule (23%)

When accounting for the size of the business, the postponed or delayed ordering or delivery schedule was still the top challenge for small businesses (62%). In addition, the loss of planned sales had a larger impact on small businesses (54%) when compared to medium-sized businesses (38%) and large-sized businesses (36%).

Question 27

Has your business experienced any of the following as a direct result of preparation for a potential government shutdown? *(Select all that apply)*



Impact of Funding Instability on DoD Acquisitions and Operations

In addition to wasting money, CRs also waste time. Since FY2010, Congress has included additional language in every CR to further restrict "DoD's use of amounts appropriated through the CR to initiate new production of items, increase production rates above those sustained in the prior fiscal year, or initiate multi-year procurements (MYP) using advance procurement funding for economic quantity orders."[44] Multi-year contracts and procurement authorities for long-lead parts are essential contracting mechanisms to replenish and increase munition stockpiles. **These contracting mechanisms are also critical to keeping strategic submarine construction schedules – which have little margin for error in replacing legacy capacity – on track.**

Leading up to the series of FY2025 CRs, DoD highlighted that a six-month CR would likely force reductions in military personnel, prohibit the award of multi-year procurement contracts for the CH-53K (Heavy Lift – 321 engines) and Virginia Class submarines, and delay nearly $8B in funding to modernize the nuclear triad. Additionally, a six-month CR would inhibit 168 new start efforts and 101 procurement rate increases, including the Army's Multi-Domain Artillery Cannon System (MDACS), the Navy's AIM-9X Sidewinder and Rolling Airframe Missile, the Air Force's B-52 Radar Modernization Program (RMP), the Nuclear Enterprise, LGM-35A Sentinel modifications, and the Space Procurement, Integrated Operations Network.[45]

Further, DoD detailed how a FY2025 CR ending in March is "far too close" to the April 30, 2025, deadline for a permanent sequestration order under the FRA. According to the FRA, since Congress failed to enact all 12 full appropriations acts by January 1, 2025, it started a process that could result in a $42B cut to DoD's FY2025 budget on April 30, 2025, unless reversed by Congress.[46]

Recommendations:

Short-Term

12. **Congress must enact the FY2025 DoD Appropriations Act as soon as possible.**
13. **The Military Services must ensure that the request for MYP authorities make sense from a business strategy perspective.** This should include an assessment of supply chain risk factors for critical parts and components, and a funding profile that allows industry to responsibly manage a surge in production, including workforce and capital investments.

Medium-Term

14. **Congress must enact the full-year FY2026 DoD Appropriations Act before September 30, 2025.**
15. **Congress must provide flexibility to DoD to respond to developing circumstances and take advantage of emerging opportunities should it enact a further CR.** As proposed by the PPBE Commission, this includes (1) permitting select new starts under a CR, in the limited circumstances where the program to be initiated is included in the President's Budget request (PBR) and has not been disapproved in an authorization or appropriations bill under consideration in either chamber, and (2) allowing increased program quantities and development ramps in the same limited circumstances.[47]

Inflation

Since the early 1990s, inflation was managed close to the Federal Reserve's target of 2%, as measured by the Personal Consumption Expenditures (PCE) price index, until supply and demand disruptions spurred by recent events caused inflation to rise rapidly.[5] Overall inflation peaked above 7% in June 2022, which was the highest level since 1981.[6]

The Federal Reserve responded to this high inflation rate by rapidly raising short-term interest rates, which have been kept above 5% for most of 2024. As a result, although inflation has started to move back closer to the Federal Reserve's target rate of 2%, the higher interest rates are still increasing the cost of capital for companies, which makes borrowing money more expensive.[7]

In *Vital Signs 2024*, NDIA noted that the issue of historic inflation levels was consistently cited as an ongoing concern across U.S. DIB sectors.[8] **Many companies highlighted both pre-pandemic and post-pandemic challenges managing unplanned inflation escalation, which in turn heightened suppliers' risk aversion to committing to future long-term contracts.** Companies with pre-pandemic contracts reported significant labor and material cost increases above planned inflation escalation on long-term FFP delivery contracts. U.S. DIB companies also reported that they had been struggling to retain employees and current suppliers,[9] had lower productivity and increased costs, and several reported extending delivery schedules to manage the financial viability of current contracts. These cost increases negatively impacted contractors who had limited opportunities for contract modification and/or an Economic Price Adjustment (EPA).

Small businesses particularly highlighted the challenges caused by the impacts of the highly inflationary environment on their ability to provide and hold pricing for labor and materials. Additionally, small business owners reported that inflation had a significant impact on the lowest price technically acceptable (LPTA) sourced contracts. This caused some small businesses to consider increasing their indirect rates, including accounting for new compliance costs, when bidding for new contracts, which they assessed put them at a disadvantage with larger companies, who, with more complex operations, had more options to appropriately spread indirect rates across multiple cost pools.

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5 Congressional Research Service. *Inflation in the U.S. Economy: Causes and Policy Options*. Marc Labonte and Lida Weinstock. R47273. October 6, 2022. https://crsreports.congress.gov/product/pdf/R/R47273.

6 Congressional Research Service. *Why Is the Federal Reserve Keeping Interest Rates "High for Longer"?* Marc Labonte. IN12388. July 3, 2024. https://crsreports.congress.gov/product/pdf/IN/IN12388.

7 Ibid.

8 *Vital Signs 2024*. National Defense Industrial Association, April 4, 2024. https://www.ndia.org/policy/publications/vital-signs. Page 48.

9 The competition for labor, including wage and salary competition, is discussed elsewhere in this report.

Pillar 2: Advancing DoD Digital Modernization and Transformation

The future character of war focuses on the use of emerging and disruptive technology, such as artificial intelligence (AI); offensive and defensive cyber security; autonomy for unmanned platforms; fifth generation (5G) and future generation (FutureG) communications and information technology; hypersonics; quantum computing; and directed energy. There will also be a shift from a single domain being the predominant domain of conflict to multi-domain conflict, including in space and cyberspace, which will play more prominent roles in the initial phases of any potential conflict. This will drive significant shifts in DoD's budget prioritization including: new concepts of operations ("how we fight"); more experimentation and prototyping; and renewed focus on partnerships with cutting-edge technology leaders, especially those adjacent to the traditional defense industrial base.

Winning the race to maintain the U.S.' technological competitive advantage requires deeper analysis of debates around the policies and authorities for these technologies. Getting the balance right will make or break whether DoD can successfully buy and integrate new technology at speed and scale fast enough to preserve and, where necessary, expand the U.S. military's technological competitive advantage. It will also have profound impacts on the ethical use of technology and whether the laws, policies, and regulations governing U.S. DIB companies incentivize both TDCs and NTDCs, as well as continue to attract new entrants.

Intellectual Property and Data Rights Issues

Over the past decade, the legal and regulatory framework governing IP rights and the management of these rights has undergone careful reform to balance the legitimate needs of both DoD and industry.[48] The importance of this balance is evident in the core principles of DoD's IP policy, which directs the Department to "negotiate specialized provisions when it better aligns DoD and industry interests" and to "respect and protect IP resulting from technology development investments."[49]

The NDIS Implementation Plan's Initiative #6 for Intellectual Property and Data Analysis does recognize the importance of industry collaboration and adequate training across the acquisition workforce.[50] However, it is concerning that the Department's overall posture for IP and data rights within the Implementation Plan is to pursue further ambiguous legislative and regulatory changes when many of the legislative reforms that have already been passed over the past ten years have yet to be implemented. **DoD misses a key tenet that by respecting the private sector's IP rights and more closely aligning with commercial practices, DoD will incentivize investment and provide the Department with greater access to the most advanced technological innovations.**

IP and data rights are crucial to the companies that design, manufacture, apply, and maintain the cutting-edge technologies, systems, and platforms our armed forces rely upon to deter aggression and defend our nation and its interests. However, there are many innovative companies that are still hesitant to contract with or offer their most advanced technologies to the Department out of fear of losing their IP, and this fear is growing.

In NDIA's *Vital Signs 2025 Survey*, 37% of private sector respondents said their company decided not to include certain technologies in bids because of IP concerns, which is an increase of 9 percentage points over the 2024 survey (see Q32 Chart on page 30). **In addition, over one-third (36%) of private sector respondents chose not to bid on certain DoD contracts out of fear DoD requirements for IP would put their company's rights at risk, which is an increase of 14 percentage points over last year's survey** (see Q30 Chart on page 30). Over one-half (54%) of the private sector respondents that chose not to bid identified as small businesses. In one highlighted case, one of two competitors was removed from a competition due to their unwillingness to relinquish data rights, resulting in a sole-source environment going into final proposals submittal.

In addition, 38% of private sector respondents also reported that their company has been told they have to offer at least Government Purpose Rights (GPR) in software or technical data required to be delivered (see Q31 Chart on page 30).

A GPR license means the government has the right to "use, modify, reproduce, release or disclose the technical data or computer software within the Government without restriction and outside the Government for a Government purpose."[51] This can include the release or disclosure of technical data or computer software to private sector competitors.

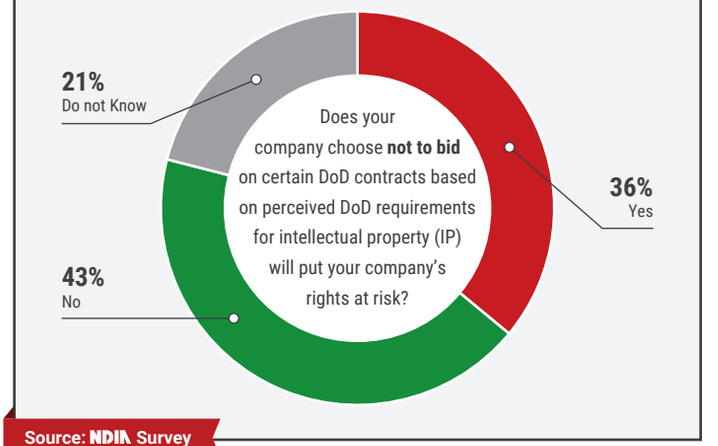
When a company develops new technology, it has potential future value, not only to the Department but also the commercial market. **If a business fears it may lose its IP, which could potentially be the "crown jewel" underpinning the entire company, the business may simply choose not to contract with DoD and protect its future value on the commercial market.** Alternatively, the company may decide to develop two different versions of a product: one for the government and one for the commercial sector. This could result in a better product going into a commercial offering or to another commercial entity that may or may not be willing to sell to the government, depending on outside investor decisions.

As the *Vital Signs 2025 Survey* demonstrates, both scenarios discussed above leave the Department without access to certain new technologies and highlight the imperative to maintain the balance of serving the needs of DoD while protecting IP rights and not driving away industry. **Protecting IP rights not only fosters innovation and attracts new suppliers to the defense industrial base, but also ensures DoD has continued access to crucial information and technical data needed to support military equipment throughout its lifecycle.** In essence, respecting and protecting the private sector's IP rights safeguards the Department's own long-term interests.

Modular Open Systems Approaches (MOSA)

One area where the protection of IP and data rights is an active discussion is in connection with the Department's efforts around MOSA.[52] Congress began citing the benefits of "modular, open architectures" as early as 2009.[53] By 2016, Congress mandated that all major defense acquisition programs be designed and developed with a modular open system approach, meaning systems should be built with interchangeable, modular components.[54] The proposed MOSA rule for DFARS Case 2021-D005 has prompted further discussion of how IP and data rights can be protected under MOSA and how these efforts can be aligned with existing commercial practices to enable the Department to realize the benefits it is seeking to achieve.[55]

Question 30



Source: NDIA Survey

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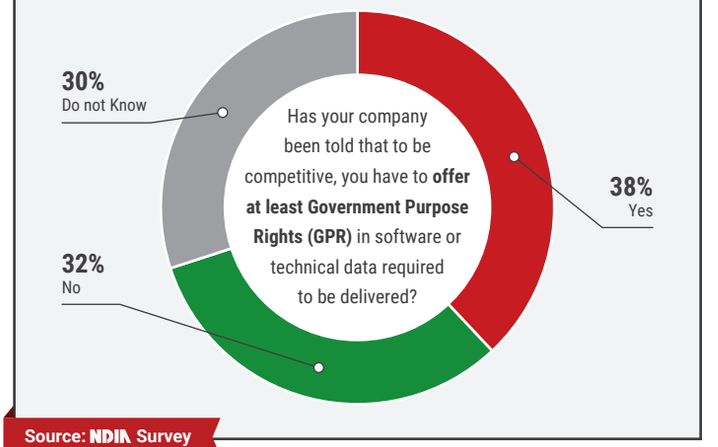
Question 31



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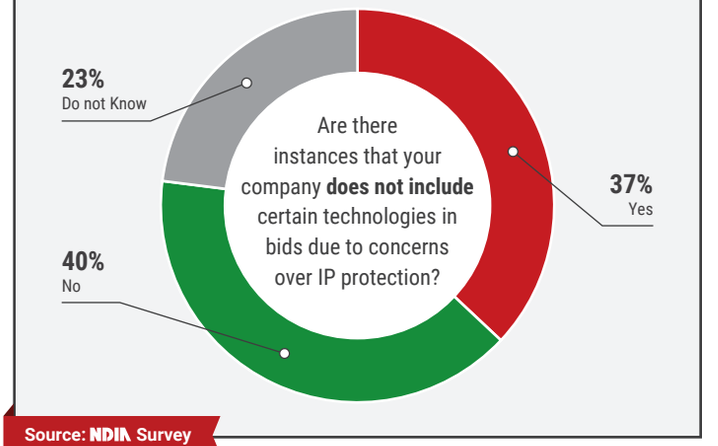
Question 32



Source: NDIA Survey

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Industry sees value in modular open systems approaches as they can foster competition, innovation, rapid upgrades, continued industry investment, and DoD access to commercial technologies. **However, if MOSA were to be implemented at too low of a level, such as inside the proverbial "black box," it would prevent many of the positive outcomes the Department is seeking,** as it would conflict with how industry already develops products commercially with existing business models.

It would benefit the Department to frame the related requirements to aim for modularity at a level compatible with the commercial marketplace. In the case of commercial software, DoD should focus on the already-available external interfaces instead of implementing MOSA in such a way that would expose internal interfaces within a software component and extract additional data rights from industry partners. Further, the Department should not penalize small businesses or private investment from any company by disfavoring the IP rights more aligned with the commercial market, including limited rights, restricted rights, or commercial terms, or those included under the Small Business Innovation Research (SBIR) program.

Technical Data Rights and Existing Commercial Practices

Another area of industry concern is the potential expansion of the types of technical data or software to which the government is entitled to unlimited rights. In DFARS Case 2021-D005, DoD proposed to establish a new definition of form, fit, and function software that would put commercial and privately-funded software architecture and internal interface information at risk of being delivered with unlimited rights – a result that is fundamentally at odds with commercial market practices.[56] **Industry also has concerns about protecting sensitive digital engineering and manufacturing data.**

Existing commercial practices can provide a pathway to demonstrate how software interoperability can be achieved without requiring contractors to hand over commercial or privately funded source code or expanding the scope of technical data or software to which the government is entitled to "unlimited rights" by regulation. One way this is achieved is through external Application Programming Interfaces (APIs) between software components (rather than internal interfaces within software components). APIs are how software components "talk" to each other, and they exist at many levels, including in both public and private applications. Commercial companies utilize external APIs to provide access to another party's data, applications, or systems without the need to share sensitive internal APIs or source code. This approach leverages the benefits of MOSA in a way that aligns with industry practices, which can help to attract commercial suppliers to the U.S. DIB.

The most effective way for DoD to maximize access to IP is to ensure the Department is a fair, collaborative partner with industry in the shared mission to provide U.S. servicemembers with the most advanced, best-maintained equipment possible. And when it comes to MOSA implementation, less is more. **The resounding feedback from industry to DoD has been to refocus MOSA implementation on less invasive solutions that align with commercial market practices.** The more companies seek to work with DoD, the more access the Department will have to capabilities that are innovative, cutting-edge, and driven by IP.

Recommendations:

Short-Term

16. **Congress and the Department must ensure that the IP Cadres, IP contracting specialists, and IP training programs are adequately resourced within the Department and across the Military Services to increase collaboration with industry and ensure that IP contracting specialists are available to manage the contracting workload in a consistent manner.**
17. **The Department must more closely align the definitions and functionality of the rule(s) with commercial market best practices for DFARS Case 2021-D005 (MOSA) and future rulemakings concerning IP and data rights.**
18. **Congress and the Department must avoid proposing new legislation impacting intellectual property until the legislative reforms already passed into law have been fully implemented and evaluated in practice.**

Cybersecurity

Technological advancements offer tremendous economic and national security benefits to our nation, but our increasingly interconnected world also incentivizes sophisticated adversaries to hunt for opportunities to exploit vulnerabilities to their advantage. From an economic and security perspective, the U.S. must protect our nation's critical data and networks.

Our pacing competitor and near-peer competitors work every day to steal commercial and personal IP, extract financial and health information, and undercut the U.S. military's competitive advantage on the battlefield. For these reasons, NDIA and our member companies long ago committed to the necessity of security for the data and systems that power the U.S. DIB, as well as the platforms, infrastructure, and services that support our nation's warfighters. Simultaneously, to avoid extraneous costs and burdens on industry, NDIA has been attentive to focusing resources and efforts to prioritize protecting the critical information and systems that truly matter.

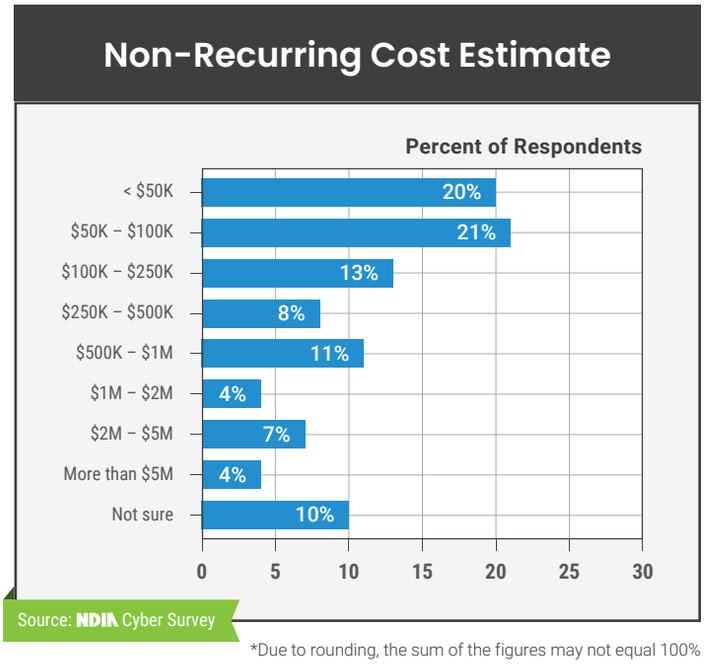
Cybersecurity Maturity Model Certification (CMMC)

The continued flux and uncertainty in scope, uneven application of DoD cybersecurity requirements, and the lack of a well-understood implementation plan have been longstanding causes of uncertainty for NDIA member companies. Since 2017, defense contractors have been required to protect controlled unclassified information (CUI) in accordance with requirements defined in National Institute of Standards and Technology (NIST) SP 800-171, Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations.[57] Subsequently, in 2019, DoD sought to require verification that a company fully complied with the required cybersecurity standards through the CMMC program, moving away from a self-attestation model to a model requiring companies to hire third-party assessors to certify compliance.

After several years and multiple iterations of rulemaking, the Department released the final rule for the CMMC program on October 15, 2024, which became effective on December 16, 2024.[58] **As the defense industry moves forward with implementation of CMMC, many companies are still facing uncertainty and questions surrounding the program, especially regarding cost.**

Cost of Implementing NIST SP 800-171

According to DoD's estimates, the private sector will face an annualized cost of $4B to implement the CMMC program. The rule also estimates a cost of more than $100,000 for three years of compliance for even small companies.[59] However, the Department's cost estimates are just related to the assessment and certification of the standards – they do



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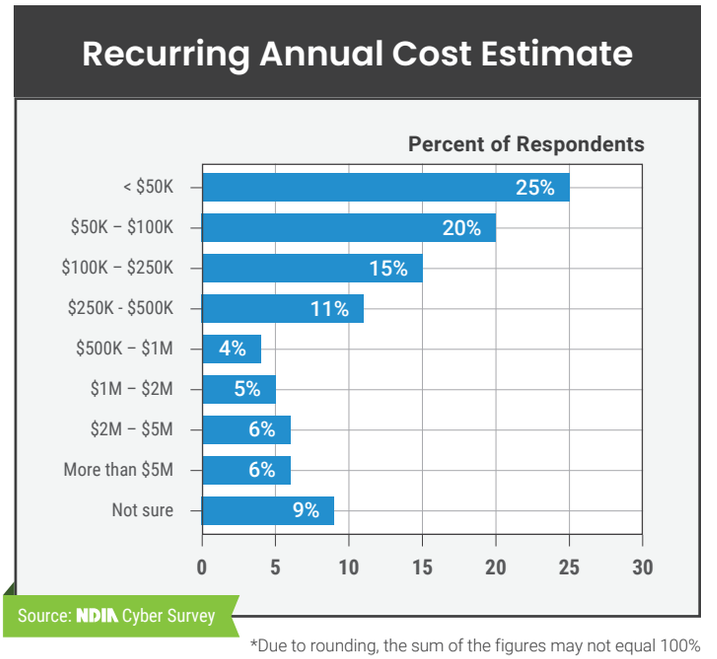

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not include the cost of meeting the actual NIST SP 800-171 standards, something that the Department never estimated prior to release but are costs DoD "deemed necessary" in 2017.[60] **Without knowing the full costs, it can be difficult for industry partners, especially small businesses and nontraditionals, to make a fully informed business decision of whether to conduct business with DoD, which can become a large barrier to entry.** To help shed light on some of these barriers, NDIA conducted a *DIB IT and Cybersecurity Survey* (Cyber Survey) in 2024, separate from the *Vital Signs 2025 Survey*.

The purpose of the Cyber Survey is to understand the current private sector approaches to and investments in information technology (IT) and cybersecurity, as well as the economic and business impacts of DoD's current cybersecurity requirements. Additionally, the intent is to help inform the Department where future IT and cybersecurity efforts are most needed, especially for small businesses.

One of the specific questions asked by the Cyber Survey was the organization's estimate for the total non-recurring costs and annual recurring costs to implement and maintain the NIST SP 800-171 standard unrelated to the costs of CMMC assessment and certification. As derived by the charts on page 32, in relation to the initial non-recurring costs of implementing the 110 security requirements specified in NIST SP 800-171, the Cyber Survey respondents reported that:

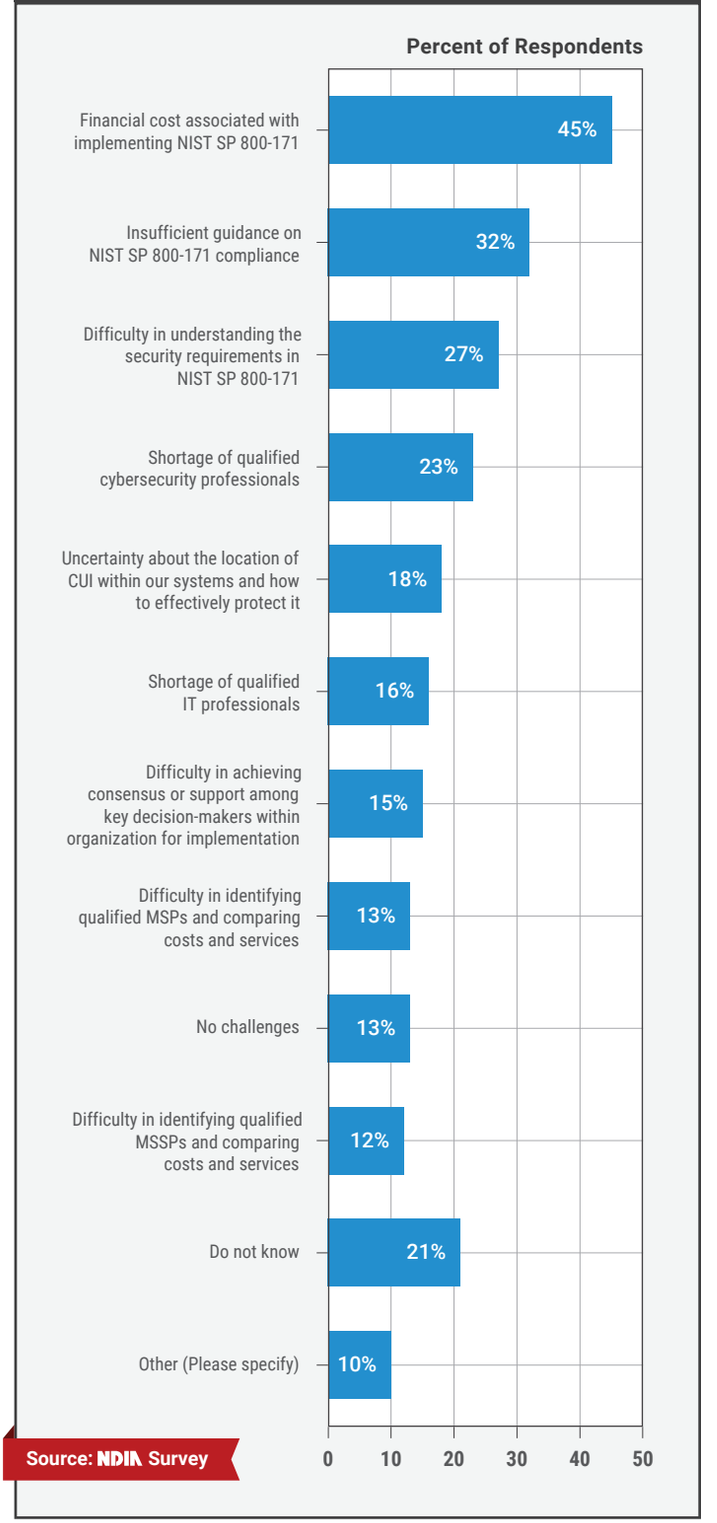
- Nearly one-half (49%) spent more than $100,000
- 28% spent more than $500,000
- 16% spent more than $1M
- 12% spent more than $2M
- 4% spent more than $5M

Even after the initial implementation costs, companies need to spend substantial resources to maintain and stay in compliance with the security requirements. For the annual costs of maintaining the security requirements specified in NIST SP 800-171, the Cyber Survey respondents reported that every year:

- 45% spend more than $100,000
- 20% spend more than $500,000
- 16% spend more than $1M
- 11% spend more than $2M
- 6% spend more than $5M

Question 38

If any, what are challenges that your organization faces in implementing the security requirements in NIST SP 800-171 to manage Controlled Unclassified Information (CUI), i.e. the security standards related to the CMMC program? *(Please check all that apply)*

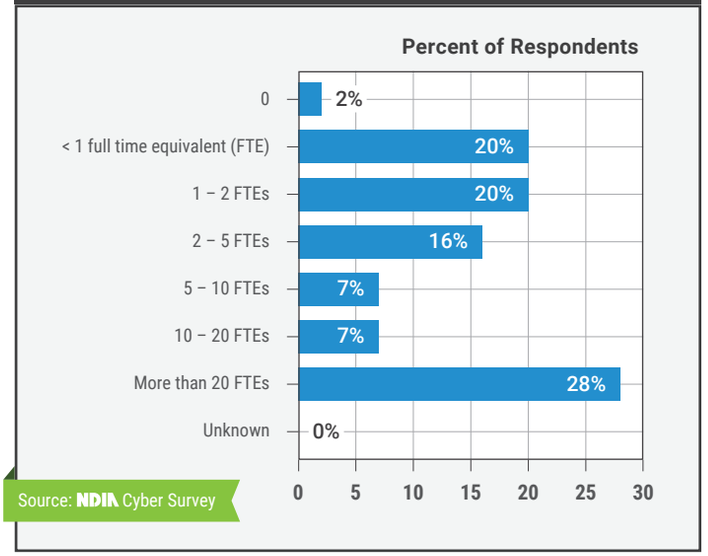


When asked about the top challenges that respondent organizations face in implementing the security requirements in NIST SP 800-171, the top four cited include the financial cost (65%), insufficient guidance on compliance (46%), difficulty in understanding the security requirements (38%), and shortage of qualified IT professionals (38%). These findings were echoed in an identical question asked in the *Vital Signs 2025 Survey*, with the financial cost associated with implementing NIST SP 800-171 as the top answer, cited by 45% of the private sector respondents (see Q38 Chart on page 33).

It is also interesting to note in the Cyber Survey that 22% of the respondents have less than one full-time equivalent employee who manages or supports IT for the organization, and over 31% of the respondents have less than one full-time equivalent employee who manages or supports the organization's cybersecurity efforts. **Despite the challenges of complying with DoD cybersecurity standards, many organizations do not have a full-time person on staff to manage these efforts.**

Aside from impacts on contractors, there are also impacts on the Department itself. Companies can include their compliance costs in the pricing of their products and services. **As currently implemented, CMMC will add significant cost to every major weapons system and service contract, especially as a higher percentage of U.S. DIB companies raise their level of compliance with the underlying NIST standards and expend additional resources toward this effort.** This will also be true when the industry shifts from Revision 2 of NIST SP 800-171 to Revision 3, which will require contractors to implement and comply with additional cybersecurity standards.[61] As implementation continues, there could also be additional management costs incurred by the Department that are not currently being adequately accounted for in budget planning assumptions. Since DoD topline is not expected to increase significantly over the next several years, these increases in expenditures will reduce funds available for other important priorities.

Number of Employees who Manage or Support IT



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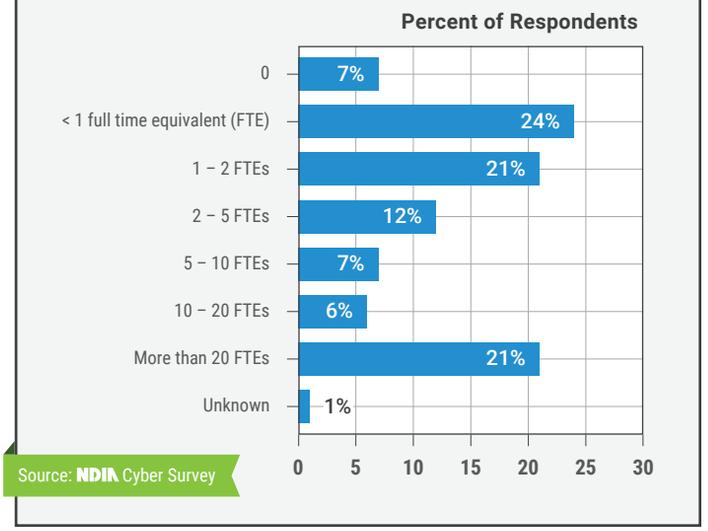
Number of Employees who Manage or Support Cybersecurity
(i.e. in addition to those who manage or support IT)



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CUI Program

An additional important consideration for policymakers is the CUI program itself. The risk management goals of CMMC are fully dependent upon the ability of government and industry to effectively manage and safeguard defense-sensitive CUI. Effective management, however, is only possible with clear, accurate identification of what information requires protection, consistent government marking of CUI prior to the transmission of such CUI, and clear instruction to the contractor when their performance under a contract will create defense-sensitive CUI.

Industry continues to highlight several instances where inconsistencies, ambiguities, and inaccuracies within the current CUI marking process lead to confusion, increased costs, and decreased security for all parties. Although contract requirements for CUI have been in place since 2017, a May 2022 report from the Government Accountability Office (GAO) found that DoD was not fully compliant with CUI requirements across four areas, including categorizing DoD CUI systems accurately and implementing the CMMC's 110 security requirements.[62] A subsequent DoD Inspector General audit report released on June 1, 2023, confirmed that "[a]lthough the Office of the Under Secretary of Defense for Intelligence and Security (OUSD[I&S]) established CUI guidance, DoD Components did not effectively oversee the implementation of that guidance to ensure that CUI documents and e-mails contained the required markings and that DoD and contractor personnel completed the appropriate CUI training."[63]

Contract Data Requirements Lists (CDRLs) and Security Classification Guides (SCGs) are existing tools used to communicate sensitive information about contractual data so that all participants are on the same page about identification and marking. These tools are underutilized by the government for CUI contracts, leaving contractors without information necessary to identify CUI for the contract.

While the CMMC program is largely managed by the Office of DoD Chief Information Officer (CIO), CUI is largely under the purview of OUSD(I&S), which establishes policy and oversees DoD Information Security Program. Outside of DoD, it is the National Archives and Records Administration (NARA) which is the federal government's Executive Agent for CUI, overseeing the CUI Program through its Information Security Oversight Office (ISOO).

As industry continues to move forward with implementation of CMMC, it will be important for policymakers within the Department, Congress, and other stakeholders to be mindful of the challenges facing industry and to identify ways to assist those that are below the "cybersecurity poverty line."[64] **Understanding the costs to contractors to safeguard information is an essential element to ensure that companies, especially small businesses and start-up companies, are not regulated out of their ability to support the Department and its missions.** It will also be important for policymakers to remain mindful and plan for the impact in other areas, including the increasing cost of weapons systems, the management of the CMMC program, and the overall CUI program itself.

Harmonization of Cybersecurity Compliance Across DoD and Federal Government

The harmonization of cybersecurity compliance requirements across all DoD branches and the federal government is essential for effective risk management and operational efficiency. As an example, the federal government relies on NIST information security standards and guidelines, such as SP 800-53, SP 800-171, and their revisions,[65] as the foundation for cybersecurity compliance among government contractors. However, these NIST standards are dynamic and will continue to evolve in response to technological advancements and emerging threats. Despite their status as "living" documents, there is a notable absence of guidance on how future updates will be integrated into regulatory frameworks and contractor compliance.

This lack of clarity has raised concerns within the industry, particularly regarding the recent changes in Revision 3 of SP 800-171, which among other things significantly increase the number of organization-defined parameters (ODPs).[66] ODPs are included in certain security requirements and can vary by the specific government/DoD solicitation, contract, program, Military Service, sites, and/or contracting officer. While each ODP provides added flexibility for a federal agency, the variability and subjectivity in applying these ODPs can further exacerbate costs, reduce operational efficiency, and heighten risks, ultimately hindering the capability of the warfighter. By limiting the number and variability of ODPs applicable to defense contractors, the federal government can enhance consistency, reduce confusion and costs, improve oversight, and allow industry to focus on mitigating cyber risks rather than navigating complex compliance requirements. To address these challenges, it is crucial for DoD and industry stakeholders to collaborate in developing a streamlined process and timeline for implementing changes in NIST standards and to actively work together to harmonize cybersecurity requirements across the federal government.

Recommendations:

Short-Term

19. **DoD must engage in a formalized process with industry and across the federal government to establish clear, consistent CUI identification and marking guidance.**
20. **DoD must work to align and lessen the regulatory burdens for cybersecurity incident reporting and software attestation across the federal government.**
21. **Any clause which includes CMMC Level 2 or higher requirements must also include instructions to the contract officer to provide a CDRL or SCG which identifies CUI for the contract.**
22. **Congress and the Department must work to enact provisions that support companies unable to adequately invest in cybersecurity protections, including tax credits and Small Business Administration (SBA) guaranteed loans.**
23. **Congress must analyze directing NARA to streamline and simplify onerous CUI markings requirements, and instead require that a CUI marking must be handled in accordance with CUI requirements to re-focus CUI expenditure on securing IT systems, rather than on non-value added, onerous markings.**

Artificial Intelligence and Autonomy

AI and Machine Learning (ML) are general-purpose technologies that can be leveraged across a broad range of use cases that offer tremendous benefits to our society and national security. Today, major industries are utilizing AI to improve their product and service offerings to consumers, including everything from email spam filters to autonomous vehicles.

DoD identifies AI as a technology with disruptive potential for defense capabilities and highlights it as a critical technology area for enhanced attention and investment.[67] **AI, ML, and autonomy are all poised to drive the military technological innovation needed to equip our warfighters with AI-enabled systems to improve the speed, quality, and accuracy of decisions in the field, which can provide the decisive advantage needed to deter or win a fight.**

Although the history of AI can be traced to the 1950s, it has recently made rapid technological advancements, and the AI market is projected to grow significantly in the coming years.[68] However, there are many in industry still working to determine how AI can be incorporated in their products and services.[69]

In the *Vital Signs 2025 Survey*, private sector respondents were asked what percentage of their company's defense products or services incorporate the use of AI. Close to 13% reported they use AI in more than one-quarter of their defense products, close to 18% reported they use AI in 15% to 25% of their defense products, but nearly 70% reported they use AI in less than 15% of their defense products (see Q35 Chart on page 37).

Private sector respondents were also asked what percentage of their company or business unit's work involves the use of AI in procurement. Close to 8% of respondents use AI for procurement in more than 25% of their work, 13% of respondents use AI for procurement in 15% to 25% of their work, and 79% of respondents use AI for procurement in less than 15% of their work (see Q34 Chart on page 37).

Real-World Impacts and the Future of Warfare

The war in Ukraine has served as a proving ground to show the potential real-world implications of AI-enabled systems on military operations, especially with decision-support, intelligence analysis, and targeting.[70] Attritable AI-powered drones, autonomous vehicles, and other AI-enabled systems are not able to fully replace soldiers and exquisite systems and platforms on the battlefield, but they are already rapidly changing the character of war and how our Military Services might engage in future fights.[71] The Department and the Military Services are continuing to move forward with efforts to harness AI and autonomous technologies to meet the challenges of the evolving

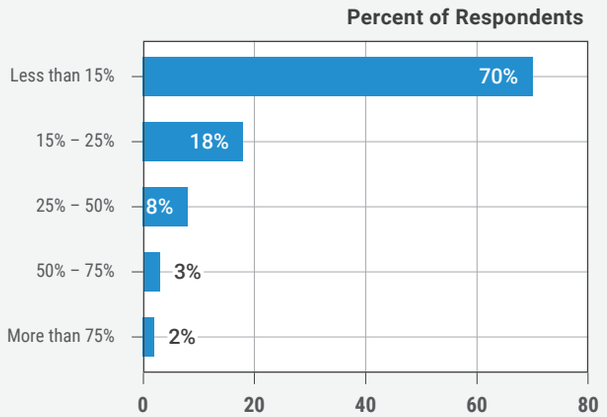
battlefield, including with two notable programs, Replicator and the Collaborative Combat Aircraft (CCA).

The Replicator initiative was announced at NDIA's Emerging Technologies Institute (ETI) Emerging Technologies for Defense Conference & Exhibition in August 2023. Led by the Defense Innovation Unit (DIU), Replicator's first line of effort is to field all-domain, attritable autonomous systems, including autonomous aerial, ground, surface, sub-surface, and/or space systems representing a range of capabilities and mission sets. Announced in September 2024, the second iteration of Replicator will focus on production capacity, technology innovation, authorities, policies, open system architecture and system integration, and force structure.[72]

Another high-profile autonomous program is the U.S. Air Force CCA program, which is intended to produce thousands of large UAVs that will fly alongside new and existing crewed aircraft. The UAVs are expected to perform a diverse set of missions including electronic warfare; intelligence, surveillance, and reconnaissance; dogfighting; and more.[73] With the CCA, the Air Force is taking an innovative approach with the acquisition process by not giving overly prescriptive requirements and instead giving industry space to focus on operational outcomes. Additionally, there is an explicit focus on preserving continuous competition to allow for new entrants, and the acquisition pathways for hardware and software have been separated.[74] The goal is to field a fully operational capability before the end of the decade by making a competitive production decision for the first increment of CCA in FY2026.[75]

Question 35

What percentage of your company's defense products or services incorporate the use of artificial intelligence?

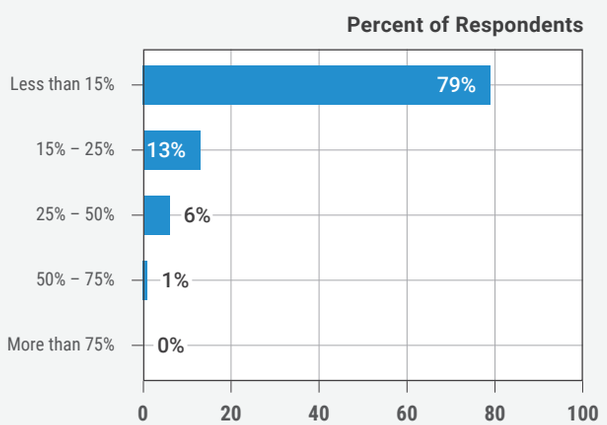


Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Question 34

What percentage of your company or business unit's work involves the use of artificial intelligence in procurement?



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Balancing Innovation, Investment, and Responsible Use of AI

DoD also underscored AI's critical role in national security with its release of the 2023 Data, Analytics, and Artificial Intelligence Adoption Strategy, which prioritizes speed of delivery, continuous learning, and responsible development to leverage AI's potential for safeguarding our national security interests globally.[76] Additionally, in May 2024, DoD released a request for information entitled "Defense Industrial Base Adoption of Artificial Intelligence for Defense Applications" to help develop policies, initiatives, and resource distribution in support of the U.S. DIB in integrating AI into defense systems.[77]

Read NDIA's comments on DoD's AI RFI at
www.NDIA.org/DIBAdoption

The DoD AI Adoption Strategy and U.S. DIB AI RFI both highlight the important role that the U.S. DIB will play in advancing innovation with AI and autonomous systems. However, there

are many considerations, foundational investments, and decisions that will need to be made to ensure government and industry are able to advance at speed and scale.

With such a broad range of possibilities for AI application, it is important for the Department to provide guidance on which mission areas it believes are most important and/or ready for AI investment and which areas it either does not want or does not believe are essential for these efforts. Setting that direction will allow companies to apply their ingenuity toward solving our nation's most pressing challenges.

Despite the expected growth in the AI market and the growing impact AI will have on future military operations, DoD's unclassified investments in AI are still relatively small in relation to its overall budget. However, these investments have only grown from just over $600M in FY2016 to approximately $1.8B in FY2024, with the Department maintaining over 685 active AI projects.[78] Additionally, AI technologies often require a platform approach to development, requiring significant investment.

The nature of AI has also sparked several questions and issues that have increased the demand for policymakers to shift their attention to this innovative tool across the federal government with an eye on establishing potential guardrails and regulations around AI's development and deployment. Over the last several years, the Department has launched several efforts to bolster the lawful and ethical uses of AI. In June 2022, DoD released its Responsible Artificial Intelligence (RAI) Strategy and Implementation Pathway[79] that highlights 64 lines of effort for operationalizing DoD's AI Ethical Principles that were adopted in 2020.[80]

In addition, in November 2023, the Chief Digital and Artificial Intelligence Office (CDAO) released the RAI Toolkit that "provides users a voluntary process that identifies, tracks, and improves alignment of AI projects to RAI best practices and the Department's AI Ethical Principles, while capitalizing on opportunities for innovation."[81] The FY2024 NDAA also requires DoD to report and remediate AI technologies that are not compliant with the RAI framework and to discontinue the use of noncompliant technologies "until effective remediation is achievable."[82]

The opportunities for applying AI technologies are effectively limitless. However, meeting the Department's mission requires a diverse set of stakeholders and industry partners with access to critical technology.

Recommendations:

Short-Term

24. **Congress and the Department must increase investment in critical AI and autonomous technologies and utilize all acquisition pathways to ensure our warfighters have access to the most innovative and cutting-edge tools.**
25. **Congress and the Department must establish contracting mechanisms and acquisition strategies that respect and protect privately developed intellectual property to the greatest extent possible and focus on acquiring only those technical data deliverables and license rights necessary to accomplish the specific definitive goals of the government at hand**, given the significant current and future investments necessary by industry to develop AI and autonomous systems.
26. **Congress and the Department must establish financing mechanisms that support not just the development of models and algorithms but also the development of software/AI systems needed to continuously enhance and develop new AI models and capabilities.**
27. **Policymakers must ensure that any AI regulatory proposal takes a risk-based approach that targets harms raised by specific applications of AI systems in high-risk use cases.** Proposed regulations should focus on specifically defined use cases (rather than a general definition of "high-risk") to enable clear legal analysis and an efficient development process.
28. **Congress must evaluate expanding 10 USC 4023 Authority to allow transitioning experimental prototypes into production**, which gives Program Managers and others greater ability to test, field, and compete a capability, which will rapidly save time and money.

Areas of Concern for Small Businesses

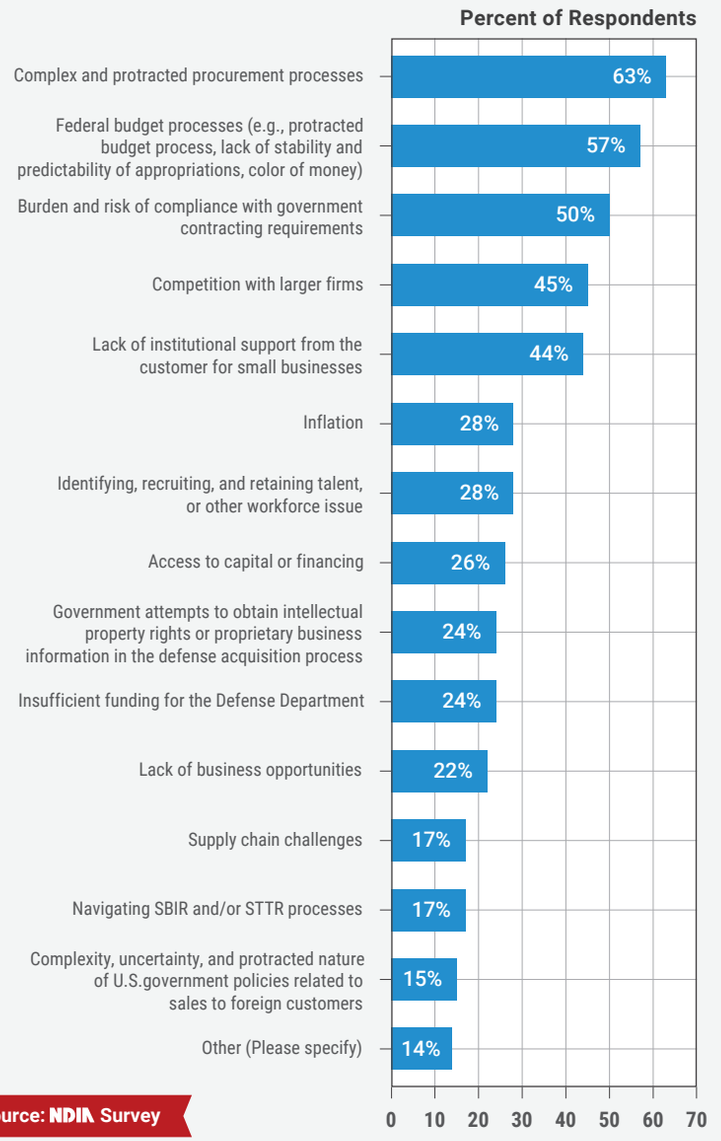
Small businesses[10] drive innovation broadly in the U.S. economy and specifically in the U.S. DIB. **As the most recent DoD Small Business Strategy notes, in FY2021, small businesses made up 73% of all companies that did business with DoD and 77% of the R&D companies that did business with DoD.**[11] However, there are troubling indications that more structural support must be provided to keep this critical population of companies in the U.S. DIB thriving.

In recent years, the overall number of companies in the U.S. DIB has declined, and **DoD estimates the number of small businesses participating in the U.S. DIB has declined by over 40% in the past decade.**[12] In addition, all companies, including small businesses, have been under additional increasing pressure over the last three years. The residual effects of the pandemic, including supply chain disruptions coupled with workforce shortages, and elevated interest rates as a result of inflation,[13] have combined to increase liquidity risk to small businesses.

The *Vital Signs 2025 Survey* included tailored questions for small business private sector respondents. Of the most significant difficulties faced by small businesses in government contracting, private sector respondents highlight the following (see Q17 Chart):

Question 17

What are the most significant difficulties faced by small businesses in government contracting? *(Select all that apply)*



10 Small businesses are defined in the *Vital Signs 2025 Survey* as generating total revenue between $0-$25M each year or registered as a small business by the U.S. government.

11 U.S. Department of Defense. *Small Business Strategy.* January 26, 2023. https://media.defense.gov/2023/Jan/26/2003150429/-1/-1/0/SMALL-BUSINESS-STRATEGY.PDF. Page 5.

12 Ibid.

13 Congressional Research Service. *Why Is the Federal Reserve Keeping Interest Rates "High for Longer"?* Marc Labonte. IN12388. July 3, 2024. https://crsreports.congress.gov/product/pdf/IN/IN12388.

- Complex and protracted procurement processes (63%)
- Federal budget processes (57%)
- Burden and risk of compliance with government contracting requirements (50%)
- Competition with larger firms (45%)
- Lack of institutional support from the customer for small businesses (44%)

For example, many small businesses report lengthy delays between being told they have won the contract and getting a definitized contract. This has significant implications for how they manage their workforce. Under these scenarios, companies report that the best option is to go with a contractor workforce, but that increases the allowable costs on the contract when the company factors in the subcontractor's own profit margin, general and administrative expenses (G&A), and overhead costs. In addition, the classified contractor pool is more limited, which also increases costs.

Further, the burden and risk of compliance with government contracting requirements not only increases the cost to the government, but also impacts the business strategies of many dual-use technology companies. Several companies have identified challenges that defense business units in commercial companies face when both the executive management of the company, as well as investors, analyze the economic inefficiency in the defense business unit, including unique accounting requirements, defense contracting specialists, the uncertainty of funding, and compliance requirements such as CMMC and authority to operate (ATO) costs.

The *Vital Signs 2025 Survey* also asked small businesses about contracting opportunities both as a prime contractor and a subcontractor. For prime contractor opportunities, 13% of small business respondents reported an increase, 58% reported the same, and 29% reported a decrease. For subcontracting opportunities, 17% of small business respondents reported an increase, 58% reported the same, and 26% reported a decrease. While some small businesses saw an increase in overall opportunities, a larger percentage saw a decrease.

In recent years, small businesses reported a noticeable decline in the emphasis on meeting federally established small business subcontracting goals. Many small businesses have observed limited communication, fewer subcontracting opportunities, and a lack of accountability mechanisms to enforce adherence to small business participation plans. This raises concerns about current oversight processes and the ability of small businesses to compete and thrive in government contracting.

Although there are several challenges facing small businesses within the U.S. DIB, there are three notable priority concerns: (1) reauthorization of the SBIR and Small Business Technology Transfer (STTR) programs, (2) current statutory R&D amortization requirement, and (3) DoD's ATO process.

SBIR and STTR Programs

The SBIR program was established in 1982[14] to (1) stimulate technological innovation; (2) use small businesses to meet federal R&D requirements; (3) foster and encourage participation by socially and economically disadvantaged and women-owned small businesses; and (4) increase private sector commercialization of innovations derived from federal R&D. The STTR program was created in 1992[15] to facilitate the commercialization of university and federal R&D by small businesses. **Both programs facilitate and streamline the participation of competitive small businesses to work in coordination with the federal government on agency-specific R&D needs,** which expands the economic impact of federal investments in small businesses by actively supporting private sector commercialization of the innovations stemming from this research.

14 P.L. 97-219.

15 P.L. 102-564.

Both the SBIR and STTR programs have three phases. Phase I funds feasibility-related R&D corresponding to the participating federal departments' and agencies' requirements.[16] Phase II supports additional R&D efforts initiated under Phase I with a focus on meeting specific program requirements and exhibiting potential for commercial application. Finally, Phase III focuses on commercialization of the results of Phase I and Phase II grants. It is important to note the SBIR and STTR programs do not provide funding under Phase III.

Case Study: SBIR Supports Diversifying the U.S. DIB

A highly successful cloud services provider in the Midwest started looking for opportunities to do business with DoD back in 2014. While the company is not located near traditional military customers, the company saw an opening to provide new services for workload in the cloud that was highly scalable and did not require being near a data center.

The company spent a couple of years educating itself about government contracting, but between the government not being interested in hybrid IT infrastructure and the "knowledge burden" of trying to figure out how to do business with DoD, the company assessed that the market was not ready.

Fortunately, before the company abandoned exploring options, in fall 2018, the company saw an AFWERX[17] announcement seeking to connect commercial small businesses with current DoD customers through the SBIR program. The company noted the request for either a 15-page slide deck or a five-page white paper was a welcome effort by AFWERX to reduce the response burden on small businesses.

In spring 2019, the company received a SBIR Phase I award. The company appreciated the short contracting cycle, AFWERX's focus on connecting the company with a customer to get to Phase II, and the knowledge that Phase II was a viable option at some point.

The company considers the SBIR program an important program for the U.S. government to provide commercial companies, especially those not around major military bases, an opportunity to contract with DoD. The company also believes it is important and positive that the SBIR program has become much more competitive. When the company started applying for SBIR awards, there were roughly 160 – 200 applicants applying for 80 awards, and now they see roughly 3,000 applicants applying for 275 awards.

The SBIR and STTR programs have been extended and reauthorized several times and are currently authorized through September 30, 2025 (FY2025). In the last reauthorization, Congress focused on improving commercialization outcomes, the geographical distribution of awards and funding, the amount of agency funding set aside for the programs, and the participation by socially, economically disadvantaged, and women-owned businesses.[18] Congress also included provisions to address research security concerns and the potential for malign foreign influence; increase performance standards in programs by multiple award recipients; create an open innovation topic for each DoD component solicitation; and direct the U.S. GAO to conduct a number of studies.[19] In addition, DoD is required to review the providence of capital for all SBIR applications.

16 Small Business Administration. *Policy Directives.* Accessed December 11, 2024. https://www.sbir.gov/about/policies.

17 AFWERX is the innovation arm of the Department of the Air Force and powered by the Air Force Research Laboratory (AFRL). Learn more at www.afrl.af.mil.

18 Congressional Research Service. *Small Business Research Programs: SBIR and STTR.* Marcy E. Gallo. R43695. October 21, 2022. https://crsreports.congress.gov/product/pdf/R/R43695.

19 Ibid.

Respecting SBIR Data Rights to Deliver Innovation to the Warfighter

The benefits and opportunities afforded by SBIR Data Rights[20] must be more consistently utilized by stakeholders across the federal innovation ecosystem, including program managers, contracting officers, and industry. SBIR Data Rights support a streamlined approach to the federal funding of innovative research and incentivize industry to engage with government stakeholders in a more collaborative, trusted, and integrated fashion. Similar to IP and data rights for all companies, when SBIR Data Rights are not used and enforced correctly, industry is disincentivized to participate.

It is important to understand key aspects of SBIR Data Rights[21] that drive industry to engage in efforts critical to our country's economic and national security interests:

- **Restricted Data Access:** Technical data and IP cannot be disclosed to competitors and can only be worked on by the contractor that owns the SBIR Data Rights.[22] This protection increases trust and collaborative research with industry innovators.
- **Sole-Source Justification:** The simplified Justification & Approval (J&A) by federal statute eliminates need for a Request for Proposal (RFP), and the sole-source right for a SBIR Phase III award reduces costs and streamlines acquisition for the government and industry.[23]
- **Contracting Preference:** There is a mandated procurement preference that follow-on work must go to the original SBIR investment,[24] which creates positive economic impact, tracks with private sector investing principles, and explicitly encourages small businesses to confidently pursue solutions to meet federal needs.
- **Retention of Data Rights:** SBIR Data Rights are connected to the innovation, not the size of the company,[25] which keeps small businesses from being penalized as they succeed, grow, and contribute to a healthy mergers and acquisitions market.

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20 U.S. Small Business Administration. *WHAT ARE SBIR DATA RIGHTS AND WHY ARE THEY IMPORTANT?* Course 9, Tutorial 2. Accessed December 14, 2024. https://www.sbir.gov/sites/all/themes/sbir/dawnbreaker/img/documents/Course9-Tutorial2.pdf.

21 U.S. Small Business Administration. *Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program Policy Directive.* May 3, 2023. https://www.sbir.gov/sites/default/files/SBA%20SBIR_STTR_POLICY_DIRECTIVE_May2023.pdf.

22 According to DFARS 252.227-7018, "The Government may not, without the written permission of the party asserting limited rights, release or disclose the technical data outside the Government, use the technical data for manufacture, or permit technical data to be used by another party…"

23 U.S. Small Business Administration. *WHAT MAKES PHASE III SO VALUABLE?* Course 9, Tutorial 4. Accessed December 14, 2024. https://www.sbir.gov/sites/all/themes/sbir/dawnbreaker/img/documents/Course9-Tutorial4.pdf.

24 U.S. Small Business Administration. *Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program Policy Directive.* May 3, 2023. https://www.sbir.gov/sites/default/files/SBA%20SBIR_STTR_POLICY_DIRECTIVE_May2023.pdf. Page 27.

25 Ibid.

Recommendations:

Short-Term

29. **Congress must permanently reauthorize both the SBIR and STTR when the programs come up for reauthorization in calendar year 2025.**
30. **The federal government must provide consistent SBIR guidelines and training to contracting officers and publicize successful SBIR transitions.**
31. **DoD must appropriately draft SBIR contracts, ensure the protection of technical data, and enforce SBIR Data Rights in market research, the contracting process, and the management of ongoing Phase III efforts.**
32. **DoD must source acquisitions from the existing pipeline of SBIR technologies and leverage the simplified acquisition authorities for companies that can reasonably meet the identified need.**
33. **DoD must ensure that evaluation criteria do not penalize industry for the assertion of SBIR Data Rights and that flow down requirements do not force subcontractors to relinquish SBIR Data Rights to perform on the contract.**
34. **DoD must create and/or identify a high-level acquisition professional role to serve as the technology insertion lead with oversight of acquisition behavior around SBIR Phase III contracting and authority to ensure acquisition and contracting actions comply with federal law.**

Tax R&D Amortization

In 2023, small businesses encountered a new and significant cash flow challenge – the statutory R&D amortization requirement.[26] While the policy discussions regarding R&D amortization have been active over the last few years, small businesses saw the evidence of the additional impact to their cash flow challenges in their 2022 tax return filings.[27] Rather than receiving the full deduction for qualified R&D expenses in the year incurred, all companies, including small businesses, are required to amortize the deduction over five years and are only allowed to deduct up to 10% of the company's expenses in the year they are incurred. This resulted in a dramatically higher tax bill for small businesses, which reduces companies' ability to maintain a highly qualified and specialized workforce as well as to make further R&D investments.

While the current statutory R&D amortization requirement is a brake on U.S. DIB companies' ability to innovate or even remain in the defense industrial base, countries such as the PRC are using their tax

26 In 2017, the Tax Cuts and Jobs Act (TCJA) (P.L. 115-97) was signed into law. The TCJA repealed the option to deduct the entire amount of research and experimental expenses incurred in a given year. The repeal was made effective with tax years beginning after December 31, 2021. Companies are therefore currently required to capitalize these expenses and amortize them over a minimum of five years. Further educational material on this topic can be found at: https://crsreports.congress.gov/product/pdf/IN/IN11887.

27 Most small businesses are so-called "pass through" entities, where the income from the business and the income from the individual owner(s) are combined for federal income tax filing purposes.

policies as an accelerator. The PRC uses a "super deduction" (200%) of qualified R&D expenses for innovative manufacturers of all sizes and sectors, including those in its defense industrial base. In total, there are 17 countries, including ten Organization for Economic Cooperation and Development (OECD) countries, that provide immediate recovery of more than 100% of eligible R&D expenses.[28]

In the 118th Congress, NDIA supported a retroactive R&D amortization patch extender deal for tax year 2024 to provide a bridge for companies until later in 2025 when a larger tax package is expected to be negotiated.[29] In the 119th Congress, NDIA will continue to support a fix to this issue as Congress considers the expiring tax provisions enacted under the Tax Cuts and Jobs Act (TCJA) of 2017.

Recommendations:

Short-Term

35. **The 119th Congress must reinstate statutory R&D amortization when the larger package of expiring tax provisions are negotiated.**

Authority to Operate (ATO)

DoD's ATO process is one of the largest barriers to providing cutting-edge software to the Department.[30] An ATO is a formal authorization from DoD that allows a system, network, or application to operate within DoD environment.

DoD leverages the NIST Risk Management Framework (RMF), which is a seven-step process outlined in NIST SP 800-37.[31] **Getting a traditional ATO can take several years at a substantial cost, which can be very burdensome to small businesses and a barrier to rapidly delivering relevant software capabilities to the warfighter in a timely manner**.[32] For example, it is not unusual for a company to pay a DoD-recommended third-party vendor high six-figures (~$400,000) to get the company certified for an ATO, and that is just for DoD's unclassified networks.

Recognizing what DoD CIO "has characterized as sluggish, duplicative processes that hinder technology and software innovation,"[33] on May 2, 2024, DoD released a one-page memo directing Authorizing Officials to leverage re-use and reciprocity "except when the cybersecurity risk is too great."[34] The goal is to save time and money by letting federal entities reuse other organizations' internal and external findings.[35]

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28 "R&D tax incentives." *Organization for Economic Co-operation and Development*. Accessed December 11, 2024. https://www.oecd.org/innovation/tax-incentives-RD-innovation/.

29 In January 2024, the House Ways & Means Committee passed H.R. 7024, the Tax Relief for American Families and Workers Act of 2024, by a vote of 40-3, and the U.S. House of Representatives passed H.R. 7024 by a vote of 357-70. The legislation promotes U.S. innovation by allowing companies to immediately deduct the cost of their U.S.-based R&D investments rather than to deduct those costs over a five-year period through 2025. In August 2024, the Senate failed to invoke cloture and proceed to the bill by a vote of 48-44.

30 Leed, Dr. Maren et al. *Coding the Future: Recommendations for Defense Software R&D*. Emerging Technologies Institute. July 2023. https://www.emergingtechnologiesinstitute.org/-/media/ndia-eti/reports/software-report/eti_codingthefuture_final.pdf?download=1.

31 National Institute of Standards and Technology Information Technology Laboratory. *Risk Management Framework for Information Systems and Organizations: A System Life Cycle Approach for Security and Privacy.* NIST SP 800-37 Rev. 2. December 2018. https://csrc.nist.gov/pubs/sp/800/37/r2/final.

32 Kroger, Bryon. "How achievable is the continuous Authority to Operate model?" *C4ISRNET.* June 28, 2024. https://www.c4isrnet.com/opinion/2024/06/28/how-achievable-is-the-continuous-authority-to-operate-model.

33 Welch, Carley. "Pentagon announces new reciprocity guidance to streamline software adaptation." *Breaking Defense.* May 9, 2024. https://breakingdefense.com/2024/05/pentagon-announces-new-reciprocity-guidance-to-streamline-software-adaptation/.

34 U.S. Department of Defense, Office of the Deputy Secretary of Defense. *MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP COMMANDERS OF THE COMBATANT COMMANDS DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS SUBJECT: Resolving Risk Management Framework and Cybersecurity Reciprocity Issues.* May 2, 2024. https://dodcio.defense.gov/Portals/0/Documents/Library/ResolvingRMF.pdf.

35 Welch, Carley. "Pentagon announces new reciprocity guidance to streamline software adaptation." *Breaking Defense.* May 9, 2024. https://breakingdefense.com/2024/05/pentagon-announces-new-reciprocity-guidance-to-streamline-software-adaptation/.

On May 29, 2024, DoD also released the Continuous Authorization to Operate (cATO) Evaluation Criteria,[36] which maps out the principles for a continuous ATO and follows DoD's 2022 cATO memo.[37] The cATO is a modernized authorization process that moves away from a point-in-time, document-based security assessment to a process that continuously assesses, monitors, and manages risk, with the goal of allowing an organization to build and release new system capabilities by continuously monitoring them against approved security controls.[38]

Recommendations:

Short-Term

36. **DoD must continue to push for greater utilization of reciprocity within the ATO process.**

36 U.S. Department of Defense. *Continuous Authorization to Operate (cATO) Evaluation Criteria: DevSecOps Use Case.* May 29, 2024. https://dodcio.defense.gov/Portals/0/Documents/Library/cATO-EvaluationCriteria.pdf.

37 U.S. Department of Defense, Office of the Secretary of Defense. *MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS, Continuous Authorization To Operate (cATO).* David McKeown. February 3, 2022.https://media.defense.gov/2022/Feb/03/2002932852/-1/-1/0/CONTINUOUS-AUTHORIZATION-TO-OPERATE.PDF.

38 Kroger, Bryon. "How achievable is the continuous Authority to Operate model?" *C4ISRNET.* June 28, 2024. https://www.c4isrnet.com/opinion/2024/06/28/how-achievable-is-the-continuous-authority-to-operate-model/.

Pillar 3: Modernizing Foreign Military Sales and Technology Cooperation

Introduction

The strong network of global and regional alliances and partnerships the U.S. built and maintained since the end of World War II serves as the diplomatic and military operational center of gravity in national deterrence and, should conflict erupt, will help provide the U.S. with decisive advantage in ultimately prevailing in conflict. At the operational level of warfare, these alliances and partnerships require assured access, basing, and overflight agreements; trusted and resilient command and control architectures; and interoperable and interchangeable platforms, systems, and infrastructure. To keep them strong, the U.S. must also focus on updating the policy, legal, regulatory, and technology security framework governing U.S. defense trade. This includes modernizing our FMS and DCS processes, deepening our technological cooperation and integration with our closest allies and partners, and having clear parameters around technology releasability and export controls.

Current U.S. defense trade's legal, regulatory, and technology security framework was designed in a strategic era when the U.S. enjoyed technological dominance. But this legal and regulatory framework has "increasingly figured as roadblocks to defense industrial and technology integration" with the United States' closest allies.[83] U.S. allies and partners around the world are building their own indigenous defense industrial sectors and are becoming centers of innovation and cutting-edge technology. Globalization, the migration of innovation to the commercial sector, and the proliferation of dual-use technologies incentivized them to explore new and innovative ways of doing business. As such, FMS and DCS reform must include analyzing policies and practices that impede multinational industries from offering advanced capabilities to DoD. Reform in this area will increase the resiliency of international supply networks and improve the overall interoperability between the U.S. and its allies and partners.

The inherent tension between protection and competition must be carefully managed, and vigorous controls around what truly needs to be protected must remain in place. At the same time, both military operational and U.S. DIB business challenges provide a compelling case for a clearer, more responsive framework that prevents the spread of sensitive technologies to countries of concern while boosting cooperation with allies and partners.

To support the ongoing work of NDIA members, the *Vital Signs 2025 Survey* asked private sector respondents to identify the biggest barriers to selling products and services to foreign customers (see Q40 Chart): The top four barriers include:

- International Traffic in Arms Regulations (ITAR) (55%)
- Slow timelines for Letter of Request (LOR) and Letter of Acceptance (LOA) and contracting/award process (41%)
- Transparency with and communication from the U.S. federal government (39%)
- Export Administration Regulations (EAR) (38%)

It is notable that in the *Vital Signs 2024* report, private sector respondents also listed ITAR as the biggest barrier to selling products to foreign customers at 45%.

The 2024 NDIS Implementation Plan[84] identifies three lines of effort to increase U.S. allied and partner industrial collaboration:

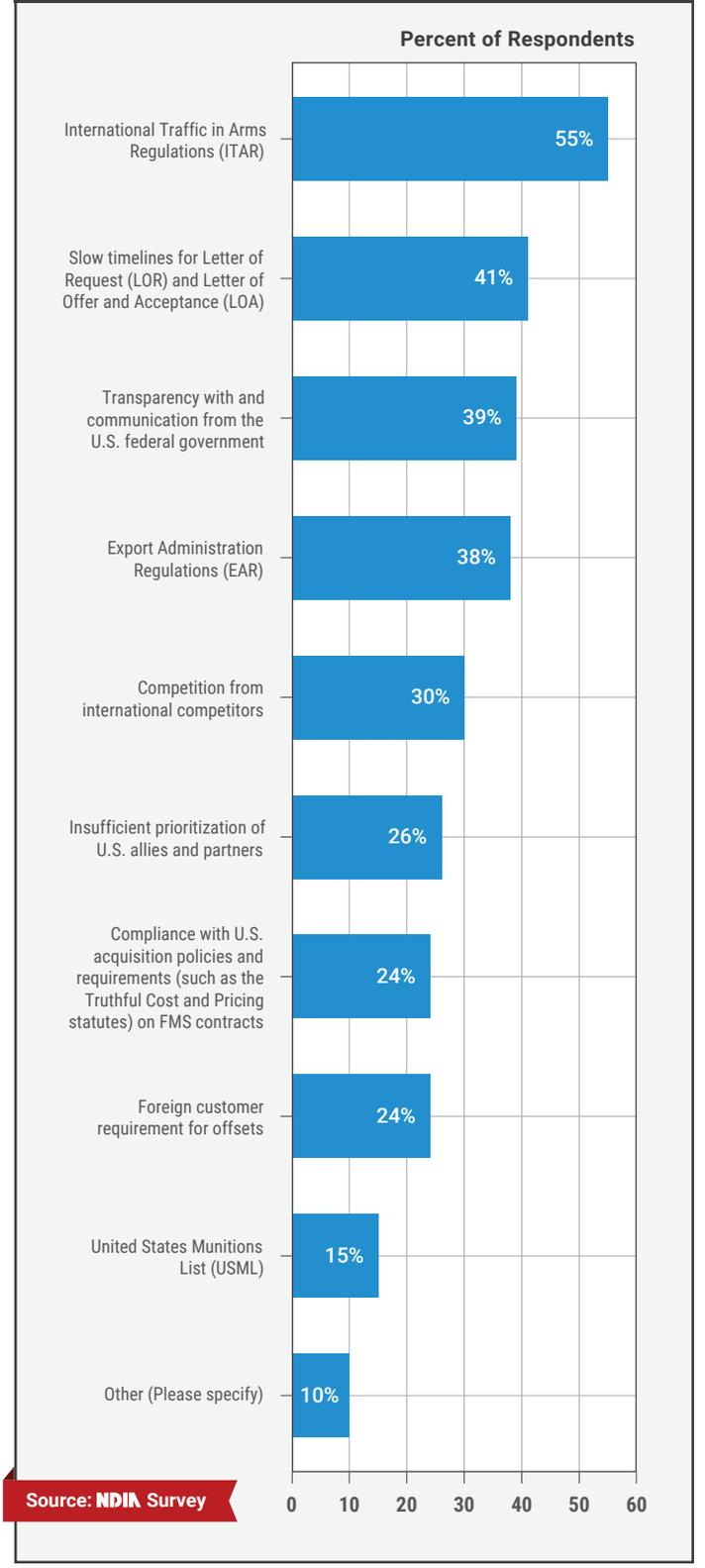
1. Australia, United Kingdom, and United States trilateral security partnership (AUKUS), which recognizes the value of licensing exemptions with allies and partners
2. Co-development and Co-production of Priority Defense Systems
3. Facilitating International Industrial Collaboration

While it remains to be seen what form these initiatives the new Administration will take, it is expected that a priority will be placed on ensuring equitable market access and burden-sharing with allies and partners.

NDIA will continue to support modernizing our FMS processes, supporting government-industry engagements to operationalize international security agreements, and working with federal agencies on export controls to facilitate international industrial collaboration. These efforts are

Question 40

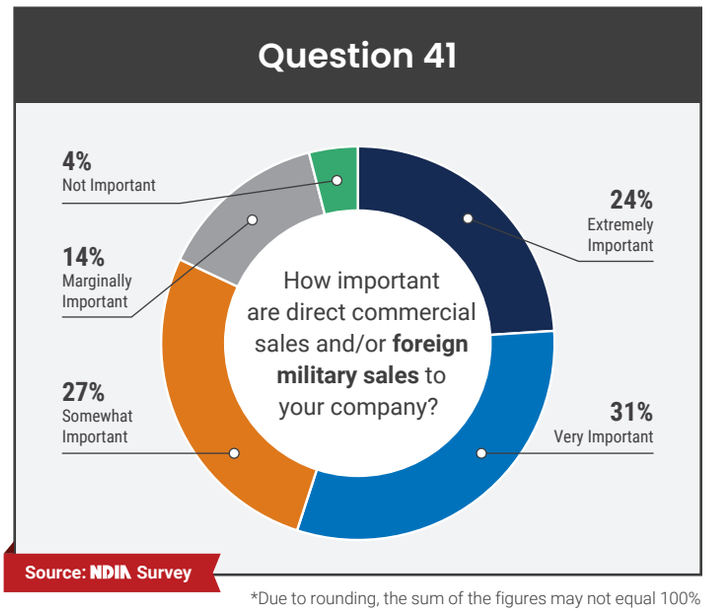
What are the biggest barriers your company faces when selling your products and services to foreign customers? *(Select all that apply)*



designed to address key concerns private sector respondents identified in the *Vital Signs 2025 Survey* including ITAR challenges, transparency with and communication from the U.S. federal government, EAR, and insufficient prioritization of partners.

Modernizing and Streamlining FMS

Reforming and modernizing FMS is critical to strengthening the resiliency of the U.S. DIB in an era of great power competition, to enhancing diplomatic ties by strengthening our network of alliances and partnerships, and to improving the effectiveness of those relationships by enhancing military interoperability at the operational level. As demand for FMS has risen consistently, jumping from $66B dollars in annual sales in 2023 to trending toward $100B by the end of 2024,[85] allies and partners are also increasingly looking toward the leadership of the U.S. to fill defense needs and strengthen the allied defense industrial base. In the *Vital Signs 2025 Survey*, 55% of respondents whose companies engage in DCS or FMS identified these sales as either extremely or very important (see Q41 Chart). FMS modernization and reform is, therefore, more crucial than ever as significant fluctuations in high-value FMS transactions are one of the three top drivers of U.S. DIB revenue volatility.



*Due to rounding, the sum of the figures may not equal 100%
**Respondents only include those who indicated their company engaged in FMS or DCS

Unfortunately, under the current framework, the FMS process, particularly technology release and foreign disclosure, is opaque, disaggregated, and slow. DoD addresses technology security risks by establishing new processes and responsibilities with defined authorities to different offices for each identified risk. Each office, in turn, develops its own internal processes with different decision-making mechanisms. As of today, no single office is responsible for resolving internal disagreement in a timely fashion,[86] and DoD lacks a coordinated technology transfer decision framework aligned to the 2022 NDS.

In August 2022, DoD established DoD FMS Tiger Team to investigate how to improve the portion of the FMS process handled by DoD. In June 2023, DoD FMS Tiger Team released six areas of reform, including: (1) improving the Department's understanding of ally and partner requirements; (2) enabling efficient reviews for technology release; (3) providing allies and partners with relevant priority capabilities; (4) accelerating acquisition and contracting support; (5) expanding DIB capacity; and (6) ensuring broad U.S. government support for improving the FMS process.[87] In February 2024, the House Foreign Affairs Committee's TIGER Task Force also released a report identifying problems with the FMS process with recommendations similar to DoD's FMS Tiger Team.[88] Since the FMS Tiger Team released its recommendations, DoD began implementation of four of the recommendations in 2023,[89] but the goals envisioned by the Tiger Team have yet to come to fruition in its entirety.

Section 918 of the FY2024 NDAA directed DoD to reform and improve the Technology Security and Foreign Disclosure (TSFD) process.[90] In December 2024, DoD provided the Section 918 report to Congress. While the report itself includes CUI, key takeaways from the executive summary make it clear that it will take senior leader engagement across the interagency to streamline the authorities, simplify the amalgamation of processes across the government, and enable the TSFD process to operate at speed and scale across multiple priority areas simultaneously.

Leveraging Direct Commercial Sales

Both Congress and Geographic Combatant Commanders are searching for innovative ways to reduce the time required – measured in years, not months – under the current FMS process to get a definitized contract. One solution is to revisit the U.S. government's FMS-only policy described in the Security Assistance Manual[91] to provide more flexibility for DCS.

Under the current FMS process, the following is the standard set of steps under a three-party, sequential process:

- STEP 1: The international customer signs a Letter of Request (LOR) to a Military Service.
- STEP 2: The international customer signs a Letter of Acceptance (LOA) with a Military Service.
- STEP 3: The Military Service signs a contract award with the Original Equipment Manufacturer (OEM).

As noted in the *Vital Signs* report series and feedback to Congress, U.S. industry usually lacks visibility into where the FMS case is in the process or if it is being prioritized, even if it should be from a U.S. policy perspective. In addition, from the original Request for Pricing and Availability (P&A) to starting to make deliveries under a contract award, (which requires a Request for Proposal (RFP), TINA review, and contract negotiations), each step in this process can take years. Finally, many FMS cases have long lead parts, some of which require 18 – 36 months to acquire, which means that without careful management of the timelines, there can be significant gaps in the production schedules.

The uncertainty and lack of predictability do not incentivize industry to invest in additional capacity to support FMS. In many high-profile FMS cases, this has created a demand backlog that can also be measured in years. The rational solution – to invest in additional capacity – can only be implemented if there is a business case to do so.

Conversely, **DCS timelines are normally measured in months and have the added benefit of permitting foreign countries to make their own commercial investments to increase production rates.** These timelines also improve the business case to make additional investments in production facilities and to improve the planning around long lead parts and components.

The policy decision for whether the acquisition will be under FMS or DCS is described in the Security Assistance Management Manual (SAMM). Industry has highlighted there are policy changes that can be made that would accelerate sales to U.S. allies and partners and increase the number of U.S. jobs, while maintaining important safeguards. These policy changes include weighting whether a particular country has established end user processes, operational understanding of the technology, and track records of securing U.S. technology.

Recommendations:

Short-Term

37. **DoD and Department of State (DoS) must clearly identify their FMS reform objectives, prioritize completing their identified areas of reform in calendar year 2025, and provide regular status updates through DoD Strategic Communication Integration Group (SCIG).** The NDIS Implementation Plan projects the reform efforts will be implemented in FY2026.[92]
38. **The Defense Technology Security Administration (DTSA) must make further improvements to the TSFD process and release the full Section 918 report to organizations capable of handling CUI.** In addition, senior leaders across the interagency must prioritize enabling the TSFD process to operate at speed and scale across multiple priority areas simultaneously.
39. **DoD must update the SAMM to provide more opportunities for DCS.** There are documented FMS workforce shortages. Creating more opportunities for DCS will help the government workforce prioritize the cases that need to remain within the FMS process. DoD must solicit industry feedback on SAMM FMS-Only lists as well as other classified FMS-Only lists.
40. **DoD must hold an annually coordinated Industry Day as required by the FY2024 NDAA, Section 873(b).**
41. **DoD must streamline how prices for FMS are determined by leveraging prior U.S. buys versus re-creating the entire RFP/Proposal/Audit process.**
42. **DoD must expand the opportunities available under AUKUS and similar security agreements with U.S. allies to better integrate the U.S. DIB with the defense industrial bases of U.S. allies.**

Medium-Term

43. **DoD must ensure appropriate resources to fill FMS roles to mitigate the current FMS workforce shortages and to meet the rising demands of FMS sales while reducing non-essential and redundant FMS functions.** DoD must hire dedicated FMS workforce civilians with the knowledge to move quickly in FMS contracting versus adding work to traditional acquisition civilians.

International Security Partnerships: Launching AUKUS Implementation

Launched in September 2021, the AUKUS security pact is designed to be part of the strategic deterrent to the PRC's growing military capabilities in the Indo-Pacific region. Although attention initially focused on the proposed transfer of nuclear propulsion technology to Australia through Pillar 1, the plan for Pillar 2 also has ambitions to develop advanced technologies and other military capabilities expected to deliver decisive advantage in the digital era of warfare. From a U.S. industry perspective, AUKUS represents at least the third attempt at export control reform.[93]

> A vigorous, comprehensive export control system is essential to preserve U.S. economic security and U.S. national security, including the technological competitive advantage of our military. At the same time, it is equally important to prioritize what requires government controls. AUKUS has the opportunity to be a pathfinder for a more modern, responsive export control framework that accelerates the delivery and interoperability of critical technologies with the U.S.' closest allies. This pathfinder should also be considered to open up opportunities with other U.S. allies.

ITAR § 126.7 Exemption

A main focus for AUKUS throughout 2024 was the concurrent rulemaking by the respective governments on the exemption for defense trade and cooperation among the AUKUS countries, which for the U.S. was mandated by Section 1343 of the FY2024 NDAA.[94] DoS released the proposed rule on the AUKUS ITAR Exemption in May 2024 and, pursuant to Section 1343 of the FY2024 NDAA, issued a determination on August 15, 2024, that the "Australia and UK export control systems are comparable to those of the United States and have implemented a reciprocal export exemption for U.S. entities."[95] The interim final rule on the AUKUS ITAR Exemption was released on August 20, 2024, and became effective on September 1, 2024.[96]

The exemption in ITAR § 126.7 applies to activities subject to the ITAR, which includes exports, reexports, retransfers, and temporary imports of defense articles; performance of defense services; and brokering activities between the U.S., Australia, and the UK. However, the delivery of the item under the exemption must be within the physical territory of the AUKUS countries. Additionally, the transferor, recipient, or broker must be either a U.S. government department or agency, U.S. persons registered with the U.S. Directorate of Defense Trade Controls (DDTC) and not debarred, or Australian or UK Authorized Users listed in the Defense Export Control and Compliance System (DECCS). Finally, items cannot be listed on the Excluded Technology List (ETL): Supplement No. 2 to § 126.7.

DoS estimates that around 80% of the value of existing commercial defense trade between AUKUS nations are eligible to go under the exemption, which is intended to make this trade faster and easier. The UK and Australia have implemented comparable exemptions to facilitate qualifying trade.[97] Similar to other ITAR exemptions, there are recordkeeping requirements for the exemption, re-exports or retransfers outside of what is approved by § 126.7 require other authorization, and companies still need to comply with other aspects of U.S. law, e.g. requirements for the transfer of classified defense articles and services.

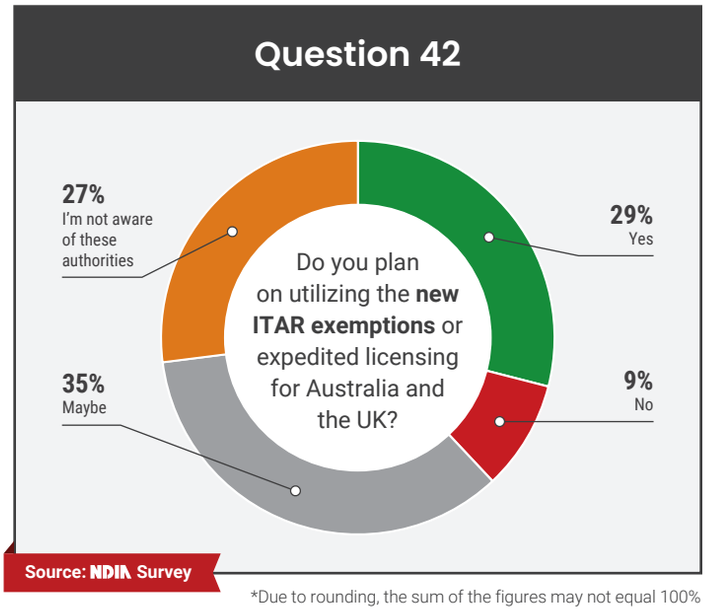
Expedited Licensing for Other Items and Services

In addition to the ITAR Exemption, the DoS has implemented expedited processing of license applications for the export of defense articles and defense services to Australia, the UK, or Canada under ITAR § 126.15, which was required by Section 1344 of the FY2024 NDAA. This applies to items or services not eligible for transfer under the ITAR Exemption and must be to, or within, the physical territory of these countries and between governments or persons of these countries. To the extent practicable, processing times under expedited processing are to be within 30 days, if related to a government-to-government agreement, and 45 days for all others. However, it should be noted that the congressional certification period is not included

in these timelines. Legislation is currently being discussed that would modify the congressional notification requirement for license-free defense trade to Australia and the UK

Initial Industry Impacts of the ITAR Exemption and Expedited Licensing

The *Vital Signs 2025 Survey* asked private sector respondents if they planned to use the new ITAR exemptions or expedited licensing for Australia and the UK (see Q42 Chart). The majority of respondents (64%) stated "Yes" or "Maybe," and only a small portion (9%) stated "No." However, over a quarter (27%) stated they were not aware of these authorities.



*Due to rounding, the sum of the figures may not equal 100%

In addition to the *Vital Signs 2025 Survey*, the U.S. partners of the AUKUS Advanced Capabilities Industry Forum (ACIF)[98] for which NDIA is a member, conducted a survey on the AUKUS ITAR Exemption in November 2024. The majority of the respondents (69.1%) viewed the ITAR Exemption as a positive step, 21.4% viewed it as negative, and 9.5% viewed the rule as neutral. When asked if the interim final rule addressed primary concerns from the proposed rule, only 38.1% of respondents said yes, while 28.57% said no and 33.33% were unsure.

Respondents were also asked about the effectiveness of different elements of the rule, and the ETL was highlighted as the least effective with 32.1% of respondents viewing the ETL as negative, 42.9% viewed it as neutral, and 25% viewed it as positive. The top concerns cited were: the ETL was considered too broad (53.57%), the ETL includes technology essential to trade with Australia and the UK (42.86%), and industry cannot identify the reason behind technologies listed on the ETL (39.29%). Furthermore, companies expressed concern that the ETL includes technology that falls under AUKUS Pillar II objectives, including electronic warfare as well as hypersonic and counter-hypersonic capabilities.

Next Steps for AUKUS Pillar 2

Three years after the announcement of AUKUS, both industry and government need to make progress on a coordinated approach with meaningful efforts within the next 12 months that can enable AUKUS partners to develop and deliver needed capabilities. With the structure and frameworks, including the ITAR Exemption and Expedited Licensing processes, largely in place, the next phase of AUKUS is moving toward the testing and evaluation implementation phase. **For the U.S., this will necessarily shift the focus of AUKUS away from DoS and to DoD, the Military Services, and Congress to begin initiating designated-AUKUS programs with dedicated funding streams and contracting vehicles.**

In this vein, the U.S. ACIF associations have been working with the DoS, DoD, the Military Services, and international AUKUS partners to identify narrowly focused strategic priorities with specific lines of effort that can enable meaningful progress under AUKUS, particularly in the near-term. One example is to address the challenges each AUKUS nation is facing with supply chain illumination and supply chain resilience. For the U.S., this includes the imperative to move away from relying on the PRC for critical minerals and finding viable supply alternatives, which this report discusses further in Pillar Five – Reinforcing Resilient Supply Chains. For example, Australia has some of the largest recoverable critical mineral deposits on earth, including high-quality cobalt, lithium, manganese, rare earth elements, tungsten, and vanadium.[99] If utilized wisely, AUKUS could provide a unique opportunity to enable the U.S. to partner with Australia for the supply of critical minerals that are essential for defense technologies and national security.

Recommendations:

Short-Term

44. **DoD and the Military Services must identify specific viable business opportunities, including a dedicated funding stream and contract vehicles, under Pillar II.** It has been over three years since AUKUS was announced.

45. **DoS must re-evaluate the ETL to ensure better alignment with AUKUS policy objectives.**

46. **DoD must implement a forward-leaning approach, streamlined and aligned across the Military Services, to sharing technology with allies and partners.** Currently, each military branch has their own separate review process, with varying standards, for transferring technology.

47. **DoD must analyze and implement the previous reform recommendations to ensure industry concerns about the TSFD requirements process, which is required to be completed before technology can be shared with allies, is streamlined.** DoD should also align TSFD with FMS-Only processes, including the new regulatory landscape of the AUKUS exemption.

Strengthening International Regional Frameworks

The PRC's growing military power has created the need to enhance U.S. deterrence and defense, assure allies and partners, and counter adversarial threats in the Indo-Pacific region. As part of this effort, DoD created the Partnership for Indo-Pacific Industrial Resilience (PIPIR) in 2024, which directly supports DoD's implementation of the Regional Sustainment Framework.[100]

The PIPIR initiative is a multi-lateral forum that will be a key mechanism for coordinating the production and sustainment of military technologies with allies and partners in the Indo-Pacific region.[101] It is intended to provide an opportunity to accelerate cooperation with the U.S. DIB "by reducing barriers to production, creating new sustainment hubs, and addressing supply chain constraints."[102]

In May 2024, 13 nations, including the U.S., endorsed the Statement of Principles for Indo-Pacific Industrial Base Collaboration at the Shangri-La Dialogue. In October 2024, the participants at the inaugural plenary meeting of PIPIR adopted a Core Vision Statement, which establishes strategic principles to guide collaboration on defense industrial resilience. The members also announced four workstreams: 1) Sustainment, 2) Production, 3) Supply Chain Resilience, and 4) Policy and Optimization.

Recommendations:

Short-Term

48. **DoD must continue efforts to strengthen international regional frameworks**, such as PIPIR, to build a robust network of industrial and economic relationships that will serve as a strategic buffer to deter conflicts that would threaten vital economic interests and prosperity in the Indo-Pacific region.

A New Approach for Dual-Use Export Controls

Two very different American administrations in the last decade delivered comparable assessments about the strategic economic and technological competition underway between the U.S. and the PRC. Similar conclusions have been drawn that a business-as-usual mindset will undermine U.S. economic and national security. From the point of view of the U.S. government, **the U.S. needs to identify new approaches and solutions to not just protect, but to also expand U.S. technological competitive advantages.**

One area where the U.S. government is implementing a new, more assertive approach is through its export control policies. Dating back to the aftermath of World War II, federal government controls on U.S.-developed technology and capabilities have been viewed as a powerful tool in U.S. national security strategies. In addition to U.S. unilateral controls, the U.S. also participates in four major multilateral control regimes: the Australia Group (chemical and biological weapons), the Missile Technology Control Regime (MTCR) (missiles and missile technology), the Nuclear Suppliers Group (NSG) (nuclear weapons), and the Wassenaar Arrangement (conventional arms and dual-use goods and technologies).[103]

After the Cold War, the U.S. government prioritized U.S. export control policies on limiting the proliferation of weapons of mass destruction (WMD) and missile technology. However, with the public emphasis, including in both the 2018 and 2022 National Defense Strategies, on the re-emergence of great power competition, U.S. export control policy debates are broadening in scope as both the executive branch and Congress consider export controls a central pillar in preserving U.S. technological leadership. This re-emphasis on technological leadership also has a U.S. values and foreign policy focus, as multiple administrations and Congress have all emphasized strengthening export controls on items that assist repressive regimes in surveilling and controlling their country's citizens, such as facial and voice recognition technology. **As a result, U.S. policy and political debates regarding dual-use export controls have shifted in a profound way based upon the U.S. government's assessment of PRC capabilities and intent.**

For example, in 2018, Congress passed the Export Control Reform Act (ECRA),[104] which established a permanent authorization for the President to control dual-use goods and certain military parts and components. The law also authorized the President to establish policy requirements for setting controls and to coordinate multilateral export control regimes. It is noteworthy that ECRA was the first export control statute to explicitly state U.S. economic security is an element of U.S. national security.

Importantly, ECRA also required the President to establish an interagency process, led by Commerce, to identify emerging and foundational technologies and for Commerce to establish a licensing process for those technologies. Commerce's Bureau of Industry and Security (BIS) is responsible for administrating these controls through the EAR. The EAR sets licensing policy for specific destinations, end use, and end user controls and includes the Commerce Control List (CCL) of dual-use technologies subject to the controls.

In the process of implementing the requirement to establish a licensing process for emerging and foundational technologies, the U.S. government has been wrestling with how to define and control AI and quantum computing. **Each technology encapsulates the biggest tension points in export controls: disputes over determining the state of the art and therefore what is worth controlling; scoping what should be controlled; an accurate assessment of foreign availability (items of comparable quality and in sufficient quantity from a non-U.S. source as to render a U.S. export control or denial of an export control license ineffective), including what is available or similar in the PRC; and identifying and controlling technology at the speed of adoption.** At the same time, both current and former Commerce senior officials emphasized export controls are a time-limited solution, and controls are likely to become less effective as technology advances and/or competitors and adversaries find workarounds. Therefore, since the passage of the ECRA, the focus has also been on effective enforcement of U.S. export controls, continuous evaluation of foreign availability, and pursuit of plurilateral cooperation with like-minded nations.

As an illustrative case, in October 2022, the U.S. government issued a rule[105] imposing controls on items that supported the PRC's advanced computing capabilities, which can also support AI applications. The rule also attempted to limit the PRC's indigenous semiconductor companies' production to their current levels, which is roughly two generations behind the current leading-edge semiconductors. Following the unilateral imposition of U.S. export controls, the U.S. government worked to secure plurilateral acceptance from the Japanese and Dutch governments because unilateral U.S. export controls would have been less effective as these countries have companies with some of the most advanced manufacturing equipment covered by the controls. It is important to note in this context that there have been discussions about adding a fifth multilateral export control regime to specifically address

the PRC challenge. However, apart from the lack of consensus on the nature and severity of the challenge, some allies and partners lack the legal framework to impose controls comparable to U.S. standards. The speed of technological change also informs the viability assessment of a fifth multilateral control regime because it takes years to get a technology controlled by the current multilateral regimes. In the case of the semiconductor industry, the planning assumption is that a new technology node will be available roughly every two years. Therefore, the strategy Commerce pursued with the Japanese and Dutch governments offers important insight into the most likely approach Commerce will pursue in future situations.

In addition, in the aftermath of the October 2022 semiconductor control rule, there were reports Chinese AI companies on the Entity List (a Commerce list of entities acting contrary to the national security and foreign policy interests of the United States) were using intermediaries to evade the controls.[106] It would be prudent for industry to assume Commerce will put increasing emphasis moving forward in ensuring companies and their supply chains "know their customers."

Finally, given the pace of technological innovation and the PRC's aggressive blending of civil-military fusion of technology, policy conversations have resurfaced in Washington about the potential utility in moving to a single licensing system. Currently, there are multiple federal departments and agencies with responsibility for export controls, and it can be confusing for industry to navigate the byzantine system. For instance, in its FY2022 annual report – its most recent published report – BIS stated it worked with DoS on 248 requests to determine whether a particular item was subject to DoS's ITAR or Commerce's EAR.[107] In many cases, those adjudications took months to complete. Back in 2009, there were conversations about reforming how the executive branch handles export controls. The review effort at the time established four goals: a single licensing agency for dual-use items and munitions, a single control list, a single agency for export control enforcement, and a single integrated information technology system.[108]

Recommendations:

Short-Term

49. **Both the executive and congressional branches must re-evaluate the merits of moving to a single licensing agency for dual-use items and munitions, a single control list, and a single agency for export control enforcement.** Peer competitors of the U.S. are increasing civil-military fusion to gain advantages in the global technological competition.

50. **The U.S. government must evaluate the market barriers in multilateral agreements, such as the MTCR, and the benefits of lessening licensing requirements to our closest allies and partners.**

51. **Both the executive branch and Congress must assess the long-term impacts of U.S. export controls to U.S. technology leadership, including the risks of "design out" and avoidance of U.S. content.**

52. **DoD and DoS must push trade policies to maintain and expand international markets with allies and partners.**

Pillar 4: Restoring Industrial Readiness Powerhouses

The key challenge facing the U.S. DIB is how to adequately prepare for a possible future need for surge production under protracted conflict. In 2021, DoD re-asserted it would take significant time and government financial resources to reorient the defense industry to effectively handle peer conflict, requiring: **"[difficult] but necessary investment choices, including expanding funding for capital investment in facilities and training and maintaining the workforce. Without serious and targeted investment – billions instead of millions – America's DIB is simply unsustainable,** [emphasis added] let alone capable of supporting our deployed forces and legacy equipment while solving complex warfighting challenges posed by advanced technologies in the 21st century, from AI and cyber to hypersonics and autonomous air and sea systems."[109]

The 2022 NDS emphasizes deterrence by resilience and defines resilience as "the ability to withstand, fight through, and recover quickly through disruption."[110] To increase industrial resilience, the U.S. government must continue to incentivize the U.S. DIB to expand its manufacturing capacity and to sustain its focus on rebuilding and revitalizing the U.S. DIB workforce.

In *Vital Signs 2024*, NDIA noted that the powerhouses of industrial readiness – stable and predictable budgets, an experienced and specialized workforce; diversified and modern infrastructure; manufacturing innovation; and sufficient, including idle, capacity – have all atrophied under the transition to a services-based economy with a premium on just-in-time commercial supply chains. Additionally, the widespread offshoring of American manufacturing has led to a decline in overall manufacturing expertise and skilled workers. The report also noted that for the last 35 years, on a bipartisan basis, the U.S. government failed to resource the U.S. industrial footprint required to prevail in near-peer conflict. The 2023 NDIS emphasized the importance of incentivizing industry to improve resilience by investing in extra capacity and recommended legislation to plan for spare production capacity and to provide oversight.[111] Any follow-on executive or congressional branch efforts should consider the **fact that currently neither the federal government nor the investor community incentivizes the U.S. DIB to have significant surge capacity.** Neither wants to pay for economic inefficiencies, including idle facilities,[112] idle capacity,[113] and high indirect rates for labor.[114]

In terms of facilities costs, there is a bias toward economic efficiency. Ordinarily, defense contractors must try to mitigate the costs of idle facilities and idle capacity before passing those costs on to the government via indirect rates. Generally speaking, costs of idle facilities are unallowable, and costs of idle capacity are allowable under certain conditions.[115] During the 2020 – 2021 global COVID-19 pandemic, the federal government made allowances under federal regulations for companies having idle capacity, but companies are reporting they expect renewed emphasis on government enforcement of this regulation. Therefore, the federal government would have to make policy and regulatory changes before companies could carry significant excess capacity. This is a continuation of a pre-existing problem facing the U.S. DIB, where companies must invest in production capacity prior to winning a contract, to be deemed capable of delivering the required quantities of materiel.

In addition, **the federal government must revisit policies and regulations around indirect rates for labor.** As a general example, as the work a company does on a program or contract winds down and the company anticipates another program or contract may begin, on its own, the company will want to keep employees it will need for the next contract, such as engineers and skilled trade workers. However, during this gap period, the federal government will not want the company to carry too many employees if it results in the company charging the government indirectly for that labor. In addition, companies know investors are also looking for economic inefficiencies, which are exacerbated by the outmoded, inflexible model of acquisition and sustainment. Investors focus on the return on a company's net assets and do not want the company carrying anything diluting economic efficiency in the metrics they use to ensure the company is financially healthy. Additionally, in government-owned contractor-operated (GOCO) facilities, where industry is even less incentivized

to make significant investments, much excess capacity has been sold off or left to become obsolete, creating further barriers to surge capacity production.[116]

Over the course of the past year, NDIA received feedback from companies across the U.S. DIB regarding the disincentives and barriers preventing companies from expanding production capacity. **One of the top issues mentioned was maintaining a workforce that could keep pace with scaling production.** Private sector respondents reported that while 52% assessed their companies had a sufficient number of skilled workers for current production rates, 31% did not. In addition, 55% of private sector respondents reported their companies currently have sufficient cleared workers for current production rates, but 30% reported they did not (see Q55 Chart). These numbers are similar to those recorded in the *Vital Signs 2024 Survey*, indicating that there is further work to be done to support industry's need for cleared and skilled workers.

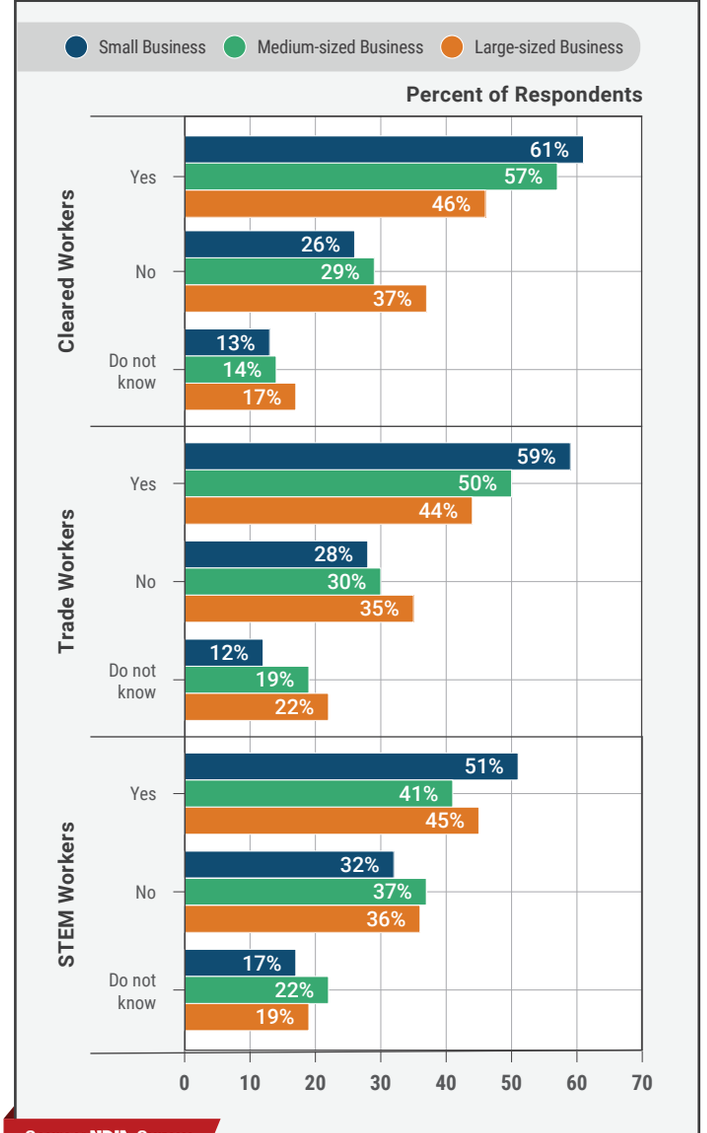
The *Vital Signs 2025 Survey* also asked private sector respondents if DoD needed to rapidly increase production for their company's service or product, would the company's suppliers be able to support increased production? While 55% responded favorably, 45% responded either negatively or said they did not know (see Q47 Chart). However, when broken down by business size, respondents from large-sized companies indicated significantly less confidence in the ability of their supplier bases to respond to surge production, with over 45% of respondents from large U.S. DIB companies saying that they do not know if their suppliers could support increased production, and a further 13% stating that their suppliers would not be able to meet surge production. One factor driving these responses is the significant number of suppliers supporting large firms, which can lead to difficulties in accurately ascertaining potential spare capacity.

The *Vital Signs 2025 Survey* asked private sector respondents several questions to identify the top issues impeding industry's ability to expand production. The top three issues identified are (see Q48 Chart on page 57):

- No contract vehicle to justify expansion (54%)
- Challenge to expand number of skilled or cleared workers (46%)

Question 55

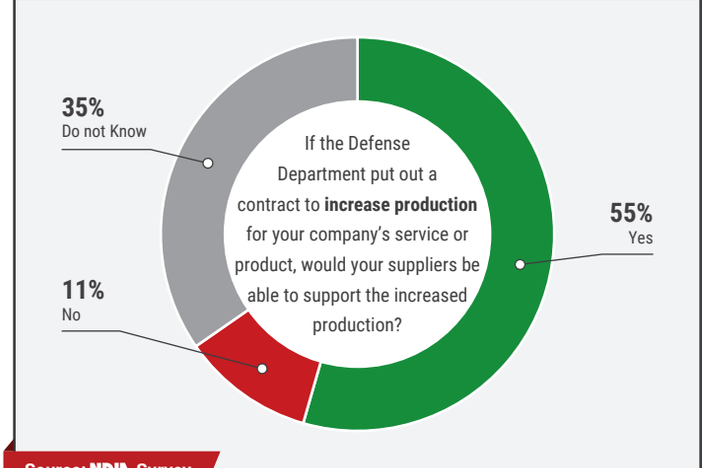
Does your company currently have a sufficient number of the following workers for your current production rates?



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Question 47



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

- DoD acquisition strategy does not justify expansion (42%)

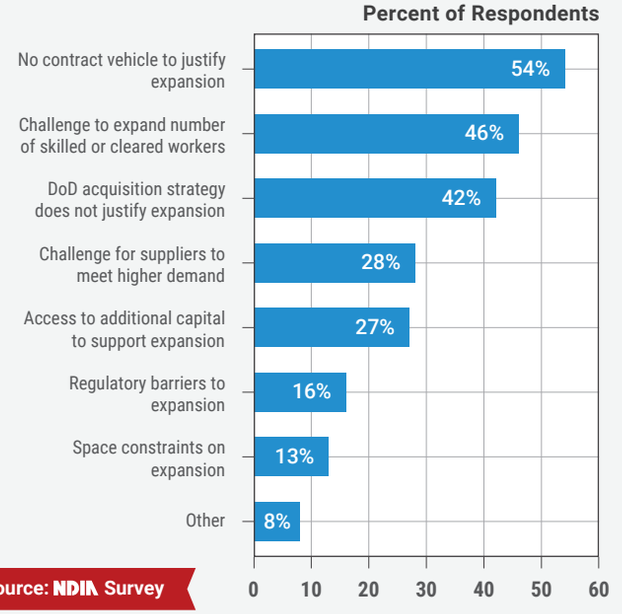
The *Vital Signs* report series previously addressed the challenge of not having a contract vehicle to justify expansion. As a concrete example, especially given the importance in the Indo-Pacific, this year's report focuses on munition production. **The current U.S. policy priority to ramp-up production of certain categories of munitions provides useful insights into private sector feedback regarding how DoD's current acquisition strategies do not justify expansion.** For historical context, munitions have often been the bill payers for higher priorities in the DoD budgeting process. While the Military Services and Combatant Commanders reference requirements-based processes, the munitions requirements in the annual budget process are often softened from "what is required" to "what we can afford." This only further weakens the munitions industrial base, as manufacturing facilities are left without sufficient cash flow to modernize or repair production lines. As Q26 Chart shows, this explains why the top two variables that drive private sector investment are government contract vehicles and what Congress specifically enacts into law each year. Unfortunately, this is further exacerbated when, as an example of challenges with acquisition strategy, the government can commit to funding the first year of a multi-year award but not necessarily commit to future funding. This repeated, year-after-year pattern disincentivizes investment, and leaves both government and industry scrambling when surge production is required.

In the event of a sudden need for surge capacity, identifying facilities with latent surge capability is also an impediment to quickly scaling up production. There is no existing mechanism to identify existing latent capacity, which could provide a crucial bridging mechanism to scaling industrial output. While the 2023 NDIS did note the importance of novel mechanisms to support new excess capacity, locating and utilizing existing facilities is equally crucial. **The legwork to support the future need for additional capacity must begin now.**

In addition, the Ukraine and Israel contingencies renewed the emphasis on MYP authorities and the associated advanced procurement (AP) and economic order quantity (EOQ) funding in the FY2024 budget requests.[117] These authorities are essential to help industry retain and recruit skilled workers necessary for surge production and to support their suppliers and supply chains with forecasts for long lead time items such as electronics, metal parts and steel, energetics, and packing

Question 48

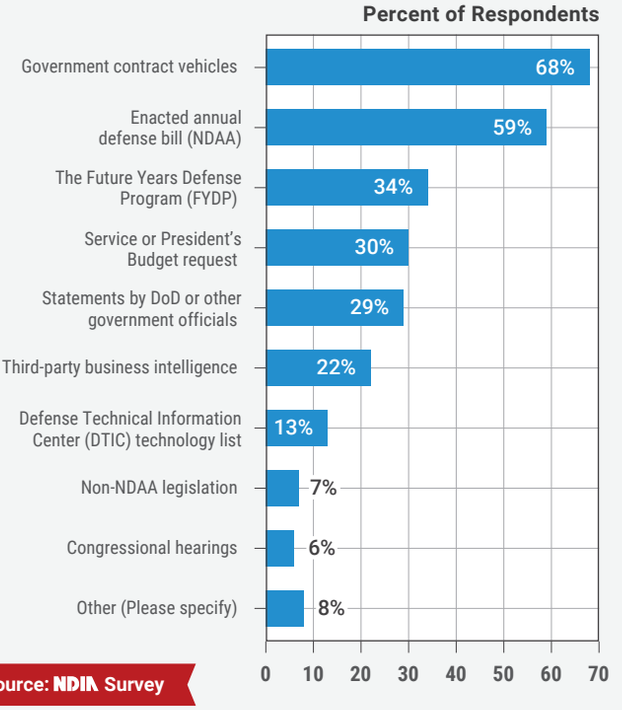
What are the biggest barriers to expanding capacity? *(Select all that apply)*



Source: NDIA Survey

Question 26

Which 3 variables represent the strongest demand signal for R&D, CapEx, and other investment decisions?



Source: NDIA Survey

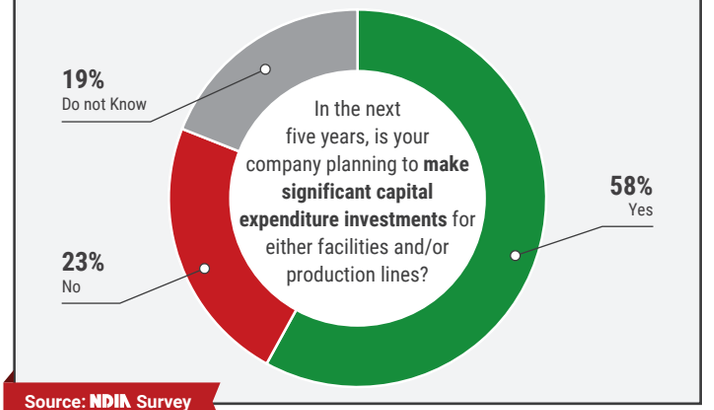
materials. However, even with these new mechanisms, there are challenges, including multi-year contracts that do not in some cases have a minimum buy or, in other cases, have a sharp decrease in production in the immediate years after the accelerated ramp-up of production.

Finally, U.S. industry has sought to constructively remind the government that ramping up production of munitions in many cases exacerbates the competition for component parts, such as electronics and circuit boards. The competition is both between munition categories and with the civilian economy, including competition with the automobile and mobile phone sectors, due to components at lower tiers of the supply chain often being dual use. This has profound implications for lead times and the impact inflation can have on the prime contractor and suppliers under FFP contracts. It therefore takes the combined efforts of OSD, the Military Services, and Congress to ensure MYP authorities and advanced procurement and EOQ requests are viable from a business strategy perspective.

Yet, despite these challenges, the U.S. DIB is continuing to assume risk and make capital investments. Of note, 63% of private sector respondents work for companies that made significant CapEx investments in the last five years for either facilities and/or production lines. Large and medium-sized U.S. DIB members continue to make investments to maintain existing facilities and increase production. However, small business respondents were far less likely to report significant investments in the last five years, with only 46% stating that their firms had made such investments. These small businesses may lack adequate demand signals to make these investments, and due to their smaller cash reserves, may need more concrete information to spur investment. **Additionally, further direct support may be needed so that small businesses can adequately scale up production to meet the requirements of large programs. This can be potentially ameliorated through the involvement of private equity and venture capital, who in recent years have indicated a greater desire to make investments in both defense and overall supply chains.**

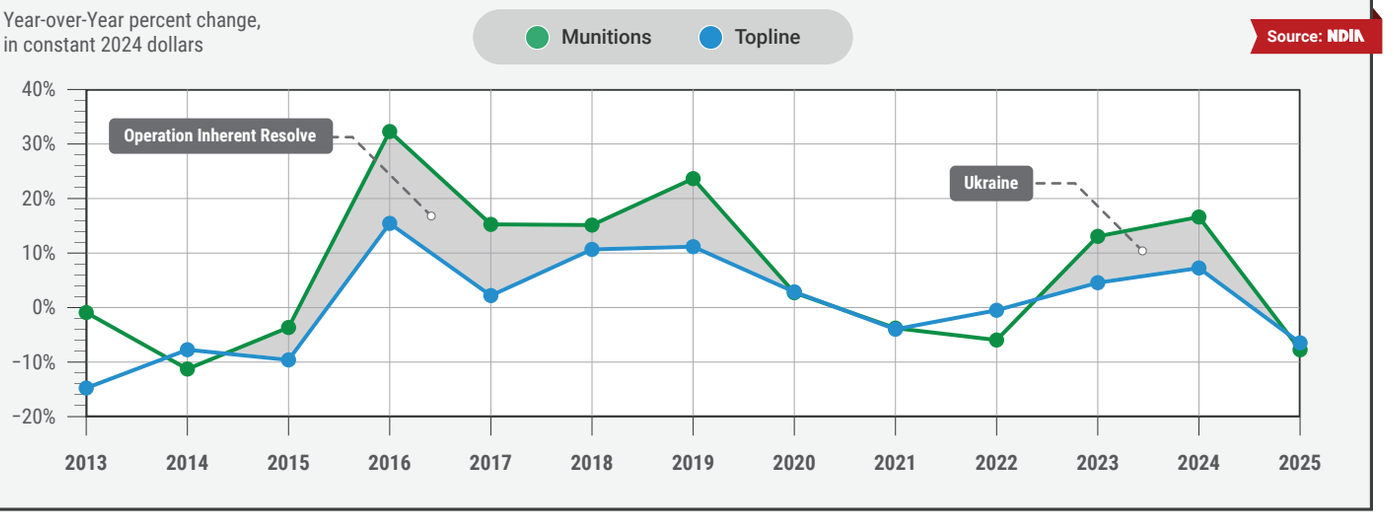
In addition, 58% of respondents indicated their companies intended to make additional significant CapEx investments in either facilities and/or production lines during the next five years (see Q45 Chart).

Question 45



*Due to rounding, the sum of the figures may not equal 100%

DoD munitions spending is directly tied to surges in demand during conflicts



Data from: OUSD Comptroller Program Acquisition Cost by Weapon System.

Recommendations:

Short-Term

53. **DoD must create a program that identifies and retains spare industrial capacity that can serve as a stopgap until additional facilities are brought online during times of additional demand.** The Defense Logistics Agency (DLA) operates a similar program for castings and forgings (alongside the American Metalcasting Consortium and the Forging Defense Manufacturing Consortium), and using that program as a guidepost, DoD can more effectively meet demand through a network of partner facilities that can either already meet production requirements for platforms or can be quickly modified to meet said requirements.

Medium-Term

54. **DoD and Congress must view and treat industrial capacity akin to a weapons system rather than an ancillary and tenuous byproduct of systems acquisition.** DoD must reconcile and strike a balance between efficiency, cost avoidance, and additional capacity, and then execute this balance with contracts. While public announcements and legislation are important signals to financial markets and industry, industry cannot routinely raise capital for new investments or expanded production absent contract vehicles.

55. **DoD and the Military Services must view the retention of a skilled workforce, the expansion of the supplier base, and the financial viability of significant CapEx investments as subsystems to industrial capacity.** For example, there are several pending MYP authorities for certain categories of munitions that face a steep acquisition cliff beyond the life of the multi-year. This impacts the business strategy decisions for production capacity, from capital investment to operating expenses and workforce management.

56. **Congress must allocate additional funding for contracts for the express purpose of enhancing capacity investments. Additionally, Congress must legislatively approve incentives such as tax incentives, regulatory relief, and long-term contracts with the specific goal of creating and maintaining production capacity ullage.** DoD in turn must execute additional allocations by creating business arrangements that enhance resilience and incentivize the U.S. DIB to perform.

Long-Term

57. **DoD must examine and prioritize permitting processes for U.S. DIB capacity support.** This includes facilities for sub-tier suppliers, component assembly, and final product integration. While there are accelerated permitting programs for clean energy projects, such as FAST-41, there are no such defined programs for U.S. DIB-critical projects.

Workforce

The recruitment and retention of a highly skilled and trained workforce is a cross-cutting issue across all five strategic pillars on which a modern, diverse, and resilient U.S. DIB is built. In 1985, the U.S. had 3M workers in the defense industry.[118] **By 2021, the U.S. had 1.1M workers in the sector, a reduction of nearly two-thirds.** The 2023 NDIS notes that the U.S. labor market "lacks sufficient workers with the right skills to meet domestic production and sustainment demand."[119] An experienced workforce meters how quickly different sectors of the U.S. DIB can scale and sustain production. Workforce recruitment and retention issues are also critical factors behind lengthening lead times in supply chains because the extended timelines often reflect how long it will take suppliers to increase their workforce to meet demand.

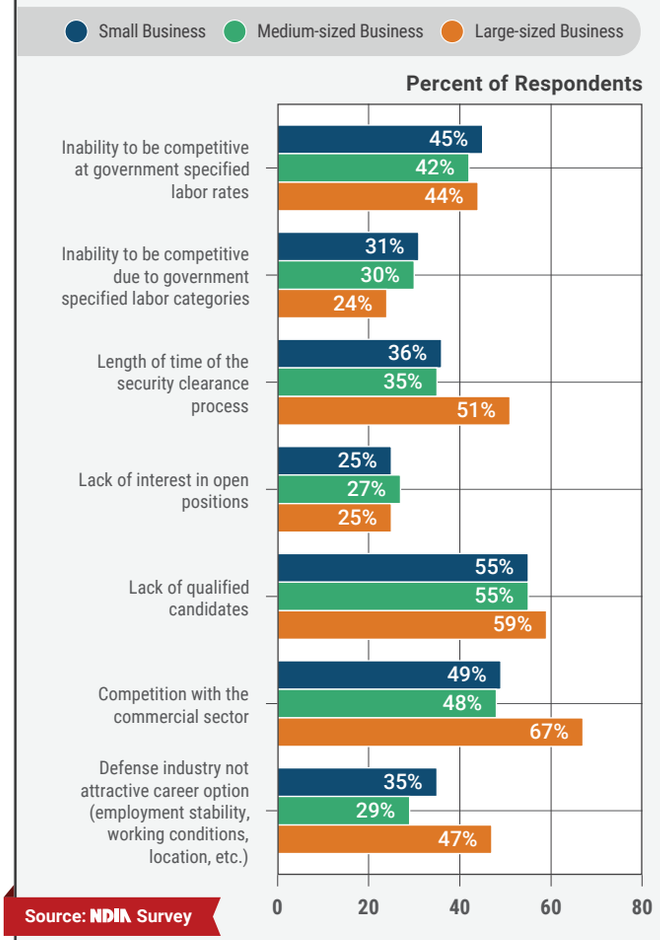
The *Vital Signs 2025 Survey* asked private sector respondents to rate how hard it is to find cleared, skilled trade, and STEM workers.[120] Across all three categories, most of the respondents indicated it was somewhat difficult or very difficult (see Q54 Chart):

- Cleared Workers (60%)
- Skilled Trade Workers (63%)
- STEM Workers (53%)

These results are very similar to last year's survey (59%, 63%, and 55%, respectively).

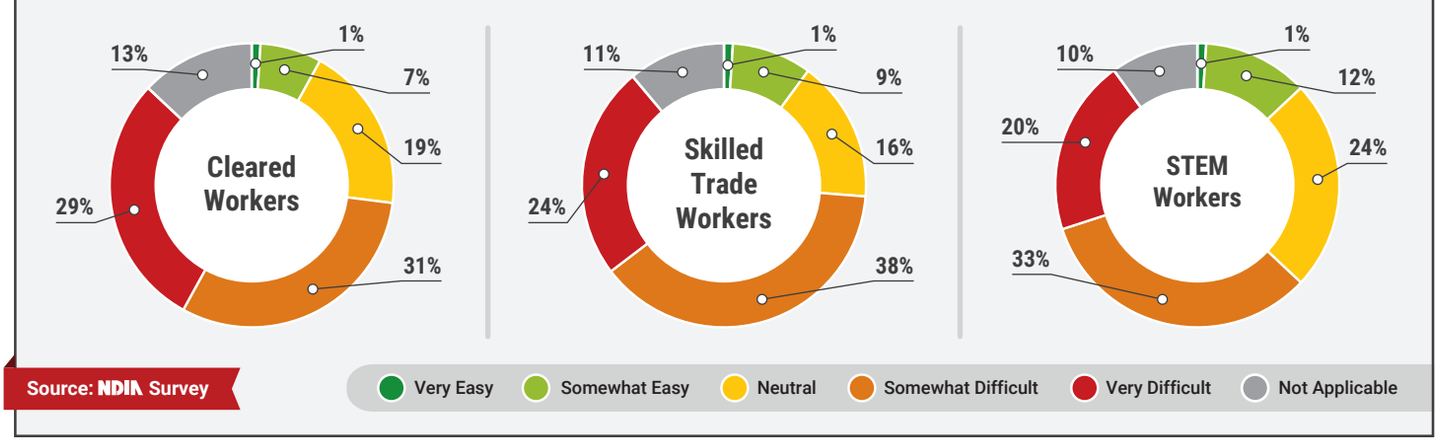
Question 56

What are the biggest barriers to filling vacancies in your company? *(Select all that apply)*



Question 54

How difficult is it to find the following workers?



*Due to rounding, the sum of the figures may not equal 100%

The *Vital Signs 2025 Survey* also sought to identify the top barriers to filling vacancies. The top two issues identified were (see Q56 Chart on page 60):

- Lack of qualified candidates (54%)
- Competition with the commercial sector (53%)

These results were two of the top four issues identified in 2024's survey.[121] Of note, large U.S. DIB companies were much more likely than smaller companies to identify as barriers (1) competition with the commercial sector (67% large vs 48% small), (2) the defense industrial sector as not being an attractive career option (47% vs 35%), and (3) the length of the security clearance process (51% vs 36%).

Industry also clearly identified the recruitment of new workers (55%) and retention of new workers (47%) as the most pressing issues companies are facing regarding their workforce. On this question, the survey found that large companies find it more difficult than their small- and medium-sized counterparts to retain workers. A clear majority of large businesses (70%) identified the retention of new workers as a pressing issue, while only 40% of the rest of industry identified this as a pressing issue. Similarly, large businesses are 15% more likely to identify the retention of long-term workers as a pressing issue compared to small companies. The survey results clearly show that the U.S. DIB's workforce challenges remain consistent and pressing.

The U.S. DIB does not operate in isolation and must compete with non-defense sectors for the same workforce. Due to regulations limiting the U.S. DIB's profits and wage limits, the U.S. DIB has not been able to keep up with non-defense increases in pay, erasing the wage premium that once ensured the nation's top talent was working in the sector dedicated to delivering solutions to the warfighter.

In addition, over the past several years, **government-industry forums have also reinforced that the U.S. DIB is not competitive with the commercial sector in the areas of compensation and fringe benefits.** Companies note that the U.S. DIB's low profit margin along with regulations regarding pay and benefits make it hard to recruit and retain professionals who can find higher pay and more attractive benefits in the commercial technology sector. For example, one NDIA member company, producing strategic platforms for the U.S. military, provided company proprietary data showing how its wage premium has eroded by 44% since 2014. There are several reasons for this, including increases in minimum hourly wages in certain states.[122] These challenges are exacerbated by the tough working environments in many U.S. DIB sectors.

NDIA member companies' human resources departments helped provide data on benefits across the aerospace and defense sectors, and the commercial technology sector. Respondents in the aerospace and defense sector noted the top four issues that encourage them to stay are, in priority order, pay and bonus (54%), retirement benefits (49%), health benefits (44%), and flexible work arrangements (34%).[123] The survey also asked respondents what factors would cause them to seek new employment. Respondents had the same priority list, but it was noteworthy that for each category – pay and bonus, retirement benefits, health benefits, and flexible work arrangements – the aerospace and defense sector respondents highlighted these issues at either double or near double the rate of commercial technology sector respondents.[124]

U.S. Submarine Industrial Base (U.S. SIB)

NDIA took a deeper look at one sector, the U.S. SIB. The two leading challenges to the U.S. SIB are the health of the supplier ecosystem and the shortage of skilled workers. These challenges have been known for several years. There has been a large decrease in the average U.S. SIB workforce experience over the last ten years, especially for skilled trade workers and for supervisors. The average experience in skilled trades has dropped from 17 years to six years, and the average experience of supervisors has dropped from six years to two years. In addition, companies and technical experts noted that it is not uncommon to see 32% – 40% first-year attrition rates for the training pipeline for the U.S. SIB. Work conditions are the most cited reasons for the attrition, including the tough working conditions in manufacturing and shipyard work

environments, and the fact that many U.S. DIB positions do not allow for remote work, which as noted above, is a very attractive recruiting tool for the commercial sector. These factors are not unique to the U.S. SIB or U.S. DIB and are consistent with other sectors that have stressed the challenge of retaining talent, including engineers, operations workers, and supervisors, at both the prime and supplier level.

Skilled Labor

Industry 4.0/5.0[125] technology innovations are increasingly required for designs of defense assets at the component and system level, creating additional requirements for defense manufacturers as they hire new workers with resonant capabilities, and upskill the current workforce to perform at the necessary scale and speed. This technical skills workforce gap also directly challenges the U.S.' productivity and the fragile supplier ecosystem. **Without robust training and tailored apprenticeship programs, there simply will not be enough welders, technicians, electricians, maintainers, and other skilled workers available to meet the manufacturing needs of the U.S. DIB, not to mention the nation as a whole.**

Unfortunately, there are several obstacles stymying the growth and sustainment of America's skilled workforce. First, there is a lack of communication, awareness, and coordination between various sponsors of vocational training programs, and there is currently no plan or mechanism to scale and spread existing pockets of excellence across the nation. For example, many regional technology hubs promoted by multiple federal agencies as well as individual companies in the U.S. DIB have experimented with workforce solutions, often through individual partnerships with community colleges and trade schools. However, without a central repository, these hubs are unable to easily collaborate, identify best practices, improve workforce promotion, and propagate solutions nationwide. Therefore, while solutions need to be locally and regionally focused and deployed, a nation-wide strategy focused on coordination, outreach, and advocacy is needed to drive the creation of educational programs designed to effectively produce the skilled workers to meet U.S. national security requirements.

Second, for many in our nation's education pipelines, a bachelor's degree for every student is considered the ideal outcome. While the intentions are honorable, the impact is ultimately detrimental to the well-being of students. It unfairly presents to students a single outcome – a four-year degree – as the only viable option for a successful future, thereby artificially blocking potential career fields in which a student could thrive. The statistics are, indeed, troubling. Since the 1990s, the average number of Career and Technical Education (CTE) credits earned by high school students in the U.S. has significantly decreased; in fact, CTE is the only subject area that saw a decrease between 1992 and 2013.[126] And while many states have since renewed pushing funding toward CTE, the decades of neglect has left gaps in data that would have been useful to track programmatic success.[127] One prominent skilling pathway, apprenticeships, has been heralded as a key workforce improvement practice, but this pathway has been underutilized due to the costs to employers.

Third, **the national perception of skilled labor as a less desirable career path hampers recruitment efforts.** Due to a negative perception, fewer potential candidates are willing to see these kinds of jobs as viable or desirable, and are, therefore, unlikely to enroll in any CTE or apprenticeship programs. To compound this challenge, for the U.S. DIB, many positions require background checks, drug tests, and/or security clearances, adding additional perception barriers to filling the U.S. DIB's skilled workforce demand. These perception hurdles are not insurmountable, but they require **a national-level effort to re-emphasize that this is a valuable career path.**

Finally, the performance and availability of small and medium-sized manufacturers in the DoD supply chain is constrained by a diminishing industrial workforce and increasing instances of skills gaps and job vacancies across our industry. These businesses often lack the resources large companies have available to invest in local and regional training pipelines. Since many small- and medium-sized businesses lack the capacity and resources required for addressing their workforce shortfalls, DoD has an opportunity to expand its current support for these businesses to further address skill gaps and job roles critical to DoD.

Recommendations:

Short-Term

58. **The executive and congressional branches must review the impacts of prevailing wage rates and labor categories on the U.S. DIB's ability to increase wages and address any impediments discovered.** Across multiple U.S. DIB sectors, companies have noted that in certain regions, minimum wage increases and service sector starting wages are approaching industrial base starting wages.
59. **DoD must design a Workforce Solutions Dashboard with a multi-faceted performance matrix that identifies, details, and quantifies workforce solution innovations and mobilized regionally by existing federal mechanisms.**
60. **DoD must align public and private skilled trades definitions such to reflect new U.S. DIB trades capabilities necessitated by emergent technologies.**
61. **DoD must facilitate existing credentialing offered by Manufacturing Innovation Institutes (MIIs) and industry partners for skilled tradespersons across public and private defense construction and sustainment venues.**
62. **DoD must expand its current support for small- and medium-sized businesses to further address those skills gaps and job roles critical to DoD.**
63. **The Military Services must encourage both collegiate degrees and skilled trades as important and viable career paths for departing service members.** Historically, a significant portion of the U.S. DIB skilled trades talent pipeline came from enlisted personnel. However, there are concerns that the Services are not currently encouraging skilled trade career paths.

Medium-Term

64. **The Department of Labor (DoL) must pursue insightful data to develop a more granular understanding of the collective status of manufacturers' workforce.** This data must specifically focus on (1) the number of engineers, skilled workers/tradesmen, and other critical roles currently employed and their experience levels, (2) existing unfilled workforce needs, and (3) forecasts of their workforce needs two years from now. This data must explicitly differentiate across sector and region.
65. **The Department of the Navy has spent several years working on local, state, and federal partnerships to re-develop skilled trade talent pipelines. The Department of the Air Force must implement a similar program directed at military aircraft manufacturing skills.**
66. **In collaboration with DoL, DoD must expand the Registered Apprenticeship Program (RAP) by increasing funding for trainee pay and mentoring that allow for training significantly larger pools of specialty-skilled workers, deploying them rapidly into the U.S. DIB.** An affiliated Pre-Apprenticeship Program available to regional defense manufacturing hubs, co-managed by industry and school systems, would create a pathway for youth into "Registered Apprenticeship 2.0."
67. **DoD must include training expenses for targeted, potential-employee training programs as allowable costs.**
68. **The new Administration must develop a national manufacturing strategy to accelerate closing the workforce gap in manufacturing across all sectors of the U.S., including the defense sector.** This strategy can be informed by the workforce development strategy detailed in Section 1451 of the enacted FY2025 NDAA.

Pillar 5: Reinforcing Resilient Supply Chains

Policymakers' renewed focus on supply chain resiliency is a recalibration of a framework that previously prioritized efficiency and lower costs over domestic production and resilience. **A new policy framework has emerged over the previous two administrations, which seeks to limit the PRC's access to cutting-edge technology, especially technology that can be diverted to military applications, and to build alternative supply chains in sectors where the PRC currently dominates.** As noted earlier in the report, this is driven in large part by the PRC's dual circulation strategy. This recalibration is having a tremendous impact on the civilian industrial sector, but it has an even deeper impact on the U.S. DIB because of its smaller purchasing power compared to the rest of the U.S. economy.

> In the *Vital Signs 2025 Survey*, both federal government respondents (61%) and private sector respondents (53%) cited supply chain challenges in the top three most pressing issues facing the U.S. DIB.

This recalibration has also led to heightened interest in both reshoring and friendshoring. It should be noted with caution, however, that these policy initiatives come with their own complexity. For example, the *Vital Signs 2024* report highlighted that the PRC provides a significant percentage of raw and intermediate inputs for priority supply chains, including for the microelectronics and advanced manufacturing sectors, to other countries in the region, as well as Mexico and Canada.[128] This will have important implications for the tariff and export control policy conversations in 2025.

In addition, as the 2023 NDIS highlights, supply chains have become global, which causes prime contractors to struggle to maintain full visibility over their entire supply chains. However, in seeking to remedy the situation, given the fluidity and complexity of international supply chains, **government and industry must both be realistic about the time required to fully identify truly independent and alternative supply chains and the level of resourcing required to operationalize those supply chains.**

Within this context, to be proactive, the two previous administrations focused on improving the resiliency of U.S. supply chains through better data on the structure of supply chains, investments in redundancy, greater ability to substitute between inputs, and improved communication across the supply chain. As part of these efforts, the previous Administration focused on Defense Production Act (DPA) Title III investments in five critical areas: kinetic capabilities, microelectronics, energy storage and batteries, strategic and critical materials, and castings and forgings.[129] For example, one-third of DoD's energetic materials are produced overseas, leading DoD to pursue partnerships to expand domestic production of energetics and chemical precursors.[130] Additionally, several funding streams and program offices have expanded efforts to access secure microelectronics due to concerns of backdoors in foreign-produced chips and supply chain disruptions.[131] In the field of castings and forgings, where according to a DoD official, the domestic supply chain for castings and forging has shrunk by 80%,[132] several consortia and public-private partnerships have engaged in efforts to leverage information sharing and accelerate workforce development.[133]

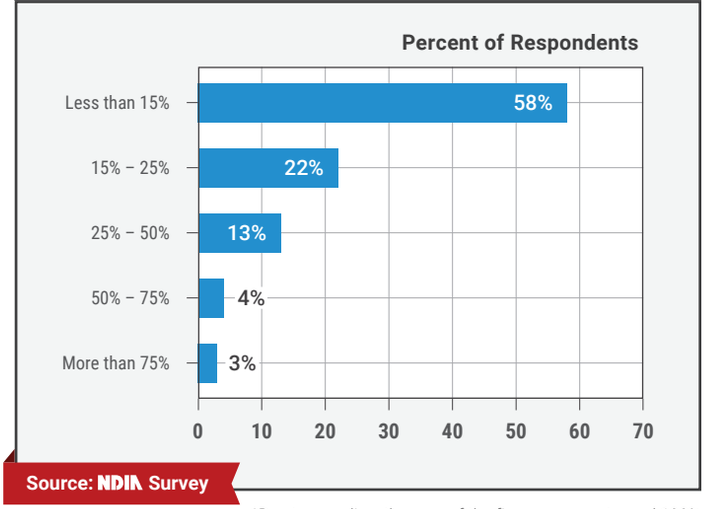
Congress also continues to focus on identifying and reducing vulnerabilities in strategic supply chains. The FY2024 NDAA included supply chain provisions covering critical mineral sourcing, energetic materials, military pharmaceuticals and military devices, semiconductors, unmanned aircraft, and cybersecurity risk management tools.[134] It also included a pilot program to identify supply chain vulnerabilities in certain platforms.[135] The FY2025 NDAA Conference Report continued this trend. Actions proposed in the NDAA include a required report on energetics supply chains and the establishment of DoD strategies for both batteries and solid rocket motors. These strategies call for the development and certification of second-source

suppliers as a crucial step toward supply chain security due to the prevalence of sole-source suppliers in many key materials.[136] Other items include supporting the small unmanned aerial systems (sUAS) supply chain, increasing public-private information sharing on adversarial practices against critical mineral supply chains, and the development of a roadmap for increased industrial capacity.

The federal government's classified sources and assessments, to which the private sector has limited access, drives the executive and congressional branches' focus and urgency with respect to reducing vulnerabilities in critical international supply chains. Due to the public policy focus surrounding friend-shoring and onshoring of supply chains, the *Vital Signs 2025 Survey* explored this issue. The majority of private sector respondents (58%) reported that 15% or less of critical components of their systems relied on allied nations for supply, and only 3% had more than 75% (see Q53 Chart).

Question 53

What percentage of components critical to your systems rely on allied nations for supply?



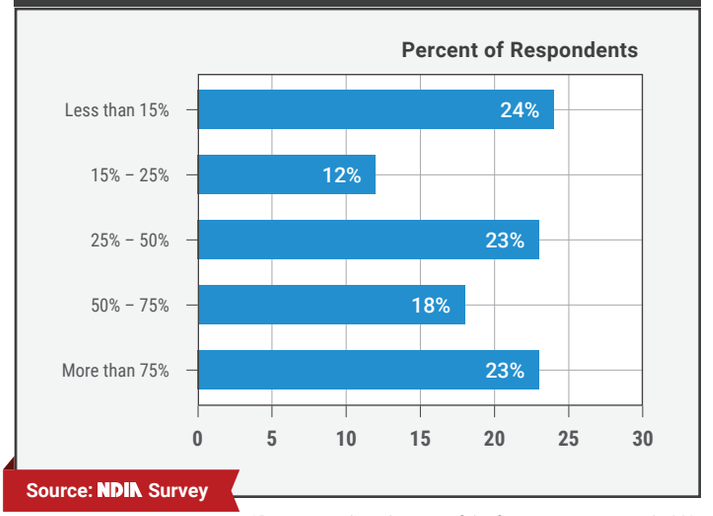
Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

These numbers, however, are not wholly representative of defense supply chains, due to the limits of supply chain visibility. For instance, a prime contractor may know that a supplier is based in the U.S. or an allied nation, but may not know from where all raw material or subcomponent inputs are sourced. Therefore, in its identified actions to achieve resilient supply chains, the 2023 NDIS noted the Department intends to leverage data analytics to improve supply chain visibility[137] to identify and minimize strategic supply chain risks and to manage disruptions proactively.[138] The *Vital Signs 2025 Survey* asked private sector respondents to identify the percentage of their company's supply chain over which they do have high visibility. Of note, 36% reported 25% or less, and 23% reported more than 75% (see Q49 Chart).

Question 49

For what percentage of your supply chain does your company or business unit have high visibility?



Source: NDIA Survey

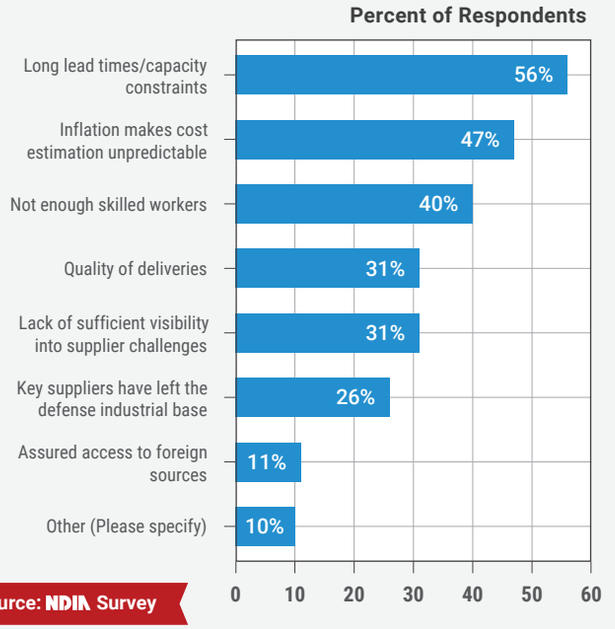
*Due to rounding, the sum of the figures may not equal 100%

DoD and Congress should continue to explore opportunities to increase supply chain illumination to identify high-risk nodes, including over-reliance on sole and single source providers, obsolescence challenges, and financial insecurity of critical contractors, as well as the overall integrity of the supply chain. At the same time, **it will be important to prioritize establishing sound policy and regulatory frameworks to support industry during this transition period.** This will help both the executive and congressional branches avoid becoming enmeshed in potential unintended consequences, such as identifying non-compliant parts and components, without the associated policies and authorities to remediate concerns.

As important as de-risking international supply chains are to national policymakers, it is important to emphasize the *Vital Signs 2025 Survey* shows private sector respondents' current biggest concerns regarding supply chain challenges are due to U.S. domestic challenges. In response to the question "What are the biggest challenges

Question 52

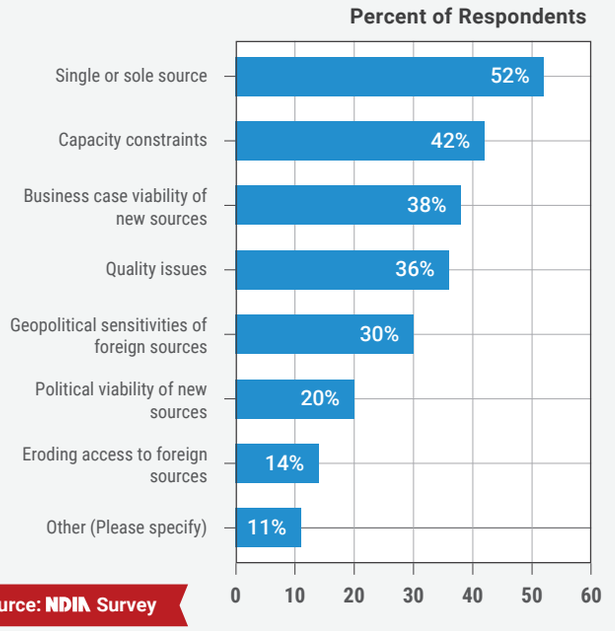
What are the biggest challenges to your supply chain? *(Select all that apply)*



Source: NDIA Survey

Question 50

Which supply chain vulnerabilities are most pressing for your company or business unit? *(Select all that apply)*



Source: NDIA Survey

to your supply chain?" the top three largest challenges were (see Q52 Chart):

- Long lead times/capacity constraints (56%)
- Inflation makes cost estimation unpredictable (47%)
- Not enough skilled workers (40%)

Private sector respondents were also asked to identify the most pressing supply chain vulnerabilities for their respective companies. The top concerns were single- or sole-source suppliers (52%), capacity constraints (42%), and the business viability of new sources (38%) (see Q50 Chart).

The *Vital Signs 2025 Survey* also sought to identify where the loss of suppliers was having the biggest impact. Of note, 28% of private sector respondents reported losing critical suppliers during the last three years, and 30% reported losing single- or sole-source domestic suppliers. In addition, roughly 16% of respondents reported losing single- or sole-source international suppliers during the same period (see Q51 Chart on page 67).

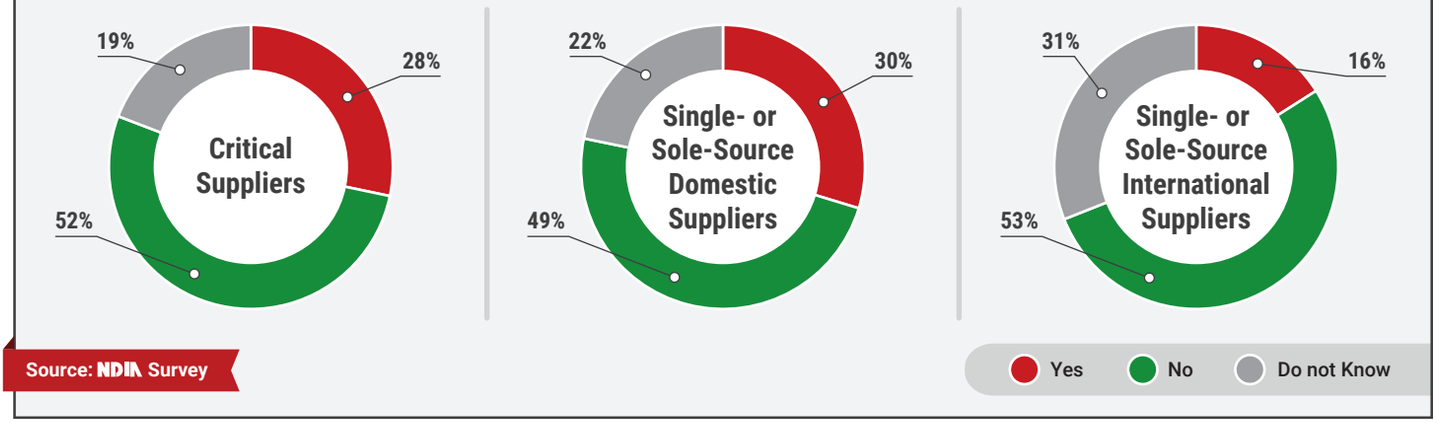
Supply Chain Harmonization

The strong policymaking focus propelling sourcing restrictions on raw materials and advanced technologies has led to a flurry of new restrictions for the U.S. DIB. Across all sizes of private sector respondents, **the *Vital Signs 2025 Survey* results found that procurement requirements were a significant impediment to working with DoD. Overlapping regulations and legislative language, with different effective dates, only serve to exacerbate this issue.**

Specifically, most of the proposed and active regulations are designed to be implemented in phases. While this may be helpful in an isolated case, in the aggregate, varying timelines for overlapping restrictions with different carveout exemptions confuse not only industry, but also contracting officers within DoD as well. It is important to note that NDIA members repeatedly emphasize they agree with the spirit of the restrictions and the effort to safeguard critical supply chains, but they note that the issuance of new restrictions is occurring at too fast of a pace and in a scattershot way, which impedes industry's ability to contribute to the overall goal.

One key area that comes into play when non-compliant parts are found is Domestic Non-Availability Determination (DNAD) Waivers. Under the Specialty Metals clause, a

Question 51 In the last three years, have you lost any of the following suppliers:



*Due to rounding, the sum of the figures may not equal 100%

waiver can be obtained through either the Director of the Defense Logistics Agency, the Secretary of one of the Military Services, or the Undersecretary of Defense for Acquisition and Sustainment.[139] It is crucial that the individuals responsible for issuing these waivers are on the system as much as possible, and that the waiver process is not sent further up the chain at DoD, to keep processing times low and minimize production disruption.

Supply chain harmonization can provide a level set for industry and government. This will allow all players to operate with a shared understanding of the regulatory environment, enable the necessary organic evolution of supply chains, and negate the need to create a positive list of DoD-approved suppliers, the latter of which would undermine the public policy goal of accelerating innovation and attracting new U.S. and allied suppliers for materials and technologies.

Recommendations:

Short-Term

69. **The Military Services must include resourcing second-source suppliers in their budget requests for critical single source material, components, and equipment.** Congress must support funding for second-source suppliers in these areas.
70. **DoD and Congress must collaborate with industry to develop a mechanism to address instances of supply chain noncompliance.**
71. **There must be interagency coordination and industry collaboration to harmonize supply chain restrictions/requirements.** A wide spectrum of supply chain sourcing restrictions/requirements will go into effect over the next three years. Clear, concise, and executable guidance must be provided to contractors to enable compliance with these restrictions/requirements.

Medium-Term

72. **DoD and Congress must prioritize both advanced procurement funding and a stable and long-term acquisition strategy for stockpiling.**

Critical Minerals

Raw materials are the foundation of all supply chains, many of which are dual use in nature. In recent years, competitor dominance of the production and processing of these raw materials has sounded alarm bells for national policymakers due to the possibility of restricted access to these critical materials.

The PRC is the world's largest producer, processor, and consumer of critical materials. This position was built over decades through its industrial policies and natural mineral endowment. For example, the PRC has significant reserves of some critical minerals, including heavy concentrations of rare earths in Inner Mongolia and antimony in Hunan. Additionally, the PRC has engaged in significant foreign investment to secure access to those resources that are not abundant in its own territory.

The PRC's production of critical materials feeds its manufacturing base, which currently represents 34% of total global manufacturing.[39] Government subsidies are a part of PRC industrial policy, and a recent brief by the Kiel Institute notes that, even by conservative estimates, PRC industrial subsidies amounted to nearly 2% of total PRC GDP.[40]

While critical minerals are often discussed in terms of clean energy technologies, it is important to note critical minerals have many military applications that are vital to the overall lethality of the U.S. Joint Force.

Select Critical Minerals in Defense Applications

Antimony	Antimony trisulfide is used in ammunition as a primer and in explosives.[41]
Arsenic	Used as a doping agent in semiconductors to increase conductivity.[42] Also used in lead alloys for bullets. [43]
Gallium	Widely used in semiconductors, including in electronic warfare suites and radar pods.[44]
Germanium	Germanium is used in night-vision and infrared lenses, as well as in sensors for satellite imagery.[45]
Nickel	Nickel is a component of many high-strength alloys, such as those used in rocket nozzles and armor plating.[46]

39 Seong, Jeongmin. "The global economy is resetting, China is repositioning itself to export innovative technologies, and its trading partners are more diverse." *McKinsey Global Institute.* April 22, 2024. https://www.mckinsey.com/mgi/overview/in-the-news/the-global-economy-is-resetting-china-is-repositioning-itself-to-export-innovative-technologies-and-its-trading-partners-are-more-diverse.

40 Bickenbach, Frank et al. "Foul Play? On the Scale and Scope of Industrial Subsidies in China." *Kiel Policy Brief.* Kiel Institute for the World Economy, April 2024. https://www.ifw-kiel.de/publications/foul-play-on-the-scale-and-scope-of-industrial-subsidies-in-china-32738/.

41 U.S. International Trade Commission. *Antimony: A Critical Material You've Probably Never Heard Of.* Brian Daigle and Samantha DeCarlo. October 2021. https://www.usitc.gov/publications/332/executive_briefings/ebot_a_critical_material_probably_never_heard_of.pdf.

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Niobium	Due to niobium's high heat tolerance, it is used in hypersonic platforms, jet engines, and nozzles.[47]
Rare Earths	Rare earths are used predominantly in magnets. Rare earth magnets are both strong and heat-tolerant, making them ideal for use in aerospace and kinetic applications.[48]
Tungsten	Due to tungsten's hardness, it is used in armor-piercing shells and ammunition rounds.[49]

As a result of the national security risks posed by adversarial dominance of the supply chains for critical and raw materials, Congress has called for increased investment in, and prioritization of, domestic and allied supply chains in recent legislation. The FY2024 NDAA stated U.S. "dependence on importing processed rare earth metals from adversarial nations presents a significant risk of supply chain disruption to the United States and our allies."

Recommendations:

Short-Term

73. **The U.S. government must take urgent and impactful action to secure a supply of gallium and germanium for the U.S. DIB, including increased stockpiling, providing bridge capital for allied projects, and promoting domestic recycling efforts.**

74. **DoD must certify the availability, at or near market prices, of supplies not sourced from Foreign Entities of Concern *before* sourcing restrictions/ requirements go into effect.** Without available, compliant raw materials, the U.S. DIB will be unable to complete work on platforms and products, hampering readiness. If senior DoD officials cannot certify the availability of the needed critical minerals, there must be trigger mechanisms in place to promote domestic and allied mining.

Medium-Term

75. **The 45X tax credit must be modified to support the development of a domestic mining industry.** This must entail increasing the credit to 20% and reducing purity requirements to allow non-vertically integrated mining operations to qualify.

Long-Term

76. **Congress must create further tax incentives for U.S. DIB-critical projects, along the lines of the 45X tax credit, with the express purpose of developing resilient supply chains for critical and emerging capabilities.** This can be combined with pre-existing authorities, such as Title III of the Defense Production Act. Additionally, trusted partner nations must be invited to invest in such U.S. DIB-critical projects.

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Conclusion

The United States is grappling with serious economic, social, and security challenges at home, and they deserve urgent and serious responses. At the same time, the world is growing more dangerous, fractured, and volatile. The new Administration and 119th Congress are inheriting their defense options from previous generations of leaders, but they are also creating the options and risks their successors will inherit. In a crisis, one thing leaders cannot buy is more time.

As discussed at the beginning of the report, time and consistency are immutable factors for both military readiness and defense industrial readiness. The report covers the most important issues that require real change, not incremental improvements, to ensure a healthy, diverse, and resilient U.S. DIB; one that provides the capabilities and capacity our warfighters require and deserve.

The clock is ticking.

Appendix A:

Top Defense Industrial Base Companies

Top Public Defense Contractors With 20% or More of Their Revenue Sourced from DoD Contracts
Contractor
AeroVironment Inc
Boeing Co/The
Booz Allen Hamilton Holding Corp
CACI International Inc
General Dynamics Corp
Great Lakes Dredge & Dock Corp
Huntington Ingalls Industries Inc
KBR Inc
Kratos Defense & Security Solutions Inc
L3Harris Technologies Inc
Leidos Holdings Inc
Lockheed Martin Corp
Northrop Grumman Corp
Oshkosh Corp
Parsons Corp
RTX Corp
Science Applications International Corp
V2X Inc
Viasat Inc
VSE Corp

Appendix B:

Recommendations by Section

Synergistic Partnerships

Assessing the Challenges

Short-Term

1. **The Department of Defense (DoD) and Congress must continue to make more substantial, sustained, and predictable financial investments to rebuild the U.S. defense industrial base's (U.S. DIB's) strategic endurance and resilience.** As reasserted in DoD's Fiscal Year (FY) 2020 Industrial Capabilities Report to Congress, the order of magnitude of financial investment is in the billions, not millions, of dollars.
2. **DoD and Congress must transform the inflexible programming, budgeting, and appropriations process,** as recommended by the Planning, Programming, Budgeting, and Execution (PPBE) Reform Commission.
3. **DoD and Congress must examine the application of cost and pricing data requirements by either raising the threshold or providing contracting officers additional flexibility.** One of the most particularly cumbersome regulations for NDIA member companies of all sizes is the requirement for certified cost or pricing data. The burden of cost or pricing requirements could be ameliorated either by raising the Truthful Cost or Pricing Data Act (formerly known as the Truth in Negotiations Act (TINA)) threshold or by granting contracting officers additional authorities to tailor these requirements to specific procurements, including allowing contracting officers to rely on historical data of recent prices paid in determining costs of a subcontract, a purchase order, or a modification of either.

4. **The appropriate contract type must be selected after reviewing the complexity and maturity of requirements and the level of financial and technical risk in the program.** NDIA companies of all sizes note that the Department and Military Services are preferencing firm-fixed price (FFP) contracts, even when it is not the most appropriate contract vehicle.
5. **The Office of the Under Secretary of Defense (OUSD) Acquisition and Sustainment (A&S) must update all policies, guidance, instructions, and training curricula to ensure they reflect the current policy provided by the Adaptive Acquisition Framework (DoD Instruction 5000.85), and the Military Services must also review whether they are following current policy,** consistent with the FY2022 National Defense Authorization Act (NDAA) in which Congress repealed the statutory preference for FFP contracts.
6. **DoD and Congress must review and reform the requirements process.** Experienced DoD acquisition executives note significant work has been undertaken to reform acquisition and PPBE processes. However, the third leg – the requirements process – needs to be reformed. This is an important area for additional work.

Novel Approaches and Flexible Pathways

Short-Term

7. **DoD and Congress must rethink the approach to acquisition strategies to ensure the most streamlined and appropriate contract vehicles are offered to all offerors.** It is counterintuitive that traditional contractors should be subject to less favorable terms and conditions because they have an established history of compliance with policy, statutory, and regulatory requirements..
8. **DoD must employ the full range of contract vehicles, including cost contracting. While there is a temptation to focus on firm-fixed price and commercial contracts, these contract vehicles are not necessarily the most effective approach for complex and exquisite platforms and munitions.** In recent years, not only have traditional and nontraditional contractors been adversely impacted by DoD awarding the wrong contract vehicle for the desired acquisition, but, more importantly, DoD and the warfighter do not benefit when the wrong contract vehicle leads to delays in schedule, increased costs, and suboptimized performance.

Medium-Term

9. **DoD must commence a focused review to harmonize and streamline the layers of compliance requirements.** This must start with an industry engagement to nominate compliance requirements to target. While a review of acquisition processes that do not require a change in statute can start quickly, the biggest regulatory changes will require Congress to act.
10. **In the FY2026 NDAA, Congress must direct DoD to analyze the differing requirements placed on traditional contractors and nontraditional contractors** to determine where aligning requirements would result in more rapidly fielding advanced capabilities and increasing capacity and innovation while balancing the needs to attract and retain non-traditional, small business, and academic contractors.

Long-Term

11. **DoD must examine and implement the best practices of the Adaptive Acquisition Framework.** A&S is currently collecting data concerning the appropriate use of the framework and should leverage the current congressional authorities that have already been provided.

Pillar 1: Prioritizing Sufficient and Stable Budgets

Short-Term

12. **Congress must enact the FY2025 DoD Appropriations Act as soon as possible.**
13. **The Military Services must ensure that the request for multi-year procurements (MYP) authorities make sense from a business strategy perspective.** This should include an assessment of supply chain risk factors for critical parts and components, and a funding profile that allows industry to responsibly manage a surge in production, including workforce and capital investments.

Medium-Term

14. **Congress must enact the full-year FY2026 DoD Appropriations Act before September 30, 2025.**
15. **Congress must provide flexibility to DoD to respond to developing circumstances and take advantage of emerging opportunities should it enact a further continuing resolution (CR).** As proposed by the PPBE Commission, this includes (1) permitting select new starts under a CR, in the limited circumstances where the program to be initiated is included in the President's Budget request (PBR) and has not been disapproved in an authorization or appropriations bill under consideration in either chamber, and (2) allowing increased program quantities and development ramps in the same limited circumstances.

Pillar 2: Advancing DoD Digital Modernization and Transformation

Intellectual Property (IP) and Data Rights Issues

Short-Term

16. **Congress and the Department must ensure that the IP Cadres, IP contracting specialists, and IP training programs are adequately resourced within the Department and across the Military Services to increase collaboration with industry and ensure that IP contracting specialists are available to manage the contracting workload in a consistent manner.**
17. **The Department must more closely align the definitions and functionality of the rule(s) with commercial market best practices for Defense Federal Acquisition Regulation Supplement (DFARS) Case 2021-D005 (MOSA) and future rulemakings concerning IP and data rights.**
18. **Congress and the Department must avoid proposing new legislation impacting intellectual property until the legislative reforms already passed into law have been fully implemented and evaluated in practice.**

Cybersecurity

Short-Term

19. **DoD must engage in a formalized process with industry and across the federal government to establish clear, consistent controlled unclassified information (CUI) identification and marking guidance.**
20. **DoD must work to align and lessen the regulatory burdens for cybersecurity incident reporting and software attestation across the federal government.**
21. **Any clause which includes Cybersecurity Maturity Model Certification (CMMC) Level 2 or higher requirements must also include instructions to the contract officer to provide a Contract Data Requirements List (CDRL) or Security Classification Guide (SCG) which identifies CUI for the contract.**
22. **Congress and the Department must work to enact provisions that support companies unable to adequately invest in cybersecurity protections, including tax credits and Small Business Administration (SBA) guaranteed loans.**
23. **Congress must analyze directing National Archives and Records Administration (NARA) to streamline and simplify onerous CUI markings requirements, and instead require that a CUI marking must be handled in accordance with CUI requirements to re-focus CUI expenditure on securing information technology (IT) systems, rather than on non-value added, onerous markings.**

Artificial Intelligence (AI) and Autonomy

Short-Term

24. **Congress and the Department must increase investment in critical AI and autonomous technologies and utilize all acquisition pathways to ensure our warfighters have access to the most innovative and cutting-edge tools.**
25. **Congress and the Department must establish contracting mechanisms and acquisition strategies that respect and protect privately developed intellectual property to the greatest extent possible and focus on acquiring only those technical data deliverables and license rights necessary to accomplish the specific definitive goals of the government at hand**, given the significant current and future investments necessary by industry to develop AI and autonomous systems.

26. **Congress and the Department must establish financing mechanisms that support not just the development of models and algorithms but also the development of software/AI systems needed to continuously enhance and develop new AI models and capabilities.**

27. **Policymakers must ensure that any AI regulatory proposal takes a risk-based approach that targets harms raised by specific applications of AI systems in high-risk use cases.** Proposed regulations should focus on specifically defined use cases (rather than a general definition of "high-risk") to enable clear legal analysis and an efficient development process.

28. **Congress must evaluate expanding 10 USC 4023 Authority to allow transitioning experimental prototypes into production**, which gives Program Managers and others greater ability to test, field, and compete a capability, which will rapidly save time and money.

Areas of Concern for Small Businesses

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs

Short-Term

29. **Congress must permanently reauthorize both the SBIR and STTR when the programs come up for reauthorization in calendar year 2025.**

30. **The federal government must provide consistent SBIR guidelines and training to contracting officers and publicize successful SBIR transitions.**

31. **DoD must appropriately draft SBIR contracts, ensure the protection of technical data, and enforce SBIR Data Rights in market research, the contracting process, and the management of ongoing Phase III efforts.**

32. **DoD must source acquisitions from the existing pipeline of SBIR technologies and leverage the simplified acquisition authorities for companies that can reasonably meet the identified need.**

33. **DoD must ensure that evaluation criteria do not penalize industry for the assertion of SBIR Data Rights and that flow down requirements do not force subcontractors to relinquish SBIR Data Rights to perform on the contract.**

34. **DoD must create and/or identify a high-level acquisition professional role to serve as the technology insertion lead with oversight of acquisition behavior around SBIR Phase III contracting and authority to ensure acquisition and contracting actions comply with federal law.**

Tax Research and Development (R&D) Amortization

Short-Term

35. **The 119th Congress must reinstate statutory R&D amortization when the larger package of expiring tax provisions are negotiated.**

Authority to Operate (ATO)

Short-Term

36. **DoD must continue to push for greater utilization of reciprocity within the ATO process.**

Pillar 3: Modernizing Foreign Military Sales (FMS) and Technology Cooperation

Modernizing and Streamlining FMS

Short-Term

37. **DoD and Department of State (DoS) must clearly identify their FMS reform objectives, prioritize completing their identified areas of reform in calendar year 2025, and provide regular status updates through DoD Strategic Communication Integration Group (SCIG).** The NDIS Implementation Plan projects the reform efforts will be implemented in FY2026.

38. **The Defense Technology Security Administration (DTSA) must make further improvements to the Technology Security and Foreign Disclosure (TSFD) process and release the full Section 918 report to organizations capable of handling CUI.** In addition, senior leaders across the interagency must prioritize enabling the TSFD process to operate at speed and scale across multiple priority areas simultaneously.

39. **DoD must update the Security Assistance Management Manual (SAMM) to provide more opportunities for direct commercial sales (DCS).** There are documented FMS workforce shortages. Creating more opportunities for DCS will help the government workforce prioritize the cases that need to remain within the FMS process. DoD must solicit industry feedback on SAMM FMS-Only lists as well as other classified FMS-Only lists.
40. **DoD must hold an annually coordinated Industry Day as required by the FY2024 NDAA, Section 873(b).**
41. **DoD must streamline how prices for FMS are determined by leveraging prior U.S. buys versus re-creating the entire Request for Proposal (RFP)/Proposal/Audit process.**
42. **DoD must expand the opportunities available under the Australia, United Kingdom, and United States trilateral security partnership (AUKUS) and similar security agreements with U.S. allies to better integrate the U.S. DIB with the defense industrial bases of U.S. allies.**

Medium-Term

43. **DoD must ensure appropriate resources to fill FMS roles to mitigate the current FMS workforce shortages and to meet the rising demands of FMS sales while reducing non-essential and redundant FMS functions.** DoD must hire dedicated FMS workforce civilians with the knowledge to move quickly in FMS contracting versus adding work to traditional acquisition civilians.

International Security Partnerships: Launching AUKUS Implementation

Short-Term

44. **DoD and the Military Services must identify specific viable business opportunities, including a dedicated funding stream and contract vehicles, under Pillar II.** It has been over three years since AUKUS was announced.
45. **DoS must re-evaluate the Excluded Technologies List (ETL) to ensure better alignment with AUKUS policy objectives.**
46. **DoD must implement a forward-leaning approach, streamlined and aligned across the Military Services, to sharing technology with allies and partners.** Currently, each military branch has their own separate review process, with varying standards, for transferring technology.
47. **DoD must analyze and implement the previous reform recommendations to ensure industry concerns about the TSFD requirements process, which is required to be completed before technology can be shared with allies, is streamlined.** DoD should also align TSFD with FMS-Only processes, including the new regulatory landscape of the AUKUS exemption.

Strengthening International Regional Frameworks

Short-Term

48. **DoD must continue efforts to strengthen international regional frameworks**, such as Partnership for Indo-Pacific Industrial Resilience (PIPIR), to build a robust network of industrial and economic relationships that will serve as a strategic buffer to deter conflicts that would threaten vital economic interests and prosperity in the Indo-Pacific region.

A New Approach for Dual-Use Export Controls

Short-Term

49. **Both the executive and congressional branches must re-evaluate the merits of moving to a single licensing agency for dual-use items and munitions, a single control list, and a single agency for export control enforcement.** Peer competitors of the U.S. are increasing civil-military fusion to gain advantages in the global technological competition.
50. **The U.S. government must evaluate the market barriers in multilateral agreements, such as the Missile Technology Control Regime (MTCR), and the benefits of lessening licensing requirements to our closest allies and partners.**
51. **Both the executive branch and Congress must assess the long-term impacts of U.S. export controls to U.S. technology leadership, including the risks of "design out" and avoidance of U.S. content.**
52. **DoD and DoS must push trade policies to maintain and expand international markets with allies and partners.**

Pillar 4: Restoring Industrial Readiness Powerhouses

Short-Term

53. **DoD must create a program that identifies and retains spare industrial capacity that can serve as a stopgap until additional facilities are brought online during times of additional demand.** The Defense Logistics Agency (DLA) operates a similar program for castings and forgings (alongside the American Metalcasting Consortium and the Forging Defense Manufacturing Consortium), and using that program as a guidepost, DoD can more effectively meet demand through a network of partner facilities that can either already meet production requirements for platforms or can be quickly modified to meet said requirements.

Medium-Term

54. **DoD and Congress must view and treat industrial capacity akin to a weapons system rather than an ancillary and tenuous byproduct of systems acquisition.** DoD must reconcile and strike a balance between efficiency, cost avoidance, and additional capacity, and then execute this balance with contracts. While public announcements and legislation are important signals to financial markets and industry, industry cannot routinely raise capital for new investments or expanded production absent contract vehicles.

55. **DoD and the Military Services must view the retention of a skilled workforce, the expansion of the supplier base, and the financial viability of significant Capital Expenditures (CapEx) investments as subsystems to industrial capacity.** For example, there are several pending MYP authorities for certain categories of munitions that face a steep acquisition cliff beyond the life of the multi-year. This impacts the business strategy decisions for production capacity, from capital investment to operating expenses and workforce management.

56. **Congress must allocate additional funding for contracts for the express purpose of enhancing capacity investments. Additionally, Congress must legislatively approve incentives such as tax incentives, regulatory relief, and long-term contracts with the specific goal of creating and maintaining production capacity ullage.** DoD in turn must execute additional allocations by creating business arrangements that enhance resilience and incentivize the U.S. DIB to perform.

Long-Term

57. **DoD must examine and prioritize permitting processes for U.S. DIB capacity support.** This includes facilities for sub-tier suppliers, component assembly, and final product integration. While there are accelerated permitting programs for clean energy projects, such as FAST-41, there are no such defined programs for U.S. DIB-critical projects.

Workforce

Short-Term

58. **The executive and congressional branches must review the impacts of prevailing wage rates and labor categories on the U.S. DIB's ability to increase wages and address any impediments discovered.** Across multiple U.S. DIB sectors, companies have noted that in certain regions, minimum wage increases and service sector starting wages are approaching industrial base starting wages.

59. **DoD must design a Workforce Solutions Dashboard with a multi-faceted performance matrix that identifies, details, and quantifies workforce solution innovations and mobilized regionally by existing federal mechanisms.**

60. **DoD must align public and private skilled trades definitions such to reflect new U.S. DIB trades capabilities necessitated by emergent technologies.**

61. **DoD must facilitate existing credentialing offered by Manufacturing Innovation Institutes (MIIs) and industry partners for skilled tradespersons across public and private defense construction and sustainment venues.**

62. **DoD must expand its current support for small- and medium-sized businesses to further address those skills gaps and job roles critical to DoD.**

63. **The Military Services must encourage both collegiate degrees and skilled trades as important and viable career paths for departing service members.** Historically, a significant portion of the U.S. DIB skilled trades talent pipeline came from enlisted personnel. However, there are concerns that the Services are not currently encouraging skilled trade career paths.

Medium-Term

64. **The Department of Labor (DoL) must pursue insightful data to develop a more granular understanding of the collective status of manufacturers' workforce.** This data

must specifically focus on (1) the number of engineers, skilled workers/tradesmen, and other critical roles currently employed and their experience levels, (2) existing unfilled workforce needs, and (3) forecasts of their workforce needs two years from now. This data must explicitly differentiate across sector and region.

65. **The Department of the Navy has spent several years working on local, state, and federal partnerships to re-develop skilled trade talent pipelines. The Department of the Air Force must implement a similar program directed at military aircraft manufacturing skills.**

66. **In collaboration with DoL, DoD must expand the Registered Apprenticeship Program (RAP) by increasing funding for trainee pay and mentoring that allow for training significantly larger pools of specialty-skilled workers, deploying them rapidly into the U.S. DIB.** An affiliated Pre-Apprenticeship Program available to regional defense manufacturing hubs, co-managed by industry and school systems, would create a pathway for youth into "Registered Apprenticeship 2.0."

67. **DoD must include training expenses for targeted, potential-employee training programs as allowable costs.**

68. **The new Administration must develop a national manufacturing strategy to accelerate closing the workforce gap in manufacturing across all sectors of the U.S., including the defense sector.** This strategy can be informed by the workforce development strategy detailed in Section 1451 of the enacted FY2025 NDAA.

Pillar 5: Reinforcing Resilient Supply Chains

Supply Chain Harmonization

Short-Term

69. **The Military Services must include resourcing second-source suppliers in their budget requests for critical single source material, components, and equipment.** Congress must support funding for second-source suppliers in these areas.

70. **DoD and Congress must collaborate with industry to develop a mechanism to address instances of supply chain noncompliance.**

71. **There must be interagency coordination and industry collaboration to harmonize supply chain restrictions/requirements.** A wide spectrum of supply chain sourcing restrictions/requirements will go into effect over the next three years. Clear, concise, and executable guidance must be provided to contractors to enable compliance with these restrictions/requirements.

Medium-Term

72. **DoD and Congress must prioritize both advanced procurement funding and a stable and long-term acquisition strategy for stockpiling.**

Critical Minerals

Short-Term

73. **The U.S. government must take urgent and impactful action to secure a supply of gallium and germanium for the U.S. DIB, including increased stockpiling, providing bridge capital for allied projects, and promoting domestic recycling efforts.**

74. **DoD must certify the availability, at or near market prices, of supplies not sourced from Foreign Entities of Concern *before* sourcing restrictions/requirements go into effect.** Without available, compliant raw materials, the U.S. DIB will be unable to complete work on platforms and products, hampering readiness. If senior DoD officials cannot certify the availability of the needed critical minerals, there must be trigger mechanisms in place to promote domestic and allied mining.

Medium-Term

75. **The 45X tax credit must be modified to support the development of a domestic mining industry.** This must entail increasing the credit to 20% and reducing purity requirements to allow non-vertically integrated mining operations to qualify.

Long-Term

76. **Congress must create further tax incentives for U.S. DIB-critical projects, along the lines of the 45X tax credit, with the express purpose of developing resilient supply chains for critical and emerging capabilities.** This can be combined with pre-existing authorities, such as Title III of the Defense Production Act. Additionally, trusted partner nations must be invited to invest in such U.S. DIB-critical projects.

Appendix C

Glossary

5G – fifth generation

A&S – Acquisition and Sustainment

ACIF – Advanced Capabilities Industry Forum

AFRL – Air Force Research Laboratory

AI – artificial intelligence

AIA – Aerospace Industries Association

AP – advanced procurement

APIs – Application Programming Interfaces

ATO – authority to operate

AUKUS – Australia–United Kingdom–United States

BIS – Bureau of Industry and Security

CapEx – capital expenditures

CAS – Cost Accounting Standards

cATO – Continuous Authorization to Operate

CCA – Collaborative Combat Aircraft

CCL – Commerce Control List

CCP – Chinese Communist Party

CDAO – Chief Digital and Artificial Intelligence Office

CDRLs – Contract Data Requirements Lists

CIO – Chief Information Officer

CMMC – Cybersecurity Maturity Model Certification

COVID-19 – Coronavirus 19

CRs – continuing resolutions

CTE – Career and Technical Education

CUI – controlled unclassified information

Cyber Survey – DIB IT and Cybersecurity Survey

DCS – direct commercial sales

DDTC – Directorate of Defense Trade Controls

DECCS – Defense Export Control and Compliance System

DFARS – Defense Federal Acquisition Regulation Supplement

DIU – Defense Innovation Unit

DLA – Defense Logistics Agency

DNAD – Domestic Non-Availability Determination

DoD – Department of Defense

DoL – Department of Labor

DoS – Department of State

DPA – Defense Production Act

DTIC – Defense Technical Information Center

DTSA – Defense Technology Security Administration

EAR – Export Administration Regulations

ECRA – Export Control Reform Act

EOQ – economic order quantity

EPA – Economic Price Adjustment

ETI – Emerging Technologies Institute

ETL – Excluded Technology List

EW – electronic warfare

FAR – Federal Acquisition Regulation

FCF – free cash flow

FFP – firm-fixed price

FIRRMA – Foreign Investment Risk Review Modernization Act

FMS – Foreign Military Sales

FRA – Fiscal Responsibility Act

FutureG – future generation

FY – Fiscal Year

G&A – general and administrative expenses

GAAP – Generally Accepted Accounting Principles

GAO – Government Accountability Office

GDP – gross domestic product

GICS – Global Industry Classification Standard

GOCO – Government-Owned Contractor-Operated

GRP – Government Purpose Rights

I&S – Intelligence and Security

IoT – Internet of Things

IP – Intellectual Property

IRAD – independent research and development

ISOO – Information Security Oversight Office

ITAR – International Traffic in Arms Regulations

LOA – Letter of Acceptance

LOR – Letter of Request

LPTA – lowest price technically acceptable

MCEA – Defense Microelectronics Activity

MDACS – Multi-Domain Artillery Cannon System

MIIs – Manufacturing Innovation Institutes

ML – Machine Learning

MOSA – Modular Open Systems Approaches

MTCR – Missile Technology Control Regime

MYP – multi-year procurements

NARA – National Archives and Records Administration

NDAA – National Defense Authorization Act

NDIA – National Defense Industrial Association

NDIS – National Defense Industrial Strategy

NDS – National Defense Strategy

NIST – National Institute of Standards and Technology

NSG – Nuclear Suppliers Group

NTDC – nontraditional defense contractors

ODPs – organization-defined parameters

OECD – Organization for Economic Cooperation and Development

OEM – Original Equipment Manufacturer

OT – Other Transaction

OUSD – Office of the Under Secretary of Defense

P&A – Pricing and Availability

PCE – Personal Consumption Expenditures

PPBE – Planning, Programming, Budgeting, and Execution

PPP – purchasing power parity

PRC – People's Republic of China

PSC – Professional Services Council

R&D – research and development

RAI – Responsible Artificial Intelligence

RAP – Registered Apprenticeship Program

RFP – Request for Proposal

RMF – Risk Management Framework

RMP – Radar Modernization Program

S&P – Standard and Poor's

SAMM – Security Assistance Management Manual

SBIR – Small Business Innovation Research

SCGs – Security Classification Guides

SCIG – Strategic Communication Integration Group

SEC – U.S. Securities and Exchange Commission

STTR – Small Business Technology Transfer

sUAS – small unmanned aerial systems

TCJA – Tax Cuts and Jobs Act

TDC – traditional defense contractor

TINA – Truth in Negotiations Act

U.S. DIB – U.S. defense industrial base

U.S. SIB – U.S. submarine industrial base

USMCA – U.S.-Mexico-Canada Agreement

USSR – Union of Soviet Socialist Republics

Endnotes

1 Executive Office of the President. Executive Order 14186. *The Iron Dome for America.* Federal Register. Published January 27, 2025. https://www.federalregister.gov/documents/2025/02/03/2025-02182/the-iron-dome-for-america.

2 The NDIA *Vital Signs* report series uses the term "resilience" in a manner consistent with the definition in the 2022 National Defense Strategy: "the ability to withstand, fight through, and recover quickly from disruption." U.S. Department of Defense. *2022 National Defense Strategy.* October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDf. Page 8.

3 NDIA. *Vital Signs 2025 Survey.* Question 1.

4 NDIA. *Vital Signs 2025 Survey.* Question 3.

5 The S&P 500 is a stock market index that tracks the stock performance of 500 of the largest companies listed on stock exchanges in the United States. It includes approximately 80% of the total market capitalization of U.S. public companies.

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120 Cleared workers refer to workers who require a security clearance to perform their job. Skilled trade workers include construction laborers, electricians, welders, and other roles that require specialized knowledge and skills. STEM workers have educational background in the fields of science, technology, engineering, and mathematics.

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122 U.S. Department of Labor, Wage and Hour Division. *State Minimum Wage Laws.* Updated January 1, 2024. https://www.dol.gov/agencies/whd/minimum-wage/state.

123 "2022 Global Benefits Attitudes Survey, United States." *WTW.* November 11, 2022.

124 "2022 Global Benefits Attitudes Survey, United States." *WTW.* November 11, 2022.

125 Industry 4.0, otherwise known as the Fourth Industrial Revolution, is a method(s) to which industry takes in the production and distribution of their respective technologies in a revolutionary fashion. This includes but is not limited to integrating new technologies, utilization of Internet of Things (IoT), cloud and analytic computing, as well as AI and ML.

126 National Center for Education Statistics. *Public High School Students' Career and Technical Education Coursetaking: 1992 to 2013.* Albert Y. Lie and Laura Burns. NCES 2020010. November 17, 2020. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2020010.

127 Jacob, Brian A. "What we know about Career and Technical Education in high school." *The Brookings Institution.* October 5, 2017. https://www.brookings.edu/research/what-we-know-about-career-and-technical-education-in-high-school/.

128 *Vital Signs 2024.* National Defense Industrial Association, April 4, 2024. https://www.ndia.org/policy/publications/vital-signs. Page 45; The PRC, according to some analysts, can or already does utilize the U.S.-Mexico-Canada Agreement (USMCA) to bypass tariffs and trade control measures and enter the U.S. market. See Meltzer, Joshua P. "The US, Canada, and Mexico need a more coordinated approach to their trade relationships with China." *The Brookings Institute.* June 7, 2024. https://www.brookings.edu/articles/the-us-canada-and-mexico-need-a-more-coordinated-approach-to-their-trade-relationships-with-china/.

129 U.S. Department of Defense, Office of the Undersecretary of Defense for Acquisition and Sustainment, Industrial Base Policy. *Industrial Base Policy Securing America's Defense-Critical Supply Chains*. Accessed January 21, 2025. https://www.businessdefense.gov/eo14017.html. Page 3; DoD reports that since E.O. 14017 was issued, the Department has both requested and been appropriated over $4.7B in both DPA Title III and IBAS funds for investments in several critical sectors including kinetic capabilities, microelectronics, energy storage and batteries, strategic and critical materials, and castings and forgings. See U.S. Department of Defense, Office of the Assistant Secretary of Defense for Industrial Base Policy. *National Defense Industrial Strategy Implementation Plan for FY2025.* November 21, 2024. https://www.businessdefense.gov/docs/ndis/NDIS-Implementation-Plan-FY2025.pdf. Pages 68-69.

130 The Defense Industrial Base Consortium, a consortium operated in conjunction with OUSD (A&S) has listed kinetic capabilities, including precursor production, as a key priority. Additionally, DoD has partnered with the American Center for Manufacturing Innovation on a pilot program to leverage pilot capital to effectively produce energetic materials.

131 Most of DoD's work surrounding microelectronics is focused on providing access to trusted and assured microelectronics. This includes the efforts of the Defense Microelectronics Activity (DMEA), as well as the Trusted Foundry and Secure Enclave programs.

132 "New Defense Department Program Aims to Transform U.S. Metal Manufacturing in Casting and Forging Industry." *Institute for Advanced Composites Manufacturing Innovation.* December 11, 2023. https://iacmi.org/new-defense-department-program-aims-to-transformu-s-metal-manufacturing-in-casting-and-forging-industry/.

133 This includes the American Metalcasting Consortium and the Forging Defense Manufacturing Consortium, which collaborate with DLA to provide shared information, tooling location, and schematic interpretation and modernization.

134 P.L. 118-31. Sections 241, 716, 1513, 1813, and 2809.

135 P.L. 118-31. Section 856.

136 A recent GAO report found that of the materials identified as being in shortfall in the National Defense Stockpile during FY23, 90% either had only a single domestic source, or no source at all. This lack of available material significantly hampers the ability of the DoD to respond to supply chain disruptions, particularly in regard to critical minerals and other defense-critical industrial inputs. See U.S. Government Accountability Office. *National Defense Stockpile: Actions Needed to Improve DOD's Efforts to Prepare For Emergencies*. September 2024. https://www.gao.gov/assets/gao-22-105259-highlights.pdf.

137 The 2023 NDIS defines supply chain visibility as the ability to track parts, materials, and services from prime contractors back to sub-tier level suppliers and sources – effectively from the raw materials to the end-product. U.S. Department of Defense, Office of the Assistant Secretary of Defense for Industrial Base Policy. *National Defense Industrial Strategy.* November 16, 2023. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf. Page 21.

138 U.S. Department of Defense, Office of the Assistant Secretary of Defense for Industrial Base Policy. National Defense Industrial Strategy. November 16, 2023. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf.

139 U.S. Department of Defense, Office of the Assistant Secretary of Defense for Acquisition. "Berry Amendment Frequently Asked Questions (FAQs)." *International Contracting - Berry Amendment (10 U.S.C. 2533a).* Accessed December 3, 2024. https://www.acq.osd.mil/asda/dpc/cp/ic/berry-amendment.html.

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