

Appendix A – The U.S. Defense Industrial Base and the Massachusetts Defense Sector

The Defense Industrial Base (DIB) is the worldwide industrial complex that enables research and development (R&D), as well as the design, production, delivery, and maintenance of military weapons systems, subsystems, and components or materiel to meet military requirements.¹ It is a massive, multi-tiered ecosystem comprising over 100,000 companies and their subcontractors.² Economically, the DIB serves as a primary driver of high-tech manufacturing and labor. In 2023, the Department of Defense (DOD) obligated approximately \$474 billion in contracts, representing a significant portion of U.S. federal discretionary spending.³ This sector is vital for technological spillover, labor market resilience, and supporting domestic manufacturing nationally.

Technological spillovers occur when innovations developed for military requirements generate significant positive effects for the commercial economy. Spillovers can be the spread of knowledge to commercial products, economies of scale for production and use of a component, or the movement of trained and experienced workforce to other products and services. Research regularly demonstrates that the "social return" on defense-related R&D, the total value to society, exceeds the "private return" captured by the innovating firms.⁴ Economists estimate that the broader economy captures 2–4 times more value from defense R&D than the defense contractors who performed the work.⁵

Labor market resilience provided by the DIB is characterized by its ability to maintain high-skill employment and surge capacity even during periods of broader economic volatility. While the general manufacturing sector often faces cyclical downturns, the DIB acts as a stabilizer due to its long-term contract structures and national security mandates. As of early 2026, defense-related suppliers employ more than 1 million people directly.⁶ The sector is unique in its demand for specialized talent; there is currently an estimated shortage of 800,000 manufacturing roles within the DIB, including 250,000 in skilled trades alone.⁷ Roughly four-fifths (80%) of projected U.S. economic growth through 2035 is expected to stem from increases

¹ Department of Defense (DOD). (2024). National Defense Industrial Strategy (NDIS).

² Ibid.

³ Government Accountability Office (GAO). (2024). Defense Contract Expenditures: Analysis of 2023 Data.

⁴ Aerospace Technology Institute (ATI). (2021). Spillovers: Revealing the Broader Economic Benefits of Aerospace R&D.

⁵ Ibid.

⁶ The American Legion. (2026). A discussion on the defense industrial workforce.

⁷ Ibid.

in labor productivity.⁸ Because DIB roles are concentrated in high-productivity sectors like aerospace and advanced electronics, this workforce is a disproportionate driver of that national trend.

The DIB acts as a primary purchaser, venture capitalist, and strategic coordinator for the U.S. industrial ecosystem. In 2026, a shift is beginning from DOD/DOW supporting simple procurement to a "preparedness posture" characterized by massive direct investments in manufacturing capacity, particularly in sectors like munitions, shipbuilding, and biotechnology.⁹ For the 2026 fiscal year, defense spending is projected to reach approximately \$1.13 trillion, representing roughly 3.3% of U.S. GDP.¹⁰

Components and Stakeholders of the DIB

The DIB functions as a strategic "umbrella" that covers several specialized sub-sectors, most notably the Maritime Industrial Base (MIB), the Intelligence Industrial Base (IIB), and the broader National Security Industrial Base (NSIB). The NSIB is the broadest category under the DIB umbrella. It represents the full integration of America's economic and military strength, extending beyond just weapons manufacturing to include any sector considered vital to national security.¹¹ The NSIB is organized around four strategic priorities: resilient supply chains, workforce readiness, flexible acquisition, and "economic deterrence".¹² The MIB supports a network of over 20,000 businesses responsible for the design, construction, repair, and sustainment of the U.S. Navy's surface ships and submarines.¹³ This base is organized into three "lines of effort": Supplier Development (strengthening the 50-state supply chain), Innovation (robotics and additive manufacturing), and Workforce Development (trade schools and regional training pipelines).¹⁴ The IIB (often referred to as the "Intelligence Community Industrial Base") is the specialized sector that provides the high-tech sensors, data analytics, and clandestine capabilities required for "decision advantage." The IIB is defined as the network of private sector companies, academic institutions, and non-profit organizations that partner with the 18 elements of the U.S. Intelligence Community (e.g., CIA, NSA, NGA) to research, develop, and sustain intelligence capabilities.¹⁵ The IIB is estimated to comprise approximately 15,000 to

⁸ Congressional Budget Office (CBO). (2025). The Budget and Economic Outlook: 2025 to 2035.

⁹ Department of Defense (DOD). (2024). NDIS Implementation Plan (NDIS-IP).

¹⁰ TD Economics. (2025). The Economic & Fiscal Impacts of U.S. Defense Spending in 2026 and Beyond.

¹¹ DOD. (2024). National Defense Industrial Strategy (NDIS).

¹² Center for Strategic and International Studies (CSIS). (2024). Understanding the Contributions of the New NDIS.

¹³ Maritime Industrial Base (MIB) Program. (2024). The Nation Behind the Navy: A Family Guide.

¹⁴ Ibid.

¹⁵ Office of the Director of National Intelligence (ODNI). (2026). 2026 Annual Threat Assessment of the U.S. Intelligence Community.

20,000 specialized firms [NDIA, 1.2] with a combined workforce estimated at 350,000 to 500,000 cleared professionals.¹⁶

The DIB encompasses different functional sectors and tiers of production. The production and sustainment component involves the physical manufacturing and long-term maintenance of materiel and platforms including aircraft, ships, and ground vehicles. The Research, Development, Test, and Evaluation (RDT&E) sector focuses on moving technology from basic research to field-ready systems. The training, education, and workforce development component is the foundational "human capital" layer required to design, produce, and sustain capabilities.

The physical manufacturing and maintenance sector includes the prime contractors (e.g., Lockheed Martin, General Dynamics) that manage major programs and interface directly with the DOD/DOW. In 2024, nearly 30% of Department of War obligated contract funding went to the 'Big 5' prime defense contractors: Lockheed Martin, Boeing, RTX, Northrop Grumman, and General Dynamics.¹⁷ These prime contractors work with Small and Medium-sized Enterprises (SMEs) that provide components like specialized valves, sensors, or forgings. SMEs, startups, and venture-funded companies are the primary drivers of agility and technological renewal providing critical capabilities in AI, autonomy, and cybersecurity that traditional prime contractors often struggle to develop at pace.^{18,19} Startups provide the "high-risk, high-reward" innovation required for modern warfare. The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs allow DOD to support these companies. However, small business face a risky "valley of death" in the transfer of technologies from a prototype to commercial production. Only 16% of SBIR-funded companies successfully transitioned to Phase III commercialization contracts in the past decade.²⁰ Venture capital has become a primary financier of the DIB's technological edge, shifting financial risk from the taxpayer to private investors. Venture capital funding for defense tech reached a projected \$76 billion for the full year 2025, a massive increase from approximately \$38 billion in 2023.^{21,22}

The RDT&E sector serves as the "innovation engine" of the Defense Industrial Base (DIB). It is responsible for basic scientific research (6.1), applied research (6.2), advanced technology development (6.3), and the rigorous testing required before a system reaches the warfighter.²³

¹⁶ National Defense Industrial Association (NDIA). (2024). Vital Signs 2024: The Health and Readiness of the Defense Industrial Base.

¹⁷ TD Economics. (2025). The Economic & Fiscal Impacts of U.S. Defense Spending in 2026 and Beyond.

¹⁸ J.P. Morgan. (2025). Defense Tech Innovation and the Role of Startups.

¹⁹ Bower, J. (2025). Venture Capital's New Role At The Center of US National Security.

²⁰ Ibid

²¹ Ibid

²² J.P. Morgan. (2025). Defense Tech Innovation and the Role of Startups.

²³ Government Accountability Office (GAO). (2026). GAO-26-107664, Defense Research and Engineering: Action Needed to Improve Management and Oversight.

For Fiscal Year 2026, the Department of Defense (DOD) requested approximately \$180 billion for RDT&E activities, reflecting a strategic pivot toward outpacing near-peer adversaries through technological superiority.²⁴ Academic research seeds scientific discovery that the private sector often finds commercially unviable for future military advantage. Economists estimate that a 1% increase in the U.S. R&D capital stock (heavily supported by university research) improves national GDP by 0.13%.²⁵ Furthermore, scientific innovation is credited with at least one-half of all U.S. economic growth.²⁶

The training, education, and workforce development component has transitioned from a supporting function to a primary strategic priority, addressed by the National Defense Industrial Strategy (NDIS) and the FY2026 National Defense Authorization Act (NDAA) as a "generational challenge."²⁷ Primary and secondary STEM education introduces each generation to the opportunities, and provide basic knowledge foundational to many jobs in the Defense Sector. The skilled trades and manufacturing pillar focuses on the physical production skill set, such as casting and forging, maritime welding, and precision machining skills.²⁸ DOD supports development of the skilled trades in part through the Industrial Base Analysis and Sustainment (IBAS) program.²⁹ The RDT&E workforce is focused on post-secondary education programs and research experience. Research institutions, national laboratories and University Affiliated Research Centers (UARCs) each contribute to this pillar.

Recent or Anticipated Changes to the DIB Under National Directives

To meet the emerging challenges and shifting strategic landscapes outlined across recent U.S. defense and security directives, the DIB is expected to undergo a substantial transformation centered on speed and scalability, commercial acquisition, supply chain security, and technological dominance.³⁰

The DIB is expected to enhance its manufacturing capabilities to return the capability of producing systems rapidly and at massive scale under the 2026 National Defense Strategy (NDS).³¹ The White House issued National Security Strategy (NSS) mandates a "national mobilization to innovate powerful defenses at low cost" to bridge the asymmetry gap against low-cost drone and missile threats.³² The National Defense Authorization Act (NDAA) for Fiscal

²⁴ Ibid

²⁵ Brookings Institution. (2022). Localizing the economic impact of research and development.

²⁶ Ibid

²⁷ DOD. (2024). NDIS Implementation Plan (NDIS-IP).

²⁸ The American Legion. (2026). A discussion on the defense industrial workforce.

²⁹ Schaaf, K. (2025). Industrial Base Analysis and Sustainment (IBAS) Program.

³⁰ This section is based on a summary of changes relevant to the DIB extracted from reference documents using Notebook LM (March 30, 2026).

³¹ Department of War. (2026). National Defense Strategy.

³² White House. (2025). National Security Strategy. Pg.14.

Year 2026 NDAA establishes the Defense Industrial Resilience Consortium, bringing industry to the table to address parts obsolescence, supply chain fragility, and the urgent need to restore domestic surge capacity.³³ The NDAA also includes congressional directives requiring the identification and elimination of regulatory barriers that discourage contractors from maintaining or expanding surge capacity. Multi-year procurement contracts may be implemented for high-demand systems to provide financial stability to allow for industrial expansion.³⁴

Defense acquisitions are fundamentally shifting their focus to rapid fielding of new capabilities, with an emphasis on lower cost and commercial-off-the-shelf (COTS) components, as outlined by Executive Order 14265.³⁵ The DIB may be facing vastly accelerated decision timelines, which are targeted to shrink from nearly three years to as few as 90 days according to the FY2026 NDAA.³⁶ The National Security Commission on Emerging Biotechnology (NSCEB) recommends that the DIB and federal government must better collaborate via "quick-decision funding mechanisms" and research-to-commercialization projects that leverage Other Transactional Authorities (OTAs).³⁷ The FY2026 NDAA supports this shift by incentivizing the use of OTAs for prototyping and utilizing capability-based pricing, opening the door for more commercial companies to work with the DOD.³⁸

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National strategy documents include mandates for supply chain transparency and a reduction of foreign dependency. The NSS dictates the U.S. must "never be dependent on any outside power for core components."⁴³ According to a Government Accountability Office (GAO) report, the DIB

³³ House Armed Services Committee. (2026). NDAA Overview 2026.

³⁴ Ibid

³⁵ White House. (2025). Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base.

³⁶ House Armed Services Committee. (2026). NDAA Overview 2026. Pg. 9.

³⁷ National Security Committee on Emerging Biotechnology (NSCEB). (2025). NSCEB: The Future of Science.

³⁸ House Armed Services Committee. (2026). NDAA Overview 2026.

⁴³ White House. (2025). National Security Strategy.

currently provides very limited visibility into lower-tier suppliers.⁴⁴ Prime contractors may face new contract clauses requiring them to provide country-of-origin data for sub-tier suppliers, and may be required to share proprietary supply chain information.⁴⁵

The DOW has evolving critical technology priorities, which include increased funding for applied artificial intelligence (AAI), biomanufacturing, contested logistics technologies, scaled hypersonics, Quantum and Battlefield Information Dominance (Q-BID), and high-scaled directed energy.^{46,47} In the space domain, the DOW Space Strategy requires the Space Development Agency and its commercial partners to rapidly deliver new capabilities to increase warfighter lethality, maneuverability, and survivability.⁴⁸ NSCEB guidelines strongly recommend that the DIB adapt by adopting AI-powered autonomous laboratories and utilizing standardized, machine-readable datasets to accelerate scientific discovery and biotechnology development.⁴⁹

Massachusetts Defense Sector

The Defense Sector in Massachusetts operates as a multifaceted engine within the larger DIB, serving as a driver for regional stability and national security innovation. In fiscal year 2024, this Sector directed approximately \$16.6 billion into the Commonwealth through a combination of contract obligations, grants, and personnel payroll.⁵⁰ This total spending accounted for 2.1% of the state's Gross Domestic Product, highlighting a significant economic impact of the strategic DOW investments.⁵¹ These organizations that form the ecosystem of the Massachusetts Defense Sector provide a wide spectrum of products and services essential to national security. The work produced in Massachusetts heavily emphasizes high-tech equipment and scientific innovation, ranging from missile defense systems and advanced radar produced by Raytheon to specialized aircraft engine components from General Electric.⁵²

The economic footprint of these operations is vast, supporting 139,102 jobs across the state as of 2022.⁵³ The Sector employs 53,040 civilians directly within defense contracting firms and

⁴⁴ Government Accountability Office (GAO). (2025). GAO Report: Defense Industrial Base. GAO-25-107283.

⁴⁵ GAO. (2025) GAO Report: Defense Industrial Base. GAO-25-107283.

⁴⁶ Office of the Under Secretary of War for Research and Engineering (OUSW R&E). (Undated). Critical Technology Areas, website.

⁴⁷ House Armed Services Committee. (2026). NDAA Overview 2026.

⁴⁸ Department of War (DOW). (Undated). DOW Space Strategy, website.

⁴⁹ NSCEB. (2025). NSCEB: The Future of Science.

⁵⁰ Office of Local Defense Community Cooperation (OLDCC) (2025). Defense Spending by State, Fiscal Year 2024.

⁵¹ Ibid.

⁵² SENEDIA (2023). The Economic Impact of the Defense Cluster in New England.

⁵³ Ibid

another 14,156 personnel within the military defense infrastructure, which includes 3,350 active-duty military members and 6,218 DOW civilians.⁵⁴ The remaining 71,907 roles are indirect or induced jobs created through the spending of defense-related labor income.⁵⁵ This workforce creates a powerful economic multiplier effect, where every 100 direct defense jobs in Massachusetts support an additional 125 positions in other sectors of the regional economy.⁵⁶

The MIB finds its strength in the state's long-standing leadership in naval research and underwater technologies. Massachusetts hosts key contributors like General Dynamics, which received an average of \$0.9 billion annually in prime contracts between 2020 and 2022.⁵⁷ These maritime efforts are often bolstered by national laboratories, most notably the Massachusetts Institute of Technology Lincoln Laboratory (MIT LL), which averaged \$1.1 billion per year in defense-related research during the same period.⁵⁸

The IIB is equally prominent, anchored by major global aerospace and defense firms that specialize in advanced sensors, radar, and cybersecurity. Raytheon Technologies stands as the centerpiece of this sub-sector, averaging \$4.1 billion in annual prime contracts for projects ranging from missile defense to sophisticated intelligence platforms.⁵⁹ The presence of these tech-heavy organizations ensures that Massachusetts remains at the forefront of the information-driven security landscape.

Underpinning these specialized pillars is the broader NSIB, which integrates a diverse array of sectors including biotechnology and advanced manufacturing. A prime example of this convergence is ModernaTX, Inc., which received an average of \$2.7 billion annually in DOW contracts for work in Massachusetts between 2020 and 2022.⁶⁰ This broader base supported 139,102 jobs across the state in 2022, creating a robust "economic multiplier" where every 100 direct defense positions generated an additional 125 jobs in other sectors.⁶¹

The Massachusetts Defense Sector is a central pillar of the state's economy, specifically in the realms of technological innovation, labor market stability, and advanced manufacturing. Massachusetts serves as a premier hub for defense-related research and development, a category that receives roughly 11% of all DOW contract funds nationwide.⁶² Unlike many states where spending is dominated by personnel or services, 19% of Massachusetts' defense

⁵⁴ SENEDIA (2023). The Economic Impact of the Defense Cluster in New England.

⁵⁵ Ibid

⁵⁶ Ibid

⁵⁷ Ibid

⁵⁸ Ibid

⁵⁹ Ibid

⁶⁰ Ibid

⁶¹ SENEDIA (2023). The Economic Impact of the Defense Cluster in New England.

⁶² OLDCC (2025). Defense Spending by State, Fiscal Year 2024.

allocations are dedicated specifically to Research and Development.⁶³ The state hosts world-leading research institutions that drive DIB modernization. In FY2023, MIT LL received \$1.4 billion in defense contracts, while the Charles Stark Draper Laboratory and MITRE Corporation received \$478 million and \$503 million, respectively.⁶⁴

The defense sector provides a stabilizing force in the Massachusetts labor market, particularly for high-skilled technical roles. While general manufacturing in the U.S. has declined (accounting for only 10% of GDP in 2024), defense work in MA acts as a hedge against broader industrial volatility. The Massachusetts Defense Sector accounts for an average of \$2,400 in defense spending per resident in Fiscal Year 2024.⁶⁵

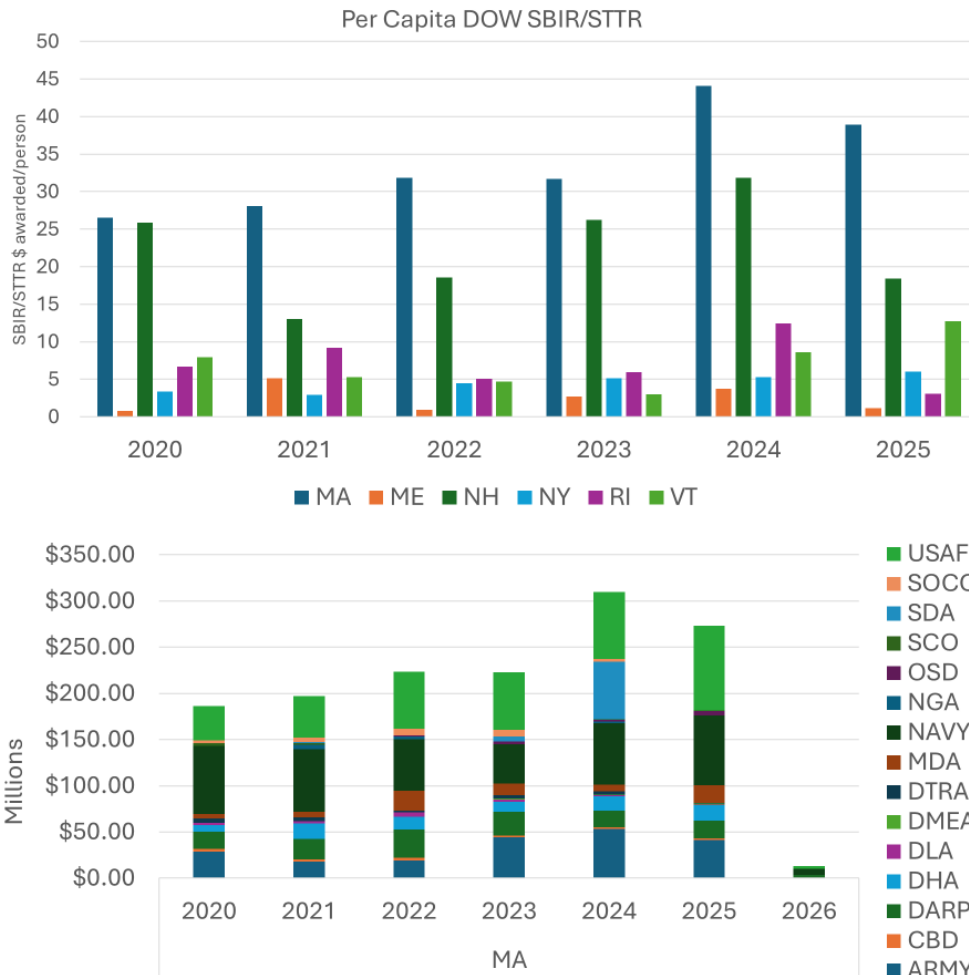
Massachusetts is a critical node for the domestic production of complex defense systems and components. 58% of the state's defense contract allocations are for Supplies and Equipment, totaling approximately \$8.7 billion.⁶⁶ Major defense primes continue to expand their local footprint. For instance, GE Aerospace recently made a \$42 million investment in its Lynn

⁶³ OLDCC (2025). Defense Spending by State, Fiscal Year 2024.

⁶⁴ Ibid

⁶⁵ Ibid

⁶⁶ Ibid



manufacturing facility to modernize machinery and expand test capacity for military engines [Mass.gov, 1].⁶⁷ The state emphasizes small-business participation. Massachusetts has one of the highest rates of small business participation in the DIB nationally. In FY2023, approximately \$2.3 billion in defense contracts was awarded specifically to Small Businesses in Massachusetts, representing roughly 15% of the state’s total contract spending.⁶⁸ Data from the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs, show that Massachusetts has the highest award rate per capita in New England and year over year increasing investment from the Air Force and the Navy in the state.⁶⁹

⁶⁷ Mass.gov (2026). Healey-Driscoll Administration Celebrates GE Aerospace's \$42 Million Investment in Massachusetts Defense Manufacturing (April 8, 2026).

⁶⁸ OLDCC (2024). Defense Spending by State, Fiscal Year 2023 - Massachusetts (December 2024).

⁶⁹ Downloaded on 17March2026 from: <https://www.sbir.gov/awards> using DOD as a filter.