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# Defense in the Bay Area

## Technology, Innovation, and the National Defense Enterprise

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# Executive Summary

Silicon Valley and the Bay Area have long been identified with technological innovation, the creation of new industries, and the disruption of old ones. The region is less well known as a hub of defense activity. Its engagement in the national defense enterprise, however, runs deep. Today, as strains grow in the global security environment and warfare shifts toward software, autonomy, and artificial intelligence, the Bay Area is re-emerging as a critical node in the American defense innovation ecosystem.

The region's contribution has a distinct character, due less to large scale manufacturing than to its strength in research, software, digital technology, and venture capital. This puts it in a unique position as the changing nature of warfare calls for technologies that can be produced at low cost, evolve with changing circumstances, and be rapidly deployed.

## A Deep Military History

In 1885, San Francisco's Union Iron Works launched the Arago, the first steel-hulled ship produced on the West Coast. More than 30 shipyards operating during WW II produced 1,400 vessels, roughly one ship per day. Kaiser's shipbuilding complex in Richmond was the largest in the world in 1944, producing 747 ships. Mare Island, the first naval shipyard on the West Coast, with 39,000 employees, produced 391 ships and repaired many more. The Kaiser yards pioneered prefabrication and assembly techniques that compressed timelines from months to as little as days.

After 1945, as this massive defense industrial base was disassembled. Soon, however, the Cold War led the Pentagon to invest heavily in the region's emerging technology base. Lawrence Livermore National Laboratory and Sandia National Laboratories–California, together with Los Alamos, anchored the nation's nuclear program. The Pentagon's demand for miniaturized electronics supported companies like Fairchild Semiconductor, later spawning Intel, AMD, National Semiconductor, and other companies that became the heart of Silicon Valley. The Stanford Research Institute (SRI) rose to prominence as a nonprofit partner of the Department of Defense.

### Disengagement and Reengagement

Between 1988 and 1995, thirty military bases closed in California, costing the Bay Area 45,000 jobs, its military infrastructure, and its identity as a military region. In the 2000s, Silicon Valley appeared to pivot away from defense after 3,100 employees protested work with the Pentagon and Google dropped its Project Maven contract. Actual defense cooperation never stopped, however. The change today couldn't be more radical, with the Bay Area at center stage as the U.S. realigns its warfighting capacity to leverage AI and the innovation coming from startups and channels unprecedented funding toward the technologies the Bay Area produces.

## Federal Policy and Priorities

In FY 2026, U.S. defense funding reached a record $1 trillion, with growing emphasis on key technologies: applied AI, biomanufacturing, contested logistics technologies, quantum, scaled directed energy, and scaled hypersonics. The CHIPS and Science Act (2022), Replicator initiative, Defense Innovation Unit (DIU), Office of Strategic Capital, and multiple federal initiatives and executive orders are reforming Pentagon procurement systems to speed the delivery of innovative technologies to warfighters.

## The Changing Nature of Warfare

The Ukraine war is a critical catalyst, bringing aerial, ground, and nautical drones to the forefront, with AI as a through line. Satellites support intelligence and enable precise drone strikes. Necessity has propelled Ukraine to pioneer low cost expendable systems, with rapid adaptation and innovation cycles shortened from years to months.

With this, AI is transforming military operations across multiple domains. Warfighters can now detect, classify and track vehicles, aircraft, ships and facilities from satellite imagery. Autonomous navigation enables the response. Machine vision allows target acquisition and tracking even in disrupted communications environments.

AI and ubiquitous sensors are eroding the ability of any military force to move or concentrate without detection.

Space is now a contested domain. Low Earth Orbit (LEO) satellites developed for commercial markets are finding defense applications in communications, navigation, surveillance, and intelligence. Starlink and Planet Labs are examples. Physical warfare is extending to space as satellites can be targeted by kinetic and electronic ground and space-based systems. With that, space is changing from a supporting domain to a theater.

Cyber warfare is now a permanent battlefield, with U.S. critical infrastructure already being targeted (China's Volt Typhoon in 2023, and Salt Typhoon in 2024). Ukraine is subject to 15 cyber attacks per day.

# The Bay Area Edge

AI, drones, autonomous systems, contested space, and cyber warfare favor speed of iteration, sophisticated software, and low-cost commercial technologies over technologies with long procurement timelines. These battlefield requirements and the deep research capabilities required in fields such as quantum align with core Bay Area capabilities.

## Foundational Research

The region is home to one of the nation's densest concentrations of defense-related research assets. Lawrence Livermore National Laboratory and Sandia National Laboratories–California safeguard the nation's nuclear stockpile and generate technologies ranging from autonomous and robotic systems to materials research, cyber defense, and resilient communications and sensing. NASA Ames Research Center operates at the intersection of space exploration, civil aeronautics, military aviation, and autonomous systems. Working closely with DARPA, SRI is a national leader in defense and intelligence research.

## Corporate Leadership

Two hundred thirty-three aerospace, maritime and defense technology companies operate in the region. Though not headquartered in the Bay Area, prime contractors with an active presence, when combined with leading ICT companies and hundreds of venture-backed startups, create a uniquely layered ecosystem.

Lockheed Martin was instrumental in the creation of Silicon Valley. Its Advanced Technology Center (ATC) is the research arm of Lockheed Martin Space, developing foundational technologies for national security and space systems. Engineers at its Sunnyvale campus work on next-generation interceptors, hypersonic systems, fleet ballistic missiles, and satellite payloads. Northrop Grumman, with a more than 100-year history in Sunnyvale, focuses on engineering for submarine propulsion, power generation, and acoustics.

ICT companies provide much of the software on which the defense department depends for daily operations. Oracle partners with the defense department and the intelligence community for enterprise-wide data collection, processing, analysis, and dissemination. In May 2022, Google was contracted to provide advanced classified networks AI capabilities as part of the Pentagon's multi-vendor infrastructure. Salesforce's Government Cloud Plus–Defense enables the defense department and its contractors to store and process highly sensitive classified data.

## Venture Capital

Perhaps the most distinctive role the Bay Area is playing is in venture capital, where Bay Area venture firms are funding a new generation of defense technology startups both within and outside the Bay Area. The broad focus is on deep-tech and dual-use technologies rather than on defense alone, as companies diversify across markets. Active investors include Andreessen Horowitz (a16z), Founders Fund, Shield Capital, Lux Capital, Draper Associates, Crosslink Capital, IQT, The Veteran Fund, Lockheed Martin Ventures, General Catalyst, Lightspeed Venture Partners, Foundation Capital, Grit Ventures, Bow Capital, DCM Ventures, DCVC Ventures, Starship Ventures, Outlander VC, Hanwha Asset Management USA, Principal Venture Partners (PVP), and Salesforce Ventures.

Accelerators supporting defense tech companies include Y Combinator and Plug and Play.

## Bridging Dual-Use Technologies to Procurement

Navigating the Pentagon's complex procurement system is a complex challenge even for large companies and is a formidable barrier for small ones. Multiple organizations are working to fill the gap. Silicon Valley Defense Group plays a mediating role between emerging defense tech companies and the Pentagon's procurement system, advocating for procurement reform. Arkenstone Defense supports emerging defense tech companies that sell to the defense department and other national security agencies, serving as a back office to help them navigate contract and compliance procedures. BMNT addresses acquisition strategies at the defense department, helping emerging companies validate their market fit. Defense Investor Network (DIN) connects defense investors with military and intelligence leaders.

Most significantly, the defense department's Defense Innovation Unit (DIU), based at Moffett Field, identifies, fields, and scales innovative commercial technology into the national security complex, accelerating the adoption and deployment of new technologies. Through 2025, DIU has awarded close to $5 billion in production contracts to 48 companies. Its FY 2024 budget surged to $946 million from $104 million in FY2023, a 9x increase.

## The Dual-Use and Defense Technology Cluster: The Nation's Largest

The 2026 NatSec 100 report shows that nearly half of the nation's top 100 emerging dual-use companies (47) are in California, with the deepest cluster by a large margin (24) headquartered in the Bay Area.

### AI

AI has quickly become the most consequential technology domain linking San Francisco and Silicon Valley with the defense department and other national security agencies.

The Pentagon's commitment to $800 million in frontier AI contracts reflects a strategic recognition that commercially developed AI will be decisive in future conflicts.

Bay Area companies are playing the central role, integrating AI into a wide range of military operations, from data management to autonomous and agentic systems. Active Bay Area companies include Scale AI, Palantir, Vannevar Labs, OpenAI, and Salesforce. Data infrastructure and applications companies are also strongly connected: Databricks, Ayar Labs, Lambda AI, Deepnight, Horizon3, and TurbineOne.

### Quantum

The Bay Area is home to the largest aggregation of quantum computing assets in the U.S., with defense applications including cybersecurity, precision navigation, and sensors. Federal policy aims to accelerate quantum development. In May 2026 the administration awarded $2 billion to two quantum foundries and seven quantum computing companies, four of which are in the Bay Area: Global Foundries, Atom Computing, PsiQuantum, and Rigetti Computing.

### Drones and Autonomous Systems

Air, maritime and ground-based drones are the fastest growing segment of the market, driven by experience from Ukraine and now Iran. Active Bay Area companies include Skydio, Saildrone, Scout AI, and Dedrone, as well as Latent AI, Aurelius, Havoc, Sentradel, and Swift Beat. Anduril, now headquartered in Costa Mesa, is an important example of an advanced autonomous systems and AI-powered software company that was incubated and financed in the Bay Area.

### Space

The commercial space sector is rapidly diversifying to include defense applications. The Bay Area, led by NASA Ames Research Center, pioneered the commercial space tech sector. Leading dual-use space companies include: Planet Labs, Astranis, Astra, Capella Space, Muon Space, Loft Orbital, LeoLabs, Antaris, and Aeonyx.

### Cybersecurity

Cyber attacks are an immediate threat to critical infrastructure and national security.

The Bay Area's depth in cybersecurity is finding critical applications through companies such as Palo Alto Networks and CrowdStrike.

### Defense Logistics

Autonomous systems (air, space, land, and sea) are a growing priority. Leading Bay Area companies in the logistics sector include Armada, Archer Aviation, Joby Aviation, Elroy Air, SiFly Aviation, Poseidon Aerospace, Applied Intuition, and Compound Eye. Bay Area venture firms are also investing in dual-use logistics companies nationally, such as Riverside-based Glīd.

## An Institutional Challenge: Defense Procurement

Despite progress in opening up the procurement system, less than 1% of participating startups in the SBIR and STTR programs ultimately receive contracts through standard government acquisition and procurement budgets. The government's demand signals are important, as startups ultimately need recurring customers and revenues. To enable startup defense tech growth and sustained investment by the venture community, procurement needs to move more quickly from the level of research and pilots to at-scale procurement and deployment.

## Defense and National Security Policy: Stanford and Berkeley

Stanford and Berkeley are rich resources for the defense community and influential in the formulation of national defense policy.

Stanford University hosts the Center for International Security and Cooperation (CISAC), the Hoover Institution's National Security Affairs Fellows program, the Stanford Institute for Human-Centered Artificial Intelligence (HAI), the Gordian Knot Center for National Security Innovation (home to the annual Stanford DEFCON forum) and the Hacking for Defense (H4D) program that has trained students at more than 70 universities across three continents.

The University of California, Berkeley leads the Nuclear Science and Security Consortium (NSSC) and is home to the Berkeley Risk and Security Lab and the Institute for Security and Governance. The new Berkeley Air & Space Center at NASA Research Park , will bring UC Berkeley and other University of California research assets to the heart of Silicon Valley, enabling deeper innovation and defense technology partnerships.

## Engaging the Veterans Community

The large community of veterans in the Bay Area and across the U.S. is a rich source of entrepreneurs with military experience and a national security orientation. Supported by a wide range of technology companies, VetsinTech plays an important role connecting veterans and military spouses to technology jobs across the country, with chapters in four California cities: San Francisco, Los Angeles, San Diego and Sacramento.

Set for its sixth year in 2027, the Military Veterans Startup Conference in San Francisco pairs veteran entrepreneurs with investors.

## A Gap and Opportunity: Maritime and Defense Manufacturing

With global tensions rising, maritime security has assumed new priority. China accounted for 53% of global commercial shipbuilding in 2024, followed by Korea (29%) and Japan (13%). The US accounted for 0.1%, producing only three of 5,448 large vessels on order.

The U.S. is down to four naval shipyards, and despite large budget commitments and federal bills and initiatives, they aren't producing at the speed or scale that's needed.

The energy around a reinvigoration of American shipbuilding has produced a proposal by California Forever to develop a major shipbuilding complex in Solano County on seven miles of waterfront facing a deepwater ship channel on the Sacramento River. If realized, the project would support as many as 72,700 jobs by full buildout in 2055, including 40,000 direct on-site jobs. Plans include an adjacent manufacturing zone that would support suppliers for the shipyard and could potentially bring aerospace and advanced manufacturing to the county.

California Forever's proposals also include another advanced manufacturing zone near Travis Air Force Base that could advance aerospace innovation and production at industrial scale.

## Global Partnerships

Like the United States, allied and aligned countries are increasing their defense budgets and developing new technologies in response to geopolitical tensions in Europe and Asia. Nordic countries particularly illustrate the change in defense thinking in Europe. As the nature of warfare shifts toward the kind of technology the Bay Area produces, high level defense delegations are regularly visiting the region for discussions centering on defense innovation and technology.

## Recommendations

1. Accelerate procurement reform in defense agencies.
2. Develop industrial zones for maritime, space, aerospace, and other advanced manufacturing.
3. Streamline regulatory pathways in California for defense production.
4. Invest in supportive workforce development.
5. Create new testbeds where emerging defense tech companies can test technologies with potential military applications in a classified setting.
6. More deeply connect the region's defense innovation system with partners in allied and aligned countries.
7. Consider the creation of a Bay Area Defense Commercialization and Allied Innovation Platform to support and strengthen an integrated allied innovation ecosystem.



# 1

# Introduction

Silicon Valley and the Bay Area have long been identified with technological innovation, the creation of new industries, and the disruption of old ones. While the region is most closely associated with commercial software, semiconductors, and artificial intelligence, its roots in defense run deep—from Civil War-era fortifications guarding the Golden Gate to the Cold War research laboratories and Pentagon-funded microchip manufacturers that gave Silicon Valley its name. Today, as strains grow in the global security environment and the nature of warfare shifts toward software, autonomy, and artificial intelligence, the Bay Area is re-emerging as a critical node in the American defense innovation ecosystem.

The United States and its allies face a global security challenge at scale. The Stockholm International Peace Research Institute (SIPRI) reports that world military spending grew by 41% between 2016 and 2025 reaching $2.877 trillion in 2025, its 11th consecutive year of growth.[1] Between 2024 and 2025, military spending rose by 17% in Europe and 8.1% in Asia and Oceania. [2] In 2025, the military share of global GDP climbed to 2.5%, its highest level since 2009,[3] with the U.S. accounting for one third of all military expenditure globally.[4]

Three dynamics are driving this buildup: Russia's war in Ukraine and Europe's resulting rearmament; China's accelerating military modernization, with spending rising 7.4% in 2025 to an estimated $336 billion,[5] and its increasingly assertive posture in the South China Sea, Sea of Japan, and Taiwan Strait; and ongoing conflicts in the Middle East.[6] The world has entered a period of tension and sustained military competition not seen since the Cold War.

These changing strategic imperatives have catalyzed a striking cultural reversal in Silicon Valley. In June 2018, Google famously dropped its Project Maven AI contract with the Pentagon[7] after approximately 3,100 employees signed a petition protesting the partnership.[8] The episode engendered a view among employees of defense contracts as morally fraught and among outside observers that Silicon Valley was disinterested in defense. The reversal since then has been striking, with the Bay Area sitting now at the crest of a wave of national defense investment and realignment, with technology startups pivoting toward defense applications, dual-use (civil-military) applications growing, venture firms investing, and the influence of AI ubiquitous.

The region's contribution has a distinct character, due less to large-scale defense manufacturing—which remains modest compared to places such as Texas or Southern California—than to its strength in research, digital technology, software development, and venture capital, and its proven ability to commercialize emerging technologies. The effectiveness of the American defense response to an increasingly dangerous world will depend not only on absolute levels of military spending but on the capacity to develop, adopt, and deploy emerging technologies at speed. That is precisely the capability the Bay Area ecosystem is built to deliver.

This report examines the defense and defense technology sector in the Bay Area—its historical roots, its assets and capabilities, and its contribution to meeting national security goals. It surveys the federal policy environment shaping defense investment; the changing nature of warfare that is elevating the importance of software, autonomy, and AI; the research institutions and national laboratories anchoring the region's defense innovation; the companies (both established primes and venture-backed startups) driving technological leadership; the venture capital and institutional capital fueling the sector's growth both regionally and nationally; the regional potential for advanced manufacturing and shipbuilding; the roles of Stanford University and UC Berkeley in shaping defense policy and growing defense talent; global defense technology partnerships; and both the challenges—such as the workforce pipeline—and opportunities that lie ahead. Across these dimensions, it finds a region whose technological strengths are closely aligned with modern defense needs and whose engagement with the national defense mission is accelerating.






# Historical Overview of the Defense Industry in the Bay Area

## Early Military Foundations

The Bay Area's relationship with the American military begins with geography. San Francisco Bay, one of the world's great natural harbors, drew military attention from the earliest days of the Gold Rush, when the strategic importance of defending the Pacific coast became apparent. In 1853 at the southern anchorage of what would become the Golden Gate Bridge, the U.S. Army began construction of Fort Point, a massive brick-and-granite fortification designed to guard the entrance to the Bay. That same year, fortification of Alcatraz Island commenced, resulting in the construction of emplacements for 111 cannons encircling the island plus towers holding smaller guns,[1] making Alcatraz the most powerful American fortress west of the Mississippi by the time of the Civil War.[2] Mare Island Naval Shipyard, established in 1854 in the northern reaches of the Bay near Vallejo, became the first naval shipyard on the Pacific Coast, launching a shipbuilding tradition that would endure for nearly a century and a half.[3]

Industrial defense capability developed in parallel. Peter Donohue founded Union Iron and Brass Co. in San Francisco in 1849, an enterprise that evolved to become Union Iron Works at Potrero Point, where in 1885 it launched the Arago, the first steel-hulled ship built on the West Coast.[4] A year later, Union Iron Works won a $1 million contract to build the cruiser USS Charleston for the U.S. Navy, establishing the region as a center of naval shipbuilding.[5] Bethlehem Steel Corporation acquired Union Iron Works in 1905, consolidating capacity at the Potrero Point yards. During World War I, the Bethlehem yards at Potrero Point launched 66 destroyers and 18 submarines—a volume of production that foreshadowed a far more dramatic mobilization to come.[6]

## World War II: Arsenal of the Pacific

Shipbuilding in the Bay Area made a major contribution to victory during World War II. More than 30 shipyards operated around the Bay between 1941 and 1945, producing approximately 1,400 vessels in 1,365 days—roughly one ship per day. Bay Area shipbuilders produced nearly 45% of all cargo shipping tonnage and 20% of warship tonnage built in the U.S. during the conflict.[7]

The scale of individual operations was extraordinary. Henry Kaiser's four Richmond shipyards,[8] the largest shipbuilding complex in the world in 1944, produced

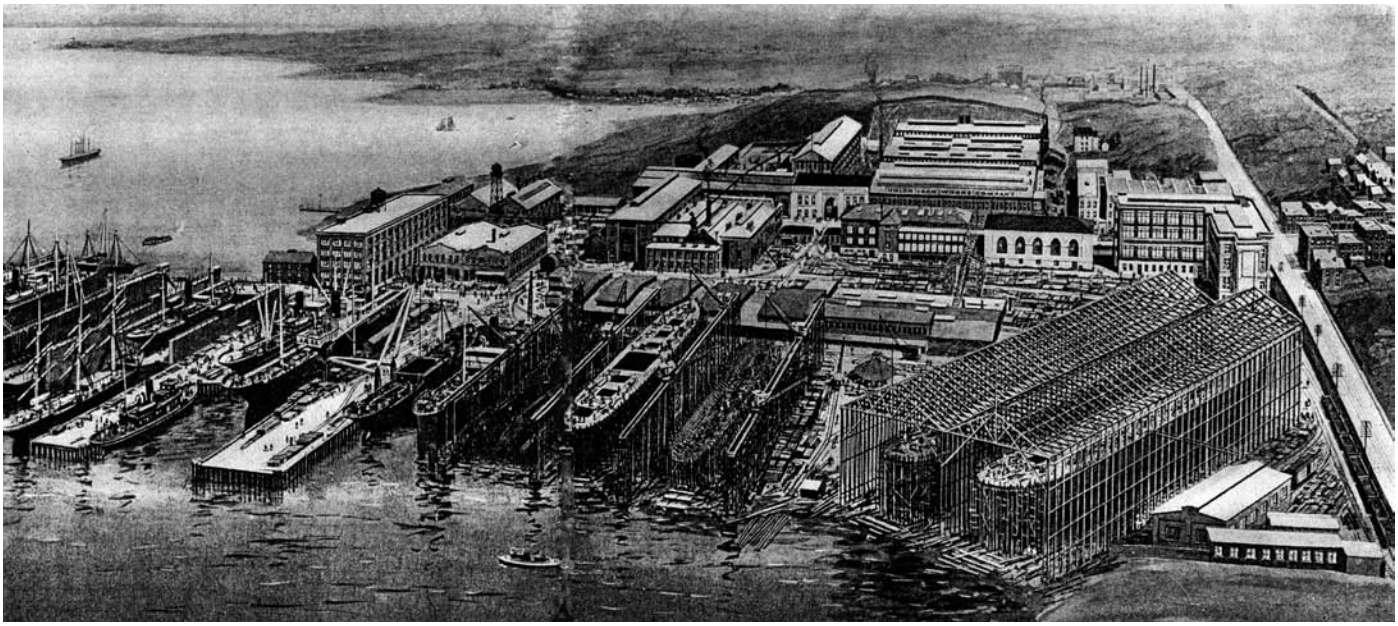
747 ships including 519 Liberty Ships—nearly a quarter of total U.S. Liberty Ship production.[9] Kaiser's yards pioneered prefabrication and assembly-line techniques adapted from the automobile industry, compressing construction timelines from twelve to fourteen months prewar to as little as four to six days at peak wartime pace.[10] The *SS Robert E. Peary*, assembled at Richmond Yard No. 2 in four days, 15 hours, and 29 minutes,[11] set the all-time record for fastest ship construction. Mare Island Naval Shipyard, meanwhile, employed over 39,000 civilians at its wartime peak, building 391 ships and repairing 1,227 vessels.[12]

The wartime mobilization had a profound demographic impact: the Bay Area's population grew by more than half a million between 1940 and 1945, driven by workers drawn to shipyards, military installations, and supporting industries.[13] The Bay Area's role as the principal Pacific staging area—with major Army, Navy, and Marine Corps facilities at the Presidio, Treasure Island, Hunters Point, Alameda, and Oakland—cemented its identity as a military region. At the war's end, the Bay Area possessed both an industrial workforce trained in advanced manufacturing and a dense network of federal installations that would continue to shape its trajectory for decades.

## Cold War: National Laboratories and the Birth of Silicon Valley

While the shipyards wound down after 1945, the Cold War brought a different—and equally consequential—form of defense investment to the Bay Area. Lawrence Livermore National Laboratory was established in 1952, co-founded by Edward Teller and Ernest Lawrence,[14] to provide competition and a "second opinion" for the nuclear weapons work underway at Los Alamos.[15] Sandia National Laboratories opened its California campus in 1956, next door to Livermore, to handle the engineering and systems integration of nuclear weapons.[16] Together with NASA Ames Research Center, Stanford University, and the University of California, Berkeley, these institutions formed the intellectual backbone of a defense-funded research ecosystem that attracted federal dollars, scientific talent, and engineering expertise on an enormous scale.

The Pentagon played a critical role in creating what was to become Silicon Valley's commercial technology economy. Fairchild Semiconductor, founded in 1957 by the "Traitorous Eight" who left Shockley Semiconductor



Union Iron Works image from Bethlehem Shipbuilding Corporation booklet published in 1918

Laboratory,[17] manufactured the first commercially viable integrated circuits[18] and derived roughly 80% of its revenue from the Pentagon through the 1960s.[19] Military demand for miniaturized, reliable electronics drove production volumes that brought costs down to levels where commercial applications also became feasible. The semiconductor cluster that grew from Fairchild's Palo Alto laboratories—spawning Intel, AMD, National Semiconductor, and numerous other firms—was in its foundational years essentially a defense industry.[20] The Defense Advanced Research Projects Agency (DARPA) funded the creation of ARPANET through Stanford Research Institute (now SRI International), laying the groundwork for the modern internet.[21] Ronald Reagan's Strategic Defense Initiative and DARPA's Strategic Computing Initiative channeled additional billions into the region's research institutions during the 1980s.[22] The defense-electronics nexus established during that era catalyzed the industrial and talent base for today's Silicon Valley—a lineage that is often forgotten but is essential to understanding the region's re-engagement with the national defense mission.

## Post-Cold War Drawdown

The end of the Cold War produced a major contraction. Between 1988 and 1995, approximately 30 major California military installations closed under successive rounds of the Base Realignment and Closure (BRAC) process. Naval Air Station Alameda, the Navy's self-described "aviation gateway to the Pacific,"[23] closed on April 30, 1997.[24] Mare Island Naval Shipyard—which had built and repaired ships continuously since 1854[25]—shut its gates in 1996.[26] The Presidio of San Francisco was transferred to the National Park Service on October 1, 1994;[27] Moffett Field went to NASA the same year; and the Oakland Army Base, Hunters Point Naval Shipyard, Treasure Island Naval Station, and Concord Naval Weapons Station all closed in succession.[28] More than 93,000 of the jobs lost nationally in the four BRAC rounds between 1988 and 1995 were in California.[29] More than 45,000 of those jobs were in the Bay Area.[30]

The closures stripped the Bay Area of much of its physical military infrastructure while simultaneously freeing prime real estate for redevelopment. Some former bases found productive second lives—the Presidio as a mixed-use national park site, Moffett Field as NASA Ames's expanded campus, Treasure Island as a planned residential community. But the larger effect was psychological as much as economic: with the bases gone and defense spending declining, the Bay Area's identity as a military region faded from public consciousness.

## Disengagement and Re-engagement

By the 2000s, Silicon Valley's cultural center of gravity had moved away from defense. The technology industry's defining companies—Google, Facebook, Apple—built their brands on consumer products, social connectivity, and corporate missions that in some cases framed themselves in opposition to government surveillance and military applications. The most visible rupture came in June 2018, when Google dropped its contract with the Pentagon for Project Maven (an AI program for analyzing drone surveillance footage)[31] after 3,100 employees signed a public petition protesting the partnership.[32] The episode was widely interpreted as evidence that Silicon Valley and the Pentagon occupied different worlds.

But behind the scenes, technology cooperation didn't stop. The Pentagon's innovation unit, established in the Bay Area in 2015 as DIUx to source innovative technologies from the commercial sector,[33] continued to build its portfolio. Former Google CEO Eric Schmidt, who became chairman of the Defense Innovation Advisory Board in 2016, was appointed in 2018 to serve as the first chairman of the National Security Commission on Artificial Intelligence.[34] Google created its Google Public Sector arm in June 2022[35] to ensure that the company remained a candidate for future federal contracts. That set up Google for one of four major Pentagon contracts for cloud services awarded the following December (to Amazon, Google, Microsoft, and Oracle).[36]

The reversal from what was a low point in relations with the military in 2018 has been driven by a

convergence of strategic urgency and economic incentive tied to growing defense markets. Russia's full-scale invasion of Ukraine in February 2022 returned large-scale conventional war to Europe, an idea considered unthinkable only a few years earlier. That conflict, in turn, has fundamentally changed the face of warfare as new technologies, particularly drones, AI, and cyber capabilities, have been deployed with devastating effect. In Asia, China's accelerating military modernization, including the territorial occupation of islands in the South China Sea and aggressive moves toward Taiwan and Japan,[37] have sharpened the imperative to both rebuild defense capacity and accelerate the incorporation of digital technologies. By 2025, a Pentagon undersecretary could declare that the era when Silicon Valley shunned military work was "completely over."[38]

This arc from deep military roots through disengagement and now to re-engagement underlines the Bay Area's unique position in the defense technology landscape. No other region combines a comparable history of defense-driven innovation, a world-leading commercial technology ecosystem, a deep pool of startups fueling innovation-led growth, and the venture capital capable of rapidly scaling new defense startups. This places the Bay Area at center stage as the U.S. realigns its warfighting capacity to leverage AI and other emerging technologies and as federal policies channel unprecedented resources toward the technologies the Bay Area produces.




# Federal Policy and Priorities

## Defense Budget Reaches One Trillion Dollars

Federal defense spending provides the fiscal foundation for the defense technology sector. The FY2025 full-year continuing appropriations and extensions act provided $831.3 billion in defense discretionary appropriations, while other titles provided another $61.2 billion, for an estimated total of $892.5 billion.[1] In FY2026, the U.S. total of discretionary, reconciliation, and mandatory defense funding reached a record $1 trillion.[2] The Trump administration's FY2027 defense budget request includes $1.15 trillion in discretionary funding alone, combined with $350 billion in mandatory funding sought through the budget reconciliation process, bringing the requested total to $1.5 trillion.[3]

While headline budget figures capture attention, the composition of spending matters as much as its scale. Procurement and operations consume the bulk of defense dollars, sustaining existing platforms and the military's force structure. The innovation engine resides in the research, development, test, and evaluation (RDT&E) accounts. In FY2025, total defense RDT&E funding was $143.7 billion, of which $141.2 billion was appropriated into Title IV organization-related accounts. The Air Force received the largest share at $46.8 billion, or 33% of the Title IV RDT&E total,[4] reflecting investment in next-generation air systems and space capabilities.[5] The Defense-Wide account, which funds DARPA, the Missile Defense Agency, and cross-cutting innovation programs that operate at the frontier of emerging technology, received $35.2 billion, or 25% of the Title IV RDT&E total.[6]

## Federal Technology Priorities

Federal policy has increasingly focused on identifying and prioritizing technologies deemed essential to national security. The Biden administration's Department of Defense identified as priorities 14 critical technology areas grouped into three categories: Seed Areas of Emerging Opportunity (biotech, quantum, future-generation wireless, advanced materials); Effective Adoption Areas (where there is strong existing commercial sector activity (AI, space tech, renewable energy, advanced computing); and Defense Specific Areas (directed energy, hypersonics, integrated sensing and cyber).[7] In November 2025, the Trump administration narrowed this list to six priority areas: applied artificial intelligence (AAI), biomanufacturing (BIO), contested logistics technologies (LOG), quantum and battlefield information dominance (Q-BID), scaled directed energy (SCADE), and scaled hypersonics (SHY).[8] While not formally identified priorities, the other technologies targeted under the previous administration are still regarded as important.

Several major policy initiatives convert these priorities to investment. The **CHIPS and Science Act**, signed into law in August 2022, authorized $52.7 billion in funding across the Departments of Commerce, Defense, and State, with participation by the Department of Energy and the National Science Foundation. Within this amount, the Act allocated $2 billion ($400 million per year for FY2023–FY2027) for establishing and operating a Microelectronics Commons national onshore network for university-based prototyping, lab-to-fab transition of semiconductor technologies (including defense-unique applications), and semiconductor workforce training. National security guardrails prohibit CHIPS funding recipients from expanding manufacturing capacities below the 28 nm level technology node in China or other countries of concern for ten years (even with their own non-CHIPS funds) or knowingly engaging in joint research or technology licensing efforts with foreign entities of concern.[9]

Innovation in artificial intelligence and AI-enabled autonomy has emerged as the most prominent technology priority across both administrations. The Pentagon's budget requests for unclassified AI investments tripled from $600 million in FY2016[10] to approximately $1.8 billion for FY2024, followed by another $1.8 billion FY2025,[11] and FY2026 has seen a commitment of $13.4 billion in AI and autonomous systems funding across more than 800 active projects.[12] The **Replicator** initiative, announced in August 2023, aimed to field "thousands of all-domain attritable autonomous systems"[13]—essentially cheap, AI-enabled drones and autonomous weapon systems[14] that can be produced in volume and expended without strategic consequence. As of October 2026, the initiative is being carried forward through the Task Force Autonomous Warfare under Special Operations Command.[15]

Announced in August 2026, the new National Security Science & Technology Strategy (NSSTS) further clarifies the Pentagon's priorities for military technology, seeking high-speed, low-cost innovations such as expendable drones in addition to traditional higher-cost mega-programs. Three priority fields are identified: submarines, space, and AI/autonomy.[16]

The **Defense Innovation Unit (DIU)**, headquartered in the Bay Area at Moffett Field,[17] is the most direct institutional bridge between federal defense policy and the commercial technology ecosystem. DIU's budget surged from $104 million in FY2023 to $946 million in FY2024, a ninefold increase,[18] then leveled off to $595 million in FY2025.[19] Its commercial solutions opening (CSO) acquisition process, which leverages its authority to use other transactions authority (OTA), enables prototype-to-production timelines for selected technologies of twelve to twenty-four months,[20] compared to the years-long traditional acquisition cycle, and its Mountain View location positions it to draw directly on Bay Area commercial innovation.

Due in part to the success of DIU, the nation's defense procurement system is undergoing fundamental change, evolving from a system principally based on high-cost, multi-year procurements built on a small group of primary contractors ("primes"), toward one that also engages smaller, fast-moving companies, enabling cutting-edge technologies to enter the system faster and often at lower cost. The Department of the Air Force subsequently created AFWERX, a parallel innovation arm operated by the Air Force Research Laboratory (AFRL) and modeled on SOFWERX, an innovation arm of the U.S. Special Operations Command. DIU and AFWERX work together but fulfill different roles: while DIU focuses on transitioning innovative commercial technologies for defense uses, AFWERX aims to nurture entrepreneurial innovation arising from within the Air Force.[21] Along similar lines in October 2026, the Space Force created a new office, the Technology Portfolio Executive, designed to bridge the gap between its operational needs and emerging industry capabilities by speeding acquisition processes.[22] Large systems change slowly, however, and these initiatives are still a work in progress. The scale of absorption of these new technologies by the defense department is a key metric.

Several other notable initiatives aim to speed the process through which the Pentagon accesses and absorbs new technologies:

- The Office of Strategic Capital was established in December 2022, with a mandate to attract private investment into critical technology areas. In the FY2026 National Defense Authorization Act, Congress expanded that mandate to give the office

the authority to become a capital allocator, issuing loans and loan guarantees and technical assistance across 34 defined technology categories.[23]

- Several executive orders aim to speed the acquisition and absorption of commercial technologies, including Executive Order 14265 "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base," (April 2025), which directs the expanded use of other transaction agreement (OTA) authority and ties procurement timelines to warfighting capability.[24]
- The Artificial Intelligence Strategy, mandated by President Trump and launched in January 2026, designates AI and autonomy as priorities.[25]
- A November 2025 memorandum by the Secretary of War, "Transforming the Defense Acquisition System into the Warfighting Acquisition System to Accelerate Fielding of Urgently Needed Capabilities to Our Warriors," establishes speed of technology deployment as an organizing principle in the acquisition system. Expedited commercial acquisition measured by timelines and outcomes is prioritized ahead of contracting process compliance.[26]
- In October 2026, the defense department announced the creation of an Autonomous Warfare Command (AUTOWARCOM) under a four-star general, placing it at a similar level to major service commands such as the Pacific Command and the Central Command in the Middle East. Its goal is to establish a domestic pipeline of inexpensive unmanned and robotic systems that can be rapidly adapted and deployed.[27] Consistent with that directive, the Army—the largest single source of demand for small drones[28]—has redesignated its Futures and Concepts Command (FCC) as the Army Futures and Autonomous Systems Command (FASCOM).[29]

## Bay Area Alignment

These federal priorities map to Bay Area assets. The FY2026 enacted total of $148.6 billion in RDT&E defense funding supports scientific and technical knowledge development performed by industry, universities, federal laboratories, and others,[30] including Lawrence Livermore and Sandia National Laboratories, NASA Ames, SRI International, and research groups at Stanford and UC Berkeley. The CHIPS Act's CHIPS for America Defense Fund targets prototyping and lab-to-fab transitions of innovations in microelectronics,[31] a field where the Bay Area maintains a dense concentration of semiconductor firms. The six Trump administration technology priorities (applied AI, biomanufacturing, contested logistics technologies, quantum and battlefield information dominance, scaled directed energy, and scaled hypersonics)[32] likewise align with Bay Area capabilities in AI, autonomous systems, quantum computing, and directed energy research. With San Francisco serving as the global center of frontier AI development, and with an allocation of $13.4 billion in FY2026 for AI and autonomous systems,[33] the region is an increasingly critical node in the defense innovation pipeline.

Today's policy environment, in other words, is channeling unprecedented resources toward the technologies in which the Bay Area leads. The question is whether the defense acquisition system can move fast enough—and whether the institutional bridges between Washington and Silicon Valley are robust enough—to translate these priorities into fielded capabilities at the speed the threat environment demands.




# The Changing Nature of Warfare

The war in Ukraine, now in its fourth year, is rapidly transforming the nature of modern warfare. While conventional technologies (ships, aircraft, and precision munitions) still excel at projecting long-range power, battlefield realities in Ukraine and the technological innovations that conflict is spawning have produced a revolution in thinking about technologies that enable both offense and defense at closer range. Commercial satellite systems such as Starlink are playing a major role in Ukraine's defense, enabling secure field communications not dependent on terrestrial systems. The rapid adaptation of FPV (first-person view) drones that can cost as little as a few hundred dollars and be assembled from commercially available components (batteries, lightweight processors, 3D-printed airframes) in response to real time field experience is shortening innovation cycles from years to months or weeks.

This ability to adapt quickly has enabled Ukrainian forces to sustain defensive and offensive lines against Russian land forces that outnumber Ukraine's by 3:1. FPV drones have been widely used by Ukraine, accounting for 60–70% of damaged or destroyed Russian systems and 70–80% of Russian casualties.[1] Ukraine produced 800,000 drones in 2023, 2 million drones in 2024,[2] and more than 4 million drones in 2025, and has aimed for more than 7 million drones in 2026—a remarkable trajectory of industrial mobilization[3] that reflects the rapid expansion of a domestic drone manufacturing base that rose from just 7 manufacturers prior to the full-scale Russian invasion in 2022 to approximately 500 drone manufacturers operating in Ukraine as of 2025.[4]

The array autonomous technologies now being deployed isn't limited to aerial drones (Unmanned Aerial Vehicles or UAVs) but also includes Unmanned Ground Vehicles (UVGs) which are land-based compact robotic systems used to deliver supplies, evacuate casualties, mine, demine, and strike targets), and naval drones (Unmanned Surface Vehicles or USVs) that have been used with devastating effectiveness against Russia's Black Sea fleet, making parts of the Black Sea a no-go zone for Russia's navy.[5] In June 2024, Ukraine established the world's first Unmanned Systems Force, a dedicated military branch for drones, ground robots, and maritime autonomous systems.[6]

Advances are coming rapidly. Drones are now capable of operating at ranges of up to 1,300 miles, distances until recently associated with strategic weapons. AI is now being used to coordinate groups of drones to attack Russian positions, the first known routine use of swarm technology in combat. For example, in a group of three UAVs, a reconnaissance drone may map the route for two other bomb-carrying drones to follow, and those drones may decide which will attack first and when as field conditions change. The ability to allow thousands of drones to be deployed in a coordinated manner using AI is making swarm technology a new frontier in drone warfare.[7]

AI is also a factor in the spatial intelligence platform[8] that powers Ukraine's ability to use images from commercial satellites to increase the speed and precision of drone strikes. By rapidly delivering geospatial intelligence to soldiers in the field, the time it takes to identify and accurately strike a Russian target has shortened by as much as 90%. This marks the first known instance of unclassified, commercial satellite imagery being sent directly to soldiers in the field to guide real-time battlefield decisions.[9]

Together, these advances, tested in battlefield conditions, constitute a transformation in military strategy, pointing to the future centrality of networked warfare, autonomy, and rapid adaptation as core military capabilities. This in turn is leading to a shift of investment away from legacy weapons systems. Those systems won't be displaced entirely, but the strategic balance in procurement decisions is changing.

Strategic implications extend well beyond Ukraine. A seen most recently in Iran, drone warfare, through the ability to conduct surveillance, strike, and interdiction missions with great effectiveness, has democratized air power, historically the preserve of wealthy nations with advanced air forces but now accessible to any state or non-state actor capable of assembling commercial components. While conventional aircraft may command the upper reaches of the sky, at lower levels drones can execute both short-distance and long-distance battle tactics, striking opponents with precision. Drones can also be treated as expendable ammunition, not maintained platforms, inverting the economics of air warfare. This paradigm inherently favors fast-iterating, software-driven innovation over traditional defense systems based on long production runs of expensive, maintained systems.

## Artificial Intelligence and Autonomous Systems

Artificial intelligence is transforming military operations across multiple domains. Applications span intelligence analysis—where foundation models can now detect, classify, and track vehicles, aircraft, ships, and facilities from satellite imagery[10]—to logistics optimization, predictive maintenance, and autonomous navigation.[11]

Drone development and deployment is a Pentagon priority. In June 2025, the White House issued an executive order, "Unleashing American Drone Dominance";[12] the announcement of Drone Dominance, a $1 billion plan to purchase small, lethal drones over a two-year period came later in the year;[13] and the Pentagon also detailed plans to spend nearly $55 billion on a new Autonomous Warfare Command (AUTOWARCOM).[14]

Both sides in the Ukraine conflict have accelerated development of powerful analytic models which can be used to enable drones with machine vision capabilities that allow autonomous target acquisition and tracking even when GPS jamming or other communications disruption would render manually piloted drones ineffective.[15] Commercial satellite constellations are achieving near-continuous surveillance of any point on Earth, with diverse sensor arrays—visible light, infrared, hyperspectral, and synthetic aperture radar.[16]

The combination of AI-powered processing and ubiquitous sensors is eroding the ability of any military force to move, concentrate, or hide without detection, fundamentally altering the calculus of deterrence and offensive operations. While autonomous weapons raise ethical and governance questions—the UN General Assembly voted 166 to 3 in December 2024 in favor of establishing a framework for governing lethal autonomous weapons, with only Russia, North Korea, and Belarus opposed[17]—and UN discussions in 2026 were inconclusive,[18] the momentum is toward increased autonomy.

## Space as a Contested Domain

Low Earth Orbit (LEO) satellites circulate at altitudes between 99 and 1,243 miles above the Earth's surface,[19] a zone occupied by nearly 18,000 satellites as of mid-2026.[20] Once the realm of single satellites, LEO is increasingly occupied by large private sector "constellations" that serve both commercial and government customers with broadband services, remote sensing, and earth observation. That role has been pioneered by Bay Area companies such as Planet Labs, Spire Global, and LeoLabs, which led the development of a national commercial space industry

based on high-volume, low-cost production. NASA Ames Research Center in Silicon Valley served as an early incubator; in the 2000s, its Space Portal office encouraged a larger private sector role in satellite and launch vehicle development. Since 2010, the number of satellites in LEO has jumped 17-fold.[21] Commercial operators account for 61.5% of the global LEO satellite market , with government and defense being the fastest-growing end use.[22]

While initially developed for commercial use, dual-use (civil-military) LEO satellites are changing the face of warfare, as can be seen in the prominent role played by the Starlink network operated by SpaceX in the conflict in Ukraine, providing communications for both civilians and Ukraine's military forces. LEO constellations also provide critical surveillance and intelligence. This is extending the potential scope of warfare into space, as satellites can be targeted by both ground and space-based systems ranging from electronic to kinetic (physical) weapons.[23] The U.S. Space Development Agency (SDA) and Space Systems Command (SSC) plan to deploy constellations for missile tracking that will place hundreds more satellites in Low Earth Orbit and Medium Earth Orbit (MEO),[24] the region of space at altitudes between 1,243 miles and 22,236 miles above Earth.[25]

With that, space is becoming an active theater of military competition. Since 2007 when it used a medium-range ballistic missile to hit and destroy one of its weather satellites in Low Earth Orbit, China has matured its direct ascent anti-satellite (DA-ASAT) capabilities against LEO targets and has subsequently focused development on systems to target satellites at MEO and GEO[26] (geostationary earth orbit at altitudes approximately 22,236 miles above Earth's equator)[27]. DA-ASATs use rockets to send kinetic-kill vehicles into space. [28] China has also had success in using lasers that can blind the optics of satellites in LEO, and in co-orbital systems that can maneuver alongside and interfere with adversary satellites.[29] In July 2026, the Defense Intelligence Agency reported that China has tripled its fleet of intelligence, surveillance, and reconnaissance satellites since 2018 and is continuing to expand its ability to track and target U.S. and allied ground and sea forces from space.[30] Russia demonstrated its Nudol DA-ASAT missile in November 2021, destroying a defunct Soviet satellite and generating as a result over 1,500 pieces of trackable debris and thousands of smaller fragments that endangered the International Space Station and spacecraft in LEO. Russia has been actively deploying ASAT systems and laser weapons and is developing ASAT capability using a new satellite designed to carry a nuclear weapon[31] which, if detonated, would potentially render the LEO orbital zone unusable for up to a year.[32]

These developments have elevated space from a supporting domain—providing communications, navigation, and intelligence to ground forces—to a potential first-strike field in any major conflict. With the military's dependence on space-based assets for precision navigation (GPS), communications, missile warning, and intelligence collection, a disruption of space capabilities could significantly degrade warfighting capability.

A paper issued by the U.S. Space Command in July 2026 outlines emerging forces that define the space warfighting environment, including proliferating dual-use spacecraft that absorb and regenerate under attack; AI-enabled networks that reroute and self-heal faster than adversaries can disrupt; optical and laser links that move data securely; in-space servicing and maneuver; and quantum development s impacting secure communication.[33]

The Bay Area plays an important role in this environment: at its campus in Sunnyvale, Lockheed Martin Space builds many of the nation's most critical military satellites; Planet Labs operates the world's largest commercial Earth-imaging satellite constellation from San Francisco; and multiple Bay Area startups are developing resilient satellite architectures, space domain awareness systems, and in-orbit servicing systems that could reduce vulnerability in the event of an attack. This points to the evolving role of dual-use technologies—space technologies originally developed for commercial purposes but that now have found national security and defense applications.

## Cyber Warfare and the Expanding Battlespace

The cyber domain has emerged as a permanent battlefield, with nation-state adversaries persistently targeting critical American infrastructure. The IT network infiltration campaign by China's Volt Typhoon group, first publicly disclosed in May 2023, compromised U.S. energy, water, and transportation networks.[34] The network breaches by China's Salt Typhoon group, reported in October 2024[35] and described by a U.S. senator as "the worst telecom hack in our nation's history," infiltrated at least eight U.S. telecommunications providers,[36] accessing call records, communications metadata, and in some cases the content of calls and messages of senior government officials.[37] The Computer Emergency Response Team of Ukraine (CERT-UA) documented 4,315 Russian cyberattacks against Ukraine in 2024 (a 70% increase from the prior year)[38] and recorded approximately 15 cyber incidents per day in 2025 coming mostly from Russia.[39]

These campaigns suggest that the boundaries between peacetime and military conflict, and between military and civilian infrastructure, have dissolved in the cyber domain. Future conflicts will be fought simultaneously across land, sea, air, space, and cyberspace. The Bay Area's density of cybersecurity expertise, encompassing both established firms and the broader software engineering talent base, positions the region as a natural contributor to both defensive and offensive cyber capabilities.

## A Growing Advantage for Innovators

Each of these trends—drones, AI, autonomous systems, contested space, and cyber warfare—shares a common structural characteristic: they reward speed of iteration, software sophistication, and the integration of commercial technology over traditional large-scale hardware manufacturing and long procurement cycles. In April 2024, the Air Force selected Anduril Industries and General Atomics for the next round of Collaborative Combat Aircraft (CCA) drone prototyping contracts, beating three of the largest traditional defense prime contractors.[40] The selection of Anduril, a venture-backed company founded in 2017,[41] alongside an established drone manufacturer marked an inflection in defense acquisition. Shield AI's Hivemind autonomous flight software has attracted investment from L3Harris[42] and a strategic partnership with Palantir,[43] reflecting recognition that software-first approaches are not merely supplementing but are in some cases displacing traditional platform engineering.

The structural argument is straightforward. When the decisive military technologies are software-defined, rapidly adaptable, and built on commercial components, the competitive advantage shifts toward organizations that operate on commercial technology timelines rather than traditional defense acquisition timelines.

It would be a mistake, however, to assume that this alignment guarantees immediate outcomes: translating commercial innovation into fielded military capability requires navigating longstanding defense acquisition regulations and other structural barriers.




# Research and Development

The Bay Area hosts one of the densest concentrations of defense-relevant research infrastructure in the United States, anchored by four national laboratories, one of the nation's oldest independent research institutes, and world-class research universities with growing national security programs. While much of the region's economic identity is linked to commercial technology, the research institutions clustered in the Livermore Valley, Silicon Valley, and the East Bay collectively employ tens of thousands of scientists, engineers, and support personnel engaged in work that spans nuclear weapons stewardship, autonomous systems, artificial intelligence, cybersecurity, space, and advanced materials. This infrastructure reflects a decades-long accumulation of capability that predates the current defense technology surge by generations.

## Lawrence Livermore National Laboratory

The story of the Bay Area's defense research ecosystem begins, in many respects, in Livermore. Lawrence Livermore National Laboratory (LLNL) was established in 1952 at the urging of Edward Teller and Ernest O. Lawrence as a second nuclear weapons design laboratory—a Cold War complement to Los Alamos - to more rapidly advance nuclear weapons science and technology.[1] LLNL today supports national security by applying advanced science, engineering, and computing to complex defense challenges. As a federally funded research and development center managed for the U.S. Department of Energy's National Nuclear Security Administration (NNSA), its core mission is strategic deterrence, delivering scientific and technological innovation to ensure the safety, security, reliability, and effectiveness of the nation's nuclear weapons stockpile and to support national and nuclear security more generally. This work involves leveraging advances in high energy density science, advanced materials, high-performance computing, data science, and related domains.[2]

LLNL houses some of the world's most powerful supercomputers for weapons simulation and modeling and applies cutting edge science to achieve breakthroughs in enterprise resilience, counterterrorism, and energy security—efforts that extend the national security reach well beyond the nuclear weapons complex.[3] The laboratory operates on an annual budget exceeding $3.7 billion (with more than 75% dedicated to nuclear defense programs under the NNSA) and employs more than 9,300 people.[4]

LLNL is home to the National Ignition Facility (NIF), the world's highest-energy laser system and the only facility capable of creating conditions critical to understanding modern nuclear weapons: temperatures exceeding 100 million degrees and pressures more than 100 billion times the Earth's atmosphere.[5] In December 2022, NIF

achieved fusion ignition, an historic scientific milestone demonstrating that a controlled fusion reaction could produce more fusion energy than the amount of laser energy delivered to the target. Since then, LLNL researchers have repeated the ignition achievement ten more times, with the most recent ignition achieved on June 20, 2026.[6]

A major area of ongoing work is the Stockpile Stewardship Program. Since the United States ended full-scale underground nuclear testing, LLNL has helped sustain confidence in the nuclear stockpile through experiments, advanced simulations, nonnuclear testing, and detailed assessments of weapon components. The laboratory's High Energy Density (HED) science research produces experimental data and predictive models used to simulate and ensure the reliable operation of nuclear weapons as they age, are subjected to the extreme conditions of a thermonuclear explosion, or are refurbished as part of lifetime extension or modification.[7] The lab's high-performance computing capabilities (HPC) are critical to its stockpile management and modernization efforts,[8] with LLNL serving as a design agency in partnership with Sandia National Laboratories (SNL) and other agencies.

More broadly, the lab's programs are also at the forefront of materials science and manufacturing, supporting innovation in energy, aerospace, and industrial applications. Its seven Core Competencies span advanced materials and manufacturing; bioscience and bioengineering; earth and atmospheric science; high energy density science, high-performance computing, simulation, and data science; lasers and optical science and technology, and nuclear, chemical, and isotopic science and technology.

The laboratory also collaborates with other federal agencies on Threat Preparedness and Response (delivering capabilities to stem the proliferation of weapons of mass destruction, understand and anticipate adversary capabilities, and support the mitigation of natural and man-made threats); Energy Security (developing technologies to secure domestic energy production and environmental sustainability); and Multi-Domain Deterrence (bolstering strategic advantage across a spectrum of domains, including strategic defense, conventional strike warfare, space, and cyber).[9] It frequently serves as a technical resource for evaluating emerging threats, testing prototypes, modeling complex systems, and transitioning research results to operational users and industrial partners. Across domains, its role is to provide trusted scientific and technical judgment, combining long-term research with mission-focused engineering.[10]

LLNL's advancement of technologies that address rapidly changing security environments is centered in the Global Security Directorate. Current areas of focus include machine-learning tools for scientific and defense analysis, resilient communications and sensing, autonomous and robotic platforms, hypersonic and high-temperature materials research, modeling and simulation to assess threats to border and port security, tunnel detection, counter-drone technology to safeguard critical infrastructure, additive manufacturing, cyber defense, and methods for detecting and mitigating weapons of mass destruction. The directorate's Space Science and Security Program applies science, engineering and physics-based modeling and simulation to space as a national security domain.

## Sandia National Laboratories–California

Adjacent to LLNL, Sandia National Laboratories operates a California site that employs approximately 2,000 people with an estimated budget exceeding $500 million.[11] While Sandia's total enterprise spans multiple locations with more than 16,350 employees and a budget of $5.77 billion in FY2025,[12] the Livermore site plays a distinctive role.

Sandia California supports life extension programs for the nation's nuclear warheads, providing the engineering complement to LLNL's physics design work.[13] That singular nuclear deterrence mission has made possible myriad other research initiatives. The site's research facilities include the Center for Cyber Defenders, established in 1999, which has trained more than 800 interns in cybersecurity,[14] with many going

on to careers in the intelligence community and the defense industrial base. Its 410-acre campus is also home to the Micro and Nano Technologies Laboratories (MANTL),[15] the Combustion Research Facility (CRF),[16] and the Applied Biosciences Laboratory (ABL), which focuses on biosecurity and the resilience and security of the nation's energy infrastructures and environment.[17]

The Livermore Valley Open Campus, a collaborative space shared between LLNL and Sandia, hosts the Center for Infrastructure Research and Innovation and the Biotech Collaboration Center,[18] providing a model for open research partnerships that bridges classified and unclassified work. The LVOC model is noteworthy because it addresses one of the fundamental tensions in defense research: the need to maintain security around classified programs while enabling collaboration with universities, startups, and commercial technology companies that operate in unclassified environments.

Together, the LLNL-Sandia complex in Livermore constitutes a workforce of more than 10,000 and a combined budget approaching $4 billion[19]—a concentration of national security research capability unmatched outside of New Mexico's Los Alamos-Sandia corridor.

## NASA Ames Research Center

NASA Ames Research Center occupies a distinct position at the intersection of space exploration, civil aeronautics, military aviation, and autonomous systems.

An important distinction is that Ames operates as a civilian space agency and doesn't directly conduct military research, though many of the technologies it develops have potential military applications and for that reason can be considered dual-use. Located at Moffett Field in the heart of Silicon Valley, Ames employs approximately 3,200 researchers and staff, operates on an annual budget of $1 billion, and manages capital assets exceeding $10 billion.[20]

Ames was established in 1939 as an aeronautics research laboratory and built some of the nation's first high-speed wind tunnels. Its wind tunnel facilities, still among the most capable in the world, have tested designs ranging from World War II fighters to the Space Shuttle to contemporary military aircraft and launch vehicles,[21] and continue to serve the defense department, launch companies, and the commercial space industry. In the post-Sputnik era, Ames pivoted toward space research, and in the decades since has contributed to missions from Pioneer to Mars rovers to Titan helicopters.[22] It is also the home of NASA's premier supercomputing facility, the NASA Advanced Supercomputing (NAS) division, which provides mass storage systems, networking, and computing tools and technologies not only to NASA but also to other government agencies and users.[23] A consequential transition for the region's defense economy has been Ames's evolution into a hub for autonomous systems and robotics research. Its Intelligent Systems Division[24] conducts work in machine learning, computer vision, and autonomous flight management[25] that has dual-use applications spanning NASA's planetary exploration programs and the Pentagon's growing investment in uncrewed platforms.

The National Full-Scale Aerodynamics Complex (NAFC) at Ames is home to the world's two largest wind tunnels, which are managed by the U.S. Air Force and used for aeronautical testing in both NASA and military projects. Other tunnels include the Unitary Plan Wind Tunnel, which has tested generations of NASA's aircraft and space vehicles from every crewed spaceflight program and is also used to support the aerospace industry and government partners by testing commercial and military aircraft.[26]

Focal points of research include software development and high-temperature materials (related, for example to hypersonic flight and space vehicle re-entry) and VTOL (vertical takeoff and landing) technology, including the Mars helicopter. New measurement techniques such as unsteady pressure sensitive paint let engineers predict how alterations in aircraft shapes change air flow patterns and affect a vehicle's performance. The Tiltrotor Test Rig studies advanced rotor blade design for aircraft that can transition from vertical takeoff to horizontal flight.[27] The Army uses the Ames VTOL facilities for testing, as do commercial VTOL companies such as Archer, Wisk and Joby that have growing connections to the defense department.

NASA Ames Research Center shares Moffett Field with the California Air National Guard's 129th Rescue Wing. Also located on its roughly 1,900 acres is the Defense Innovation Unit (DIU), which funnels innovative technologies produced by smaller commercial companies into the defense procurement system. DIU's proximity to the Center enables NASA's access to those companies as well.[28]

## Other National Laboratories

Other federal laboratories in the Bay Area contribute to the defense research landscape in more specialized ways. Lawrence Berkeley National Laboratory (LBNL) participates in the Nuclear Science and Security Consortium[29] and conducts dual-use research in advanced computing, materials science, and detector technology.[30] SLAC National Accelerator Laboratory in Menlo Park conducts particle physics and materials science research[31] with dual-use applications. While neither lab is primarily defense-focused, their capacities add to the depth of the region's scientific infrastructure and create additional pathways for technology transfer to defense applications.

## SRI International

Founded in 1946 by Stanford University trustees as the Stanford Research Institute[32] and separated from the university in 1970 in response to student protests over SRI's defense funding,[33] SRI International is a nonprofit organization that has been a fixture of Bay Area defense and intelligence research for more than three-quarters of a century.[34] Soon to be operating from relocated headquarters on the historic Palo Alto-based PARC campus,[35] SRI employs more than 1,500 people across 10+ locations[36] and in recent years has generated annual revenue in the $400 million range.[37] While SRI does not publicly break out its defense and intelligence revenue, its contributions to national security technology are deeply woven into the fabric of modern defense and non-defense systems—from its foundational role in developing ARPANET, the precursor to the internet, to the creation of the DARPA-funded CALO project, which evolved into the Siri virtual assistant now used by hundreds of millions of people worldwide.[38]

SRI supports a diverse defense portfolio. As one of three research organizations selected by DARPA in 2025, SRI won a $10.7 million contract to work on the MICA project, which aims to design nonliving artificial cells that can perform functions similar to living cells, enabling machines that self-repair, reason, and upgrade by merging biological, mechanical, and electronic systems.[39] Other DARPA-funded programs include an $11.5 million contract awarded in 2021 to develop a hardware chip for fully homomorphic encryption[40]—a technology that promises efficient computation on encrypted data without decrypting it, with major implications for secure military communications—and an $11.6 million contract awarded in 2019 for development of early-warning chemical threat detection.[41] Other programs include the METALS initiative for next-generation computational design of metallic defense components;[42] the MASH (Medics Autonomously Stopping Hemmorrhage) program,[43] which aims to develop robotic systems to autonomously find and stop life-threatening bleeding inside the body, giving wounded warfighters a better chance at survival;[44] the Cornucopia program supported by DARPA, which aims to create a variety of healthy microbial-based foods from air, water and electricity, enabling troops to produce food in remote locations;[45]and the SRI Center for Advanced Imaging, which has developed the DomiNite low-light imaging solution, an advanced night vision technology that delivers exceptional image quality in extreme low-light conditions, with both commercial and military applications.[46]

Bay Area space companies Xona[47] and LeoLabs[48] were both launched with technology licensed from SRI, which also manages the Quantum Economic Development Consortium (QED-C) that connects quantum companies across the United States and 39 countries.[49] SRI also hosts the Silicon Valley residency of DTSA, an accelerator that supports defense and dual-use startups from Ukraine that have proven their performance in operational or combat-like environments and are ready to expand into U.S., European, and Asia-Pacific allied markets.[50]

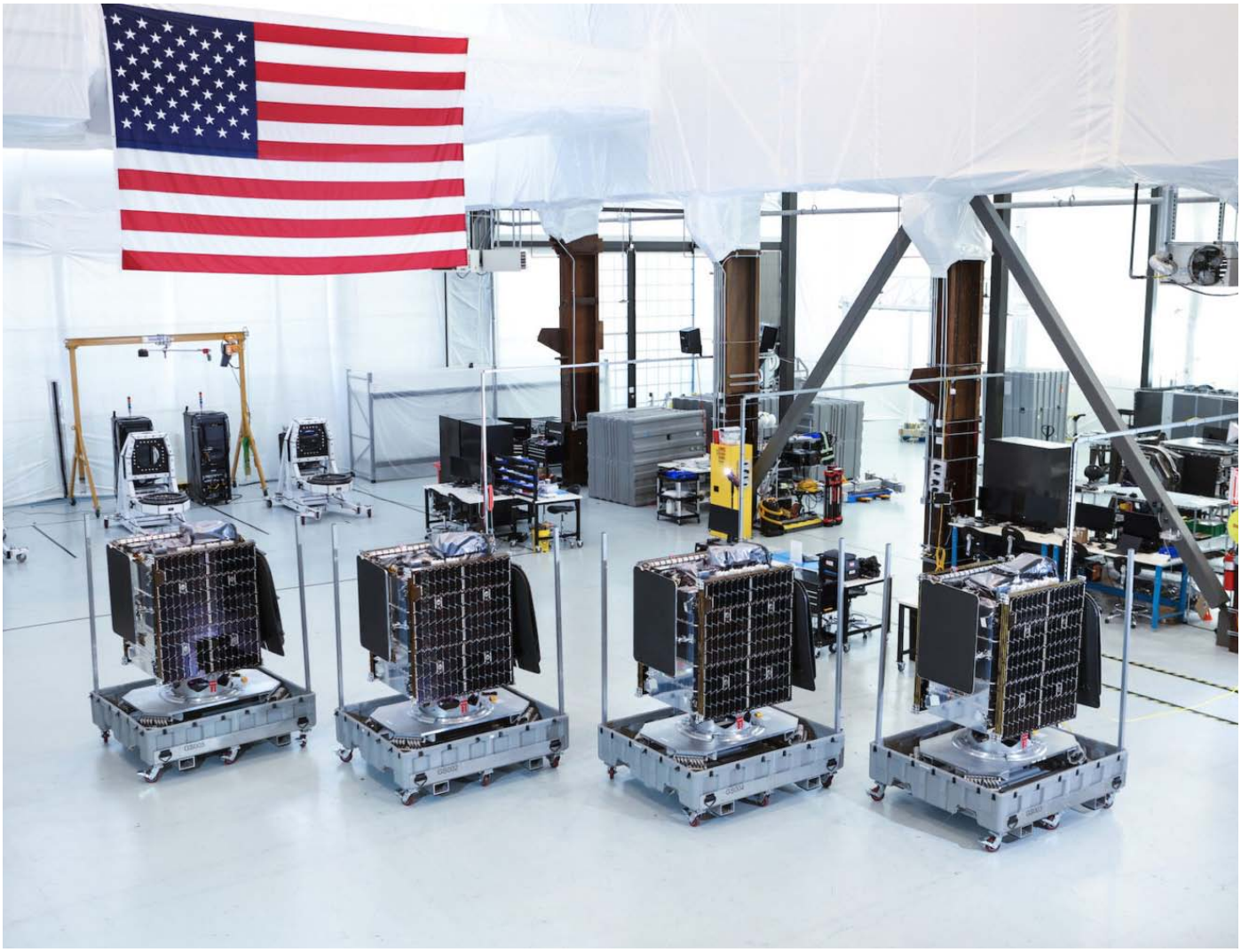
SRI was selected by DARPA in 2024 as one of five premier DARPA Commercial Accelerators in the

country,[51] a role that positions it more strongly as a conduit for moving commercial technology from Silicon Valley into the defense acquisition pipeline.

## Concentrated Assets

Taken together, these institutions constitute a research infrastructure of remarkable density and diversity. The LLNL-Sandia complex serves as the nation's primary center for nuclear weapons science outside of New Mexico. NASA Ames serves as a platform bridging civil and military research in space, aeronautics, AI, and autonomous systems. SRI International brings six decades of DARPA-funded research in fields from cryptography to robotics. While other regions—notably the Washington, D.C. corridor, Texas, and Southern California—also host important defense research assets, few match the Bay Area's combination of federal research laboratories, leading research universities, and proximity to the San Francisco/Silicon Valley Bay Area commercial technology ecosystem.

Fed by the institutional research base, that commercial technology ecosystem has turned with increasing intensity toward defense applications—a development that has produced a new generation of defense tech companies.






# Corporate Leadership

The Bay Area's defense technology landscape has undergone a transformation that would have been difficult to imagine a decade ago. Where Silicon Valley once kept its distance from military work, the region now hosts a critical mass of large defense primes, AI companies, and defense-focused startups. The business data platform Tracxn has identified 233 aerospace, maritime, and defense technology companies in the Bay Area as of mid-2026,[1] most producing dual use technology and with 61 specifically focused on military tech solutions and services.[2] While the national defense industrial base remains dominated by large prime contractors headquartered in other regions, the Bay Area's distinctive contribution lies in the digital and dual-use technology companies that are reshaping how the Pentagon acquires and deploys advanced capabilities—particularly in artificial intelligence, autonomous systems, space-based sensing, and cybersecurity.

## Prime Contractors

The major "Big 5" defense primes—Lockheed Martin, Northrop Grumman, Boeing, RTX Corporation (formerly Raytheon Technologies), and General Dynamics—collectively received 30% of defense contract dollars in FY2024 (most recent available data).[3] While their primary manufacturing and integration facilities are located elsewhere, they maintain recruiting and engineering operations in the Bay Area, drawn by the region's concentration of technical talent. The coexistence of legacy defense primes and hundreds of venture-backed startups creates a layered ecosystem in which established companies and emerging technology firms compete and occasionally collaborate—a dynamic that has no precise parallel in other defense-heavy regions such as Northern Virginia, Huntsville, or the Dallas-Fort Worth metroplex, where prime contractors more clearly dominate. In the Bay Area, the primes must compete for engineering talent with AI startups, autonomous vehicle companies, and major technology firms, creating a labor market dynamic that both constrains and enriches the defense workforce.

**Lockheed Martin**'s presence in the region dates back to 1956 when its Advanced Technology Center (ATC) was established in Palo Alto at a time when the surrounding area was still largely orchards—and a strong case can be made that its presence, along with Fairchild Semiconductor and a handful of other firms, played a key role in the creation of Silicon Valley. The ATC serves as the research lab for Lockheed Martin Space, developing foundational technologies for national security and space programs including directed energy systems capable of defeating unmanned aerial vehicles, LiDAR and LADAR sensing, satellite instruments, solar physics research, nanomaterials, advanced materials, and informatics.[4] In 2014, Lockheed opened a state-of-the-art Advanced Materials and Thermal Sciences Center building in Palo Alto.[5] At the company's Sunnyvale campus, located adjacent to NASA Ames Research Center, engineering teams work on

next-generation interceptors, hypersonic systems, fleet ballistic missiles, and satellite payloads that strengthen security in space.[6]

Several other prime contractors have a footprint in the Valley. **Northrop Grumman** , with a more than 100-year history in Sunnyvale, has teams focusing on submarine propulsion, power generation, and acoustics.[7] **Boeing** engineering teams operate from Pleasanton.[8] Operating under **RTX Corporation**'s Collins Aerospace and Raytheon corporate segments, the company's Applied Signal Technology division facility in San Jose focuses on intelligence, surveillance, and reconnaissance products, working in areas such as high-capacity broadband communications, tactical signals intelligence, and wireless communications.[9] At the **General Dynamics** Mission Systems facility in San Jose, systems engineering, digital signal processing, and software engineering teams develop next-generation defense technology products.[10]

## Information and Communications Technology

ICT companies are providing much of the software on which the defense department depends for daily operations.

**Oracle** partners with the defense department and the intelligence community for enterprise-wide collection, processing, analysis and data dissemination. Powered by AI and machine learning, Oracle U.S. Government Cloud is designed for mission-critical operations, supporting open cloud and data standards with architecture built to align with specific classification requirements. With authority to operate with classified government information, Oracle Cloud provides a cloud platform (Oracle National Security Regions) for classified, mission-critical workloads with government regions that are physically isolated from Oracle's other cloud regions, supporting Joint Warfighting Cloud Capability (JWCC) for the defense department.[11] In July 2026, the company was awarded a $7 billion 5–10 year contract through the Navy to consolidate its multiple IT contracts with different defense department entities into a single contract for the entire organization.[12]

**Salesforce** offers Government Cloud Plus—Defense, a physically isolated, dedicated instance of its Platform as a Service (PaaS) and Software as a Service (SaaS) multi-tenant cloud infrastructure, designed for the defense department and its contractors to store and process highly sensitive classified data.[13] In August 2026, Salesforce received defense department approval for its Agentforce 360 agentic AI platform, which allows defense and intelligence community users to build and deploy autonomous AI agents that can securely handle high-sensitivity military workloads.[14]

**Google** technology supports the defense department's classified networks. In May 2026, Google was one of eight frontier AI companies (along with SpaceX, OpenAI, NVIDIA, Reflection, Microsoft, Amazon Web Services, and Oracle) that entered into agreements with the Pentagon to deploy their advanced AI capabilities on its classified networks. The deployment supports the department's AI Acceleration Strategy by enabling new capabilities across its three core fields of warfighting, intelligence, and enterprise operations.[15] Supported by an earlier $200 million contract that enabled use in the Pentagon's unclassified systems through the GenAI.mil platform, Gemini is now being used across the defense department's classified networks.[16]

**Reflection** is another of the frontier AI companies selected by the Pentagon for systems deployment on its classified networks. The company is the developer of an open-weight AI model that is capable enough to support the building of proprietary, low-cost AI systems on top of it,[17] allowing government users to host, customize, and run systems on their own secure hardware without sending sensitive data to an external vendor.[18]




# Venture Capital and Defense Investment

Perhaps the most distinctive role the Bay Area is playing in the national security field is linked to venture capital, where Bay Area venture firms are funding a new generation of defense technology startups both within and outside the Bay Area. Venture investment in defense technology has surged to record levels, fundamentally changing Silicon Valley's relationship with national security. According to CB Insights, venture-backed defense technology startups worldwide raised $17.9 billion in equity funding alone in 2025—more than double the amount raised in 2024,[1] a metric that reflects both the scale of new capital flowing into the sector and a growing conviction among investors that defense technology represents a structural growth market.

## Defining the Market

The headline investment figure for defense technology varies depending on how the category is defined. PitchBook, which uses the broadest definition and includes all companies with technology products that are or could become dual-use in service of defense activities (including massive industry segments such as renewable energy generation and storage, software, and even biotech), reports global defense tech VC deal activity at $49.1 billion across 861 deals in 2025,[2] representing approximately 8% of all global venture funding[3] and an 80.5% increase over the $27.2 billion recorded in 2024. CB Insights, which focuses only on companies with meaningful defense revenue or contracts, reports that equity funding for defense technology startups more than doubled to $17.9 billion in 2025, up from $7.3 billion in 2024.[4] Crunchbase, applying the narrowest definition restricted to companies explicitly classified as military, national security, or law enforcement focused, reports $7.7 billion in funding to startups in defense across close to 100 deals in 2025.[5] The trend is consistent across all three sources: defense technology venture investment has grown dramatically since 2020 and accelerated sharply in 2024–2025.

The numerical variation reflects the increasingly blurred boundary between commercial and defense technology—one of the defining features of the current moment. The CB Insights figure might be considered as the most defensible middle ground, while noting that the broader dual-use ecosystem tracked by PitchBook amplifies the defense-relevant technology pipeline.

Regardless of which definition is applied, the composition of defense technology investment suggests the centrality of domains in which the Bay Area leads. Using PitchBook data for the U.S. only, starting from 2015, J.P. Morgan reports that cumulative venture investment through 2025 has been heavily concentrated in advanced computing and software ($90 billion); sensing, connectivity, and security ($43 billion); autonomous systems ($26 billion); and space technology ($24 billion).[6] Each of these categories maps to the Bay Area's core technology strengths, which explains the disproportionate share of defense technology capital that the region captures.

## Bay Area Venture Capital Firms Investing in Defense Technology

The Bay Area isn't only the primary source of the technology produced by defense startups. It's also home to the largest concentration of venture firms that fund them.

**Andreessen Horowitz (a16z)**, based in Menlo Park, has made defense technology a centerpiece of its American Dynamism fund, which in January 2026 raised $1.176 billion[7] as part of a $15 billion total raised across 5 funds.[8] The American Dynamism practice invests in companies supporting the national interest across aerospace, defense, public safety, education, housing, supply chain, industrials, and manufacturing, with a defense portfolio that includes Anduril, SpaceX, Hadrian, Shield AI, Skydio, and Saronic.[9] The alignment of the American Dynamism portfolio with defense department priorities gives the firm an outsized influence on capital allocation in the defense sector.[10]

**Founders Fund**, headquartered in San Francisco[11] with 2026 total assets under management of approximately $20 billion, including a $4.6 billion growth fund with a focus on frontier-tech leaders in AI and defense,[12] has perhaps "the most formidable defense portfolio in Silicon Valley"[13]—a distinction earned by backing defense technology long before it became fashionable.[14] The firm was one of the earliest investors in Palantir Technologies,[15] contributed $1 billion (the firm's largest check ever) into Anduril's Series G round,[16] and has backed defense-adjacent companies such as General Matter, Valinor Enterprises, and Varda Space Industries (all of which have a SpaceX alumnus as a co-founder).[17]

**Shield Capital**, launched in San Francisco in 2021 by Philip Bilden and Raj Shah, the former director of the Defense Innovation Unit, focuses on dual-use companies through two funds: an inaugural fund that closed in 2023 with $186 million of capital commitments[18] and the Shield Capital Fund II which has a target of $350 million and has raised $257.5 million as of July 2026.[19] It has a portfolio of more than 37 companies, including 6 unicorns.[20]

An early-stage investor, the firm focuses principally on AI, autonomy (AI applied to things that move), space, and cybersecurity. It looks for companies that can be successful commercially, but whose technologies also have a national security application. Shield defines national security broadly, going beyond what's useful directly for the military and asking instead what technologies will make the U.S. more resilient. Its senior team includes Mike Brown, who like Raj Shah served as DIU's director, and John Serafini, who also serves as the CEO of HawkEye 360, a signals intelligence satellite company in the Shield Capital portfolio.[21] Its advisory board includes former National Security Advisor H.R. McMaster and former NATO Supreme Allied Commander Admiral James Stavridis—an indication of the caliber of national security expertise that Bay Area defense venture firms can draw upon.

Two-thirds of its portfolio companies are in the Bay Area, with others based principally in Los Angeles and Boston, and in Europe. Noteworthy portfolio companies with a headquarters or major presence in the Bay Area include edge computing and infrastructure company Armada, which produces containerized data centers that can be quickly delivered to remote locations that lack conventional infrastructure, and SiFly, a company that produces long distance and heavy lift drones.

Looking back at his experience at DIU and its role in the defense procurement system, Mike Brown comments that "DIU started with problems that needed to be solved, not with military specifications known as 'requirements'. DIU demonstrated that you could use commercial methods rather than traditional military procurement methods (based on Federal Acquisition Regulations) to bring advanced technologies into the system faster. Now its model is proliferating and is a foundation for the Pentagon's Defense Acquisition Transformation strategy." On Silicon Valley's role in defense, Brown says that "Silicon Valley plays an outsized role because it's the largest home of venture capital, which is now focused on financing defense technology. Interest in the field has grown as the world has become a more dangerous place."[22]

**Lux Capital**, with offices in Menlo Park and New York, focuses on early-stage deep technology including defense applications.[23] Its Fund IX raised $1.5 billion in

committed capital in 2026.[24] Lux was an early backer of Anduril and Hadrian, the autonomous defense manufacturing company,[25] and has been explicit in its goal to "reintroduce the Pentagon to Silicon Valley."[26]

**Draper Associates,** founded more than 40 years ago and currently with $2.3 billion in assets under management (AUM) is one of the Bay Area's early investors in defense companies.[27] Its defense tech portfolio is built on a deep-tech focus where technologies point to both commercial and military markets. Key fields include AI, robotics, automation, aerospace, and space. Reflecting on the firm's dual-use focus, Venture Partner Tyrone Lee observes that "the door swings both ways, and you have to have a view of both worlds. A company can start with a commercial focus and expand to defense or begin with defense then find commercial markets." New security challenges, he says, will generate the next wave of dual-use breakthroughs. One current filter for what technologies the firm invests in is "does it work in Ukraine?" Looking back, Lee notes that with its history in Cold War defense spending, "Silicon Valley is Silicon Valley because of military technology. That's where our roots are."[28]

**Crosslink Capital**, founded in San Francisco in 1989 and now located in Menlo Park, has $3.4 billion in assets under management (AUM), and actively invests in defense tech companies. Among those companies are Albuquerque-headquartered rocket motor and additive manufactured solid rocket propellant company X-Bow Systems;[29] Texas-based developer of autonomous systems for multi-domain defense operations NODA AI[30] (co-founded by Philong Duong, who left the Bay Area AI tech ecosystem in to start the company with fellow Marine Corps veteran Dave Corbett[31]); and San Antonio-based producer of autonomous robotics systems for defense Darkhive.[32] Reflecting on the defense tech market, Crosslink partner Matt Bigge, who manages the firm's national security portfolio, notes that most venture-backed defense tech companies are at the R&D level, but that the wars in Ukraine and Iran have opened windows for theater use at scale. Both NODA's and Darkhive's systems have been deployed in Iran. He also points to the importance of modular inputs in modern defense systems: "Components can't be locked in—they have to be modular and interoperable. In today's environment, we need technologies that can be quickly changed or modernized within their operational cycle."[33]

**IQT (In-Q-Tel)**, the intelligence community's venture investment arm, was established in 1999 by the CIA as an independent, not-for-profit strategic investment vehicle. Since then, it has backed more than 800 startups, transitioned more than 500 technologies into active government use, and collaborated with more than 3,000 co-investors worldwide.[34] Headquartered in Tysons, Virginia and with a longstanding office in Menlo Park, IQT was ranked by the 2026 NatSec100 as the leading venture capital firm in national security, based on its 33 defense tech investments.[35] Government partners include the CIA, DIA, NGA, NRO, NSA, DHS, four U.S. Commands (Cyber, Africa, Central, and Space), U.S. Space Force, U.S. Army, DoE National Nuclear Security Administration, Department of the Navy, and the intelligence communities of the United Kingdom and Australia.[36] IQT's best-known early investments were in Palantir Technologies and Keyhole Inc., which became Google Earth.[37]

**The Veteran Fund,** founded in 2021 by Ryan Micheletti, is a San Francisco-based seed-stage investor focusing on companies with technologies that advance American interests and have a veteran on the leadership team. While oriented toward commercial applications and not defense tech exclusively, defense tech and dual-use companies constitute a significant part of the firm's portfolio. Fund 1 in 2022 was oversubscribed at $20.2 million, and Fund 2 is currently being raised with a target of $50 million. The Veteran Fund is now a top-decile performing fund[38] in its 2022 vintage, with a net invested rate of return (IRR) of 39% versus the top docile benchmark of 26.3%.

Areas of focus include space and aerospace, autonomous systems, AI, cybersecurity, data, and critical infrastructure (robotics, manufacturing and energy). Micheletti doesn't think the surge in defense tech investment is a bubble: "Budgets grew alongside innovation in response to sputnik and the challenge posed by Russia. Great power competition with China is just beginning, and capital will keep flowing to the sector for as long as that challenge is there."[39] With 28 portfolio companies, the firm's investments in the Bay Area include Stitch 3D, a data visualization company offering a modern cloud solution for 3D and geospatial collaboration, and Foundation, a producer of

autonomous humanoid robotics engineered for extreme environments, integrating robotics, AI, and autonomy.[40]

**Grit Ventures**, a new firm co-founded by Xioming Yin in March 2026 and now raising a $50 million fund, focuses on deeptech with three core verticals: industrial automation and robotics, compute (including quantum), and power (including data centers and power for industry), with university spinouts a major source of deal flow. Yin, who previously spent eight years with Lockheed Martin Ventures, reflects on how the defense investment market has changed in recent years: "Ten years ago, defense tech was a rounding error, but that's changing very fast. At Grit we start with deeptech, then look for commercial and defense applications. On the defense side, we're aiming for high-volume, low-cost technologies that can be rapidly adapted. In Ukraine and Iran, we're seeing multi-million dollar platforms being used to shoot down sub-$30K Iranian drones. That's not sustainable."

More broadly, she says, the firm's goal is to help rebuild the U.S. industrial base. Printed circuit boards (PCBs) are an example. In 2000, more than 50% were made in the United States but today that number is less than 1%, with China producing 75% of the PCBs made in the world. Wire harnesses are another case of a simple but important component with low U.S. production: "You have a very limited choice of suppliers in the U.S., and they're often small and expensive. People are also rapidly retiring from these companies, often with no succession plan. This is a vulnerability." Yin adds that while the Bay Area has the largest concentration of deeptech companies in the nation, companies in other countries are increasingly exploring opportunities in China, where automation is advanced and costs are lower.[41]

**Lockheed Martin Ventures**, the strategic investment arm of defense contractor Lockheed Martin, is a leading corporate venture investor in defense-adjacent dual-use technologies, with a broad focus on technologies that strengthen the resiliency of the defense industrial base. Key fields include advanced manufacturing and materials, advanced electronics, semiconductors, aerospace, autonomous systems, propulsion, sensors, communications technology,[42] AI, and quantum computing. Launched with $100 million in 2007, in April 2026 its funding capacity was increased to $1 billion. As of mid-2026,more than $500 million has been invested in more than 120 companies. Of those, more than 60 have matured to become suppliers to Lockheed Martin, receiving over $750 million in contracts. More than 25 companies have been added to the portfolio in just the last two years.[43]

Approximately one-third of Lockheed Martin Ventures' portfolio companies are in the Bay Area, with a significant cluster in Southern California and others in Texas, Florida, Alabama, and Washington D.C. In July 2026, the firm committed $100 million to investing in the UK and Europe. The UK, Germany, and the Netherlands are its primary focus but it's also looking at Europe more broadly.[44] Lockheed Martin Vice-President and General Manager Chris Moran sees Europe as an opportunity for Silicon Valley since many European companies want to come to the United States to sell to the government market.

On Lockheed Martin Ventures' broader investment strategy Moran says "We're largely dual-use but start from the defense side. We see a lot of purpose-built defense companies, but it's a tough space to be in, particularly if you have one product and one customer (the government). Having commercial market opportunities can make them more sustainable when government contracts are slow in coming." On scenarios for the future, Moran asks "We don't know how many of these new entrants will survive on their own. Will there be just a few that grow to become reliable defense suppliers, or will there be hundreds of new suppliers to the market? We're trying to figure that out. Our goal is to help increase the scale and resiliency of the defense industrial base."[45]

Other notable dual-use and defense tech investors in the region include **General Catalyst**, **Lightspeed Venture Partners**, **Foundation Capital**, **Bow Capital**, **DCM Ventures**, **DCVC Ventures**, **Starship Ventures**, **Outlander VC**, **Hanwha Asset Management USA**, **Salesforce Ventures**, **Geodesic Capital**, **Principal Venture Partners (PVP)**, and **HCVC**.

Emerging dual-use companies can also draw on venture debt, where banking supplements venture investment, helping high-growth companies to scale more efficiently. Two banks in the Bay Area have prominent roles. **First Citizens Innovation Banking** partners with venture capital firms to provide debt financing that complements equity investment.

Following its 2023 acquisition of Silicon Valley Bank, First Citizens expanded its commitment to the sector with a dedicated Aerospace, Defense & Security Innovation practice focusing on the nationwide defense industrial base. Active in the Bay Area, the bank is also seeing significant activity in Southern California, Seattle, Texas, Colorado, and Washington, D.C. Dax Williamson, Co-Head of the Aerospace, Defense & Security Innovation practice, observes that "Defense is no longer a niche investment theme. It's becoming a distinct asset class."[46] **JPMorgan Chase** has also grown its defense innovation focus, supported by a 10-year $1.5 trillion National Security and Resilience initiative that supports companies of all sizes with advice, financing, and in some cases investment capital. Key focal points of the initiative include supply chain and advanced manufacturing; defense and aerospace (defense technology, autonomous systems, drones, next-gen connectivity, and secure communications); energy independence and resilience; and frontier and strategic technologies.[47]

## Accelerators

The defense venture ecosystem extends beyond dedicated funds into the accelerator programs that shape the early-stage pipeline.

**Y Combinator (YC)**, the San Francisco-based accelerator that has helped launch more than 5,000 startups,[48] didn't accept defense technology applications before 2024. That year, YC admitted Ares Industries, a startup launched in August 2024 that builds low-cost cruise missiles, making it the first defense startup to receive YC backing.[49] Y Combinator has since expanded its defense portfolio to include companies developing defense technologies such as autonomous interceptor drones that ship in sealed containers; an operating system that unifies multiple data sources for anti-drone defense decision-making; and hip-mounted military exoskeletons that help soldiers carrying heavy combat loads by adding battery-powered assistance to their gait.[50] In November 2025, YC announced a remote-participation exception that allows it to accept Ukrainian defense technology startups whose founders may be unable to leave their country due to war conditions.[51]

**Plug and Play (PnP)**, headquartered in Sunnyvale, runs a wide range of industry-specific accelerator programs including one on aerospace and defense.[52] Areas of focus include directed energy, hypersonics, integrated sensing, cybersecurity systems, specialized electronics and hardware components for military systems, digital twin technology, connected fleet technology, satellites, propulsion, space infrastructure, and satellite data management. PnP's Sunnyvale office is one of five (out of its more than 60 offices worldwide) that hosts an Aerospace & Defense program.[53]

## Bridging Dual-Use Technologies to the Defense Procurement Market

Even as emerging dual-use companies produce innovative defense technologies and the venture firms fund them, a critical gap exists between promise and reality when it comes to the defense procurement system. The Pentagon's acquisition systems are notoriously complex and time consuming, creating what has historically been a barrier for startups with limited time and resources for the procurement and scaling of those systems through processes originally designed for large defense contractors. Recognizing the critical need to open those pathways, a number of organizations and institutions have carved out a role as bridges.

One is the **Silicon Valley Defense Group (SVDG)**, which plays a mediating role between emerging defense tech companies and the Pentagon's procurement system. Founded ten years ago in Silicon Valley and now based in Washington, D.C., its core mission is to serve as a conduit between the government (the Pentagon and Congress), founders and CEOs of defense tech companies, and investors (VCs and Wall Street),[54] with the goal of advancing a new American defense innovation base that is actively sourced by government.[55]

SVDG Executive Director Mike Keating observes that private capital investment in defense is now approaching Cold War levels as a share of total defense spending, driven by great power competition, the growing role of software in modern battlefields, and

the demonstration by SpaceX that investment in the defense tech sector can be profitable. The Bay Area, he says, remains the system's engine, but companies are spreading nationally as their needs grow and diversify. Manufacturing, for example, might make sense in the Midwest, and some might want to be close to the government market in Washington, D.C.

Asked what he sees as the biggest threat to the growing boom in defense tech investment, he points to the gap between venture investment and actual government contracts: "Venture capital brought this ecosystem to where it is today, but at some point these companies will have to see an exit. Currently defense tech companies in the NatSec100 represent only .52 basis points of the total defense budget. If the government doesn't start buying at scale, venture's appetite could implode." Part of the challenge, he says, is that "DIU has succeeded in convincing the Pentagon that venture-backed companies are the future, but the transition of companies from early-stage research grants and pilots to full scale procurements has been limited. Contracting officers are trained to work with primes on multi-decade procurements, incentive systems and operating procedures haven't changed, and risk tolerance within the system is still low. Companies that have succeeded at scale—like Anduril, Saronic, and Shield AI—went directly to the end users."[56]

SVDG works to promote procurement system reform and each year publishes the NatSec100, an index of the 100 top venture capital and private equity backed U.S. defense companies.

At a grassroots level, Menlo Park-headquartered **Arkenstone Defense**, co-founded in 2025 by former Marine Corps officer and early DIUx team member Peter Dixon,[57] serves small and emerging defense and dual-use companies that sell to the defense department and to other national security agencies. It essentially provides a back office, helping to manage payroll, benefits, HR, workforce operations, and the complex contract and compliance procedures that can constitute a formidable barrier for smaller companies dealing with the U.S. government.[58] Management roles can include personnel security, contract management, security clearance management, accounting, and a range of other compliance requirements.[59]

As Dixon explains it, there are two distinct markets for defense spending: the over $3 billion defense innovation market accessed through DIU and AFWERX, which bypasses most appropriations or compliance prerequisites, and the traditional procurement channel, a $240 billion annual market that can only be accessed by meeting standard compliance requirements. Non-traditional defense contractors (NTDCs) hold 5% or less of that market, suggesting that much of the technology the country critically needs lives in smaller companies that never make it in the door. Compliance with administrative requirements is a key to accessing that market, even ahead of mission fit. Arkenstone's strategy is to assume the compliance burden so the company can focus on capability and delivery. Dixon adds with a smile "we're the most boring company in defense tech."

Commenting on Silicon Valley's role in defense strategy, he points to the venture and startup economy. The last battlefield paradigm focused on precision strikes, capital ships, and satellites—large platforms that are becoming obsolete: "Ukraine sank a third of Russia's Black Sea fleet without a navy, and Iran's $20,000 Shahed drones are forcing responses by Patriot missiles costing $1.5 million. M-1 battle tanks sent to Ukraine aren't survivable on the modern battlefield. The new military paradigm is led by man-machine drone swarms, autonomy, and electronic and cyber warfare. This is where Silicon Valley has the edge."[60]

**BMNT** was launched in Silicon Valley in 2013 by military veterans who wanted to change how Silicon Valley and the defense department work together, focusing on acquisition strategies to accelerate innovation. Its work focuses on helping emerging companies validate their market fit for government contracts, preparing them for interaction with the defense procurement system by assuring that they meet compliance requirements.[61] Another intermediary is the **Defense Investor Network (DIN).** Started in 2019 by Heather Richman[62] and now with approximately 300 members and chapters in the U.S., the UK and Australia, DIN is a loose assembly of investors that regularly meets for discussions with military and intelligence leaders, with the goal of integrating investors more directly into the broader defense community. [63]

SPOTLIGHT

## The Defense Innovation Unit (DIU)

While private venture capital provides funding, the defense department has built its own institutional bridge to Silicon Valley's innovation system. The Defense Innovation Unit (DIU), headquartered at Moffett Field[64] and with offices in Boston, Austin, Chicago, and the Pentagon, is the only defense department organization focused exclusively on fielding and scaling innovative commercial technology across the U.S. military at speed.[65]

DIU was established in August 2015 as the "Defense Innovation Unit Experimental" (DIUx) by Secretary of Defense Ash Carter, who recognized that the Pentagon's traditional acquisition system was too slow to harness the rapidly emerging commercial technologies coming out of Silicon Valley.[66] The catalyst was a recognition that many of the technologies coming from commercial companies[67] were more advanced and less expensive than those in use by the military. In August 2018, the unit was rebranded as DIU to signal permanence and institutional commitment.[68]

DIU identifies commercial technology solutions for military problems, runs competitive prototype evaluations typically lasting 12 to 24 months, and awards Other Transaction Agreements (OTAs) that enable accelerated procurement by the defense department[69] and other national security agencies, going outside the cumbersome Federal Acquisition Regulation (FAR) contracting process that has historically discouraged many smaller technology companies from working with the government.

The cumulative impact has been significant. Through 2025, DIU has awarded more than $4.9 billion in production contracts across 48 companies, and companies in its portfolio have attracted $20 billion in private investment[70]—a leverage ratio that suggests that DIU's role as a validator of commercial defense may be at least as important as its direct funding. In 2026, DIU narrowed its portfolios to three "spearheads": Autonomous Warfare, Kill Web (sensors, space, communications networks, electronic warfare, cyber), and 10X (capability, cost and timeline gains). Positioned as cross-cutting horizontal infrastructure across all three flagship portfolios are AI (weaving next-gen AI solutions into the core of every project)[71] and the Bridge Program (facilitating technology transition and adoption strategies that cut procurement timelines).[72]

Perhaps the most telling indicator of DIU's growing institutional weight is its budget trajectory. Driven by Congress creating a dedicated "DIU Fielding" budget line item to support the adoption of mission-critical technology development, testing, evaluation, procurement, and production, DIU's budget saw a ninefold increase from $104 million in FY2023 to $946 million in FY2024.[73] The fielding line item rose to $595 million in FY2025 and was increased to $619 million in the FY2026 budget request.[74] While a GAO audit (GAO-25-106856) has noted that DIU needs better progress assessment metrics, the budget trajectory indicates that both the Pentagon and Congress view DIU's innovation bridging function as strategically important.[75]




# Rising Tide: Technology Innovation and the Commercial Defense Industry

As the heart of the U.S. technology innovation system, the Bay Area is at the forefront of a broad range of technologies bridging commercial and defense applications, and companies that are taking them to market. One measure is the NatSec100, a compendium produced by the Silicon Valley Defense Group that highlights the top 100 venture and private equity backed American dual use and defense technology companies.

Key selection criteria include U.S. government contracts, capital recently raised, total capital raised, and recent headcount growth. Eligibility requirements include being venture or PE backed and not publicly traded, clear dual-use or defense applicability to national security, at least one government contract secured as of December 31, 2025, and vetting for any foreign ownership, control, or influence concerns.[1]

**Exhibit 1**

## NatSec100 Company Count by Critical Technology Area, 2023–2026

| | 2023 NatSec100 | 2024 NatSec100 | 2025 NatSec100 | 2026 NatSec100 |
|---|---|---|---|---|
| Applied Artificial Intelligence | 35 | 40 | 46 | 40 |
| Quantum and Battlefield Information Dominance | 34 | 25 | 26 | 27 |
| Contested Logistics Technologies | 20 | 24 | 20 | 25 |
| Scaled Hypersonics | 6 | 6 | 4 | 4 |
| Biomanufacturing | 4 | 4 | 2 | 3 |
| Scaled Directed Energy | 1 | 1 | 2 | 1 |

Source: Silicon Valley Defense Group, 2026 NatSec100 Report

In the NatSec100's 2026 edition, the companies listed are broadly distributed nationally, reflecting growth in the dual-use technology sector. Clusters appear in the Greater Washington, D.C. area (Maryland and Virginia), New York, Southern California (Los Angeles, Long Beach, Costa Mesa, Torrance and El Segundo), Boston, Colorado (Colorado Springs, Boulder), Texas (Austin) and Seattle. Forty-seven companies, nearly half of the top 100, are headquartered in California. The largest headquarters cluster by far—24 companies—is in the San Francisco Bay Area.

The top technology fields where the NatSec100 companies cluster are Applied Artificial Intelligence (40), Quantum and Battlefield Information (27), and Contested Logistics (25).

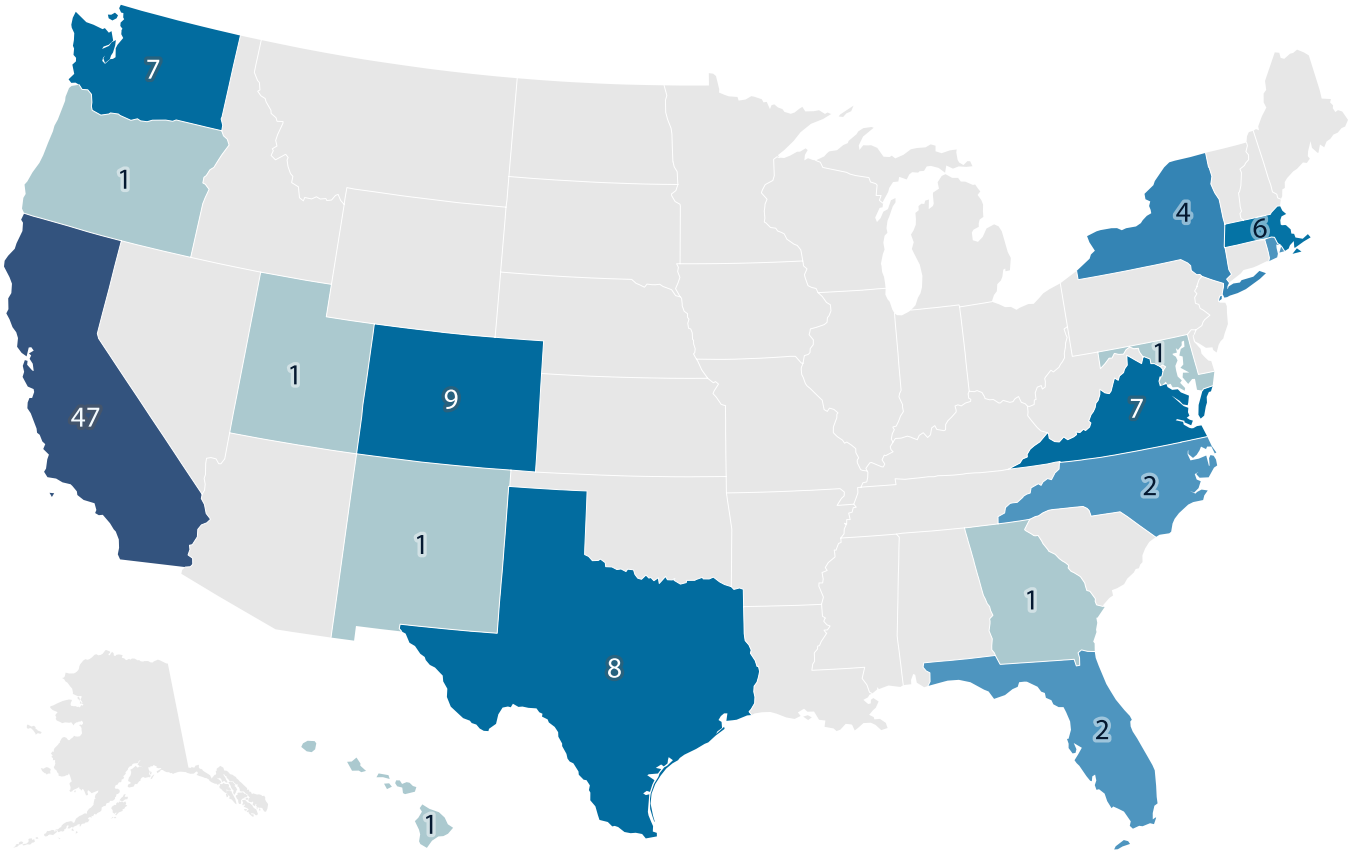
Private investment is heavily concentrated in AI, while government funding is more evenly spread across defense priorities.

The use by the government of OTAs is growing. Federal procurement of products and services from emerging dual-use companies, however, still accounts for only a small part of the total defense budget.[2]

Bay Area companies have pioneered the dual-use technology space, with applications across a broad range of national security priorities.

**Exhibit 2**

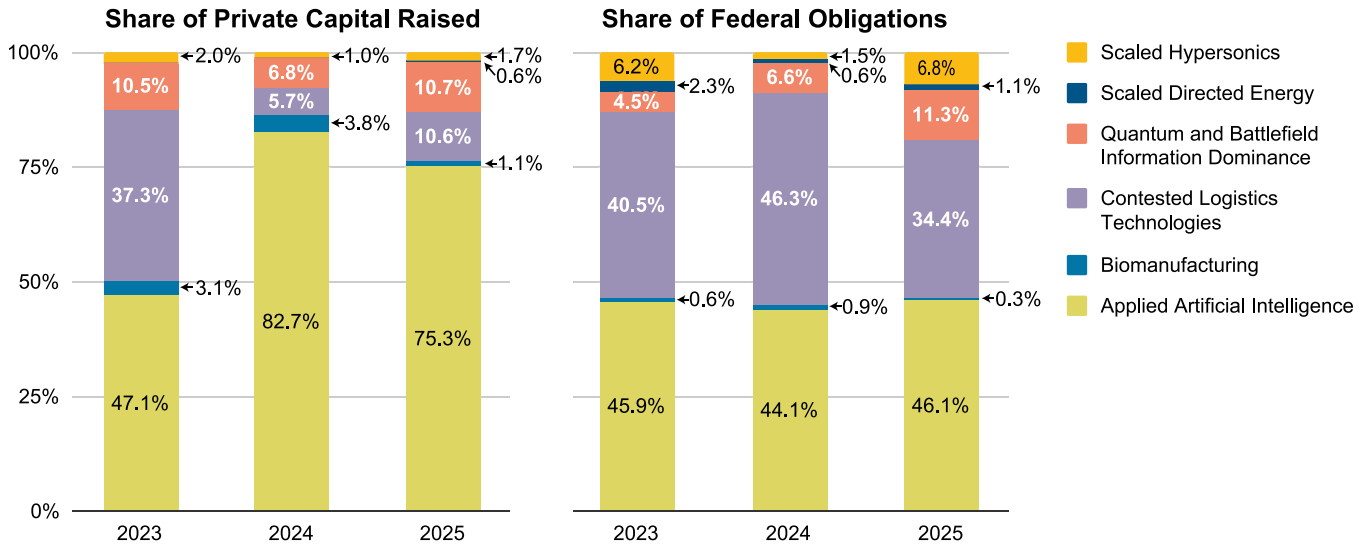
## NatSec100: Corporate HQs by State




Source: Silicon Valley Defense Group, 2026 NatSec100 Report

**EXHIBIT 3**

## NatSec 100 Distribution of Funding by Critical Technology Area, 2023–2025



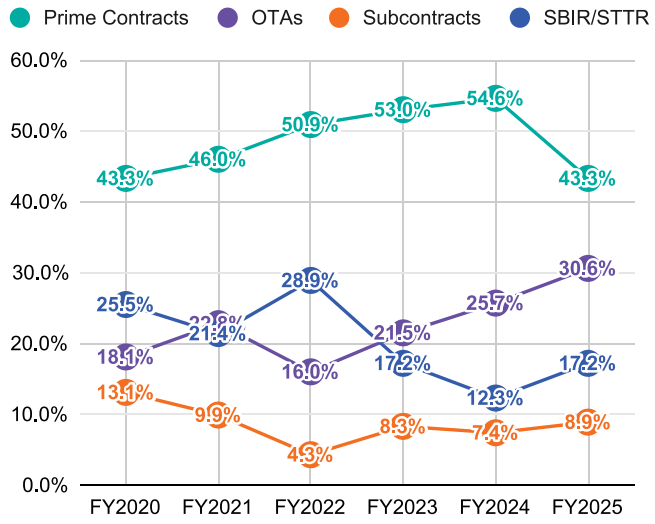

Data Source: Silicon Valley Defense Group, 2026 NatSec100 Report

**EXHIBIT 4**

## Government Contracting Trends

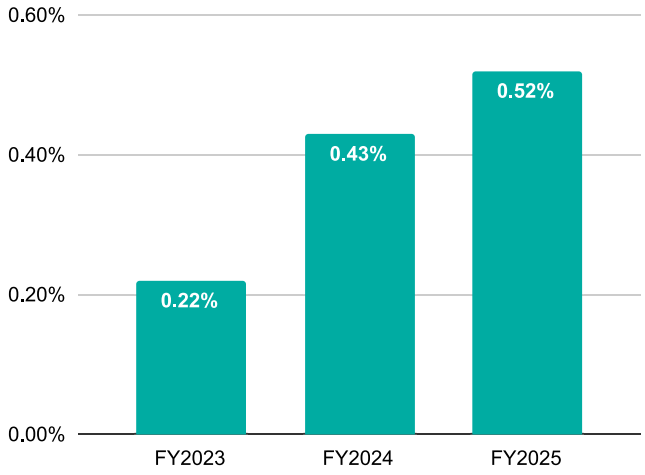
### Use of OTAs Continues to Grow Steadily

Award Type Mix for NatSec100 Companies, FY2020–FY2025




### NatSec Companies Still Capture a Thin Slice of Total Defense Spending

Share of Defense Budget Awarded to NatSec100 Companies




Data Source: Silicon Valley Defense Group, 2026 NatSec100 Report

# Artificial Intelligence

Artificial Intelligence has quickly become the most consequential technology domain linking San Francisco and Silicon Valley to the defense department and other national security agencies. Significantly, 75% of U.S. investment in AI in 2025[3] and 60% of global AI investment[4] was in Bay Area headquartered companies, primarily concentrated in the city of San Francisco.[5] The Pentagon's commitment of $800 million to frontier AI agreements (four companies at $200 million each) through the CDAO (Chief Digital and Artificial Intelligence Office) reflects a strategic recognition that commercially developed AI capabilities—including large language models, agentic AI workflows, cloud-based infrastructure and more[6]—will be decisive in future conflicts. What is distinctive about the current moment is not simply that AI companies are winning defense contracts, but that the most capable AI systems in the world are being developed by Bay Area companies for commercial markets and then adapted for military use—a reversal of the Cold War pattern in which military-funded research eventually found commercial applications. The implications for the Bay Area's defense relevance are significant: so long as the region leads in frontier AI development, its role in national defense will grow regardless of whether individual companies actively court the Pentagon.

As AI is becoming an increasingly critical tool across a range of defense applications, from administrative data management to autonomous, semi-autonomous, and agentic systems, Bay Area companies are playing the central role in its integration into a wide range of military systems. Agentic AI in particular is having profound effects on both tactical and strategic operations. This brings complexity, as the growing ubiquity of AI in military systems raises questions regarding its use in lethal applications and human control in those decisions. Much of AI's value lies in its ability to synthesize real-time data to enable effective field decisions. Department of Defense Directive 3000.9 requires that all systems be designed to "allow commanders and operators to exercise appropriate levels of human judgment over the use of force," but how and when that oversight is exercised remains a question.[7] As the scale of AI-enabled systems grows, human-in-the-loop decision making will be challenged by swarm attacks, rapidly-adapting electronic attacks, and the speed of decision making required in battlefield environments.

In April 2026, Google joined OpenAI and xAI in allowing the defense department to use its AI tools in classified settings. Criteria governing the use of AI in both the Google and OpenAI agreements require that their technologies not be used for mass surveillance or autonomous weapons (though it's unclear whether that's enforceable). Those agreements followed on the heels of a still-ongoing dispute between the Pentagon and Anthropic over the use of its technology for the same purposes, as a result of which Anthropic has been designated a supply chain risk, cutting it off from government contracts and potentially from contracts with other government contractors.[8] The advanced capabilities of Anthropic's Fable 5 and Mythos 5 models and the government's desire to limit access by potential adversaries later caused Anthropic to institute a temporary halt to customer access to those models,[9] leading to further controversy over security issues raised by AI and the federal government's role in global AI markets.

AI's growing prominence in military systems also makes AI companies potential military targets. On March 1, 2026, as hostilities escalated between the United States and Iran, Iranian Shahed drones hit U.S. commercial cloud infrastructure in the Gulf region, directly striking two Amazon Web Services data centers in the UAE and damaging a third AWS data center in Bahrain with debris from a nearby strike.[10] A month later, Iran's Tasnim news agency published a statement from the Islamic Revolutionary Guard Corps declaring its intention to target regional offices and data centers operated by 18 tech firms,[11] including Google, Microsoft, NVIDIA and Palantir,[12] accusing the firms of supporting U.S. military and intelligence activities.[13]

SPOTLIGHT

## Scale

San Francisco-headquartered Scale was the first major AI company to supply an AI-powered decision-making platform for deployment on a classified military network.[14] The company provides data, full-stack technologies, and model evaluations that help enterprises and governments build, deploy and oversee AI applications.[15] Scale started in commercial markets, producing the labeled training data that taught self-driving cars to see,[16] and entered defense work in 2020 with an Army Research Laboratory contract to annotate data for the Pentagon's machine learning programs.[17] In 2022, the Joint Artificial Intelligence Center awarded Scale a $249 million blanket purchase agreement for data labeling and AI services across the department,[18] and in 2023 the company's Donovan platform became the first large language model deployment on a U.S. government classified network.[19]

Scale's defense work now extends from data to agentic AI, providing computer vision and agentic GenAI applications across defense, intelligence, and federal and civilian agencies, including back-office functions such as acquisition, procurement, and contracting, but also mission planning and operations, war gaming, command and control, air operations command, ground autonomy, intelligence, surveillance and reconnaissance, threat assessment and targeting support, defensive cyber ops, threat detection, and perimeter security.[20] In 2025, Scale was selected as the lead contractor working alongside Anduril, Microsoft and other subcontractors in the development of the Thunderforge project, the Pentagon's initiative to integrate AI across military domains to support large-scale planning and operational decision-making. The first prototype tools are slated to be deployed to the Indo-Pacific Command (INDOPACOM) and the European Command (EUCOM).[21] Scale also has a $500 million enterprise agreement with the defense department's Chief Digital and Artificial Intelligence Office (CDAO), giving U.S. military branches and defense agencies access to Scale's full set of AI platforms for building, testing, and deploying computer vision models (Scale Data Engine), generative AI applications and agents (Scale GenAI Platform), and decision-making support applications (Scale Donovan).[22] The company is also growing its footprint in Qatar and the UK and establishing a presence in Riyadh and Dubai.[23]

Scale's vision for the role of agentic AI in warfare is laid out in a 2026 white paper, *The Agentic Coalition*. As described there, it anticipates a new generation of agents that "perform the first pass of many analytical tasks—triaging information, testing assumptions, and proposing options—while humans set intent, apply judgment, and own the risk," compressing the gap between assessment and execution.[24] Already piloted in U.S. combat commands, agentic AI systems for the military are intended to give commanders digital resources that are able to triage sensor data, stress-test thousands of scenarios in parallel, and adapt planning as conditions change—with the end goal of enabling decision makers to see the battlefield more clearly, adapt more rapidly, and synchronize assets more precisely.[25]

**Palantir Technologies**, founded in Palo Alto in 2003, develops a range of enterprise software platforms to enable companies and governments to utilize complex datasets and analytics platforms that support civil and military applications.[26] While Palantir is now headquartered in the Miami area,[27] it retains its roots in Silicon Valley and an active presence in Palo Alto.

The company's defense-related contract portfolio is formidable, serving the U.S. Army, U.S. Air Force and Space Force, the Navy and Marines,[28] NATO, and the UK's Ministry of Defense.[29] In May 2025, it grew its contract for the Maven Smart System—a command-and-control software platform that uses AI to process large volumes of battlefield data from satellites, radars, drones, sensors, and intelligence reports[30]—to nearly $1.3 billion,[31] and in March 2026 Maven's use became official across all military branches. Palantir has been the primary contractor for Maven Program since 2017.[32]

In August 2025, the company secured an Army Enterprise Contract worth up to $10 billion that consolidated 75 separate contracts.[33] Its software is now deployed across five combat commands, supporting applications from battlefield awareness and logistics to the TITAN ground station, which uses AI to process data from space-based sensors.[34]

**Vannevar Labs**, headquartered in Palo Alto, provides threat detection and analysis solutions for national security.[35] Data analytics developed by the company map information battlespaces and anticipate and illuminate threats ranging from terrorist networks, foreign intelligence actors, and cyber adversaries.[36] Current operations extend across the Indo-Pacific theater, enabling coordinated decision making with allies.[37]

**OpenAI**, based in San Francisco, has a contract with a $200 million ceiling through the defense department's Chief Digital and Artificial Intelligence Office (CDAO) to prototype how frontier AI can transform defense administrative operations in functions ranging from streamlining program and acquisition data use, to supporting proactive cyber defense. In June 2025, the company launched OpenAI for Government, which consolidates technology provision under one umbrella, offering U.S. federal, state, and local governments access to its most capable AI models, including custom models for national security.[38] Open AI is also collaborating with Anduril Industries on AI for national security missions, with a specific aim of integrating advanced AI solutions into counter-uncrewed aircraft systems (CUAs).[39]

**Salesforce** signed a $5.6 billion 10-year contract with the Army in January 2026 to help the Pentagon shorten procurement timelines and speed decision making, in part through the use of AI agents. The operative unit that was awarded the contract is Computable Insights, a wholly-owned Salesforce subsidiary serving the U.S. intelligence community and national security market.[40]

It should be noted that **Anthropic** has in the past held extensive contracts with the defense department but was banned from providing its technology to the Pentagon or to private sector entities working on defense contracts due to disputes over its technology's appropriate use. The government's labeling of Anthropic as a "supply chain risk" has resulted in extensive litigation.[41]

Other Bay Area dual use AI companies include data infrastructure companies **Databricks**, **Ayar Labs**, and **Lambda AI**, and applications companies **Deepnight** (AI-enabled night vision devices), **Horizon3** (Cloud-based penetration testing platform for AI-based vulnerability management), Ditto (a resilient edge device connectivity platform), and **TurbineOne** (AI and machine learning to support tactical operations and situational awareness through threat detection, mission coordination, and autonomous operations.)

The concentration of AI defense contracts in Bay Area companies isn't coincidental. The region's dominance in AI research talent, computational infrastructure, and venture-backed AI development creates a gravitational pull not easily replicated elsewhere. Even companies that were founded in the region but have relocated their corporate headquarters—Palantir first to Denver and then to Miami in 2026; CrowdStrike to Austin—maintain substantial Bay Area engineering operations.

## Quantum Technology

Like AI, quantum technology is positioned to play a growing role in future U.S. defense capability. The Bay Area is home to the largest aggregation of quantum computing assets in the United States, with more than 70 research institutions, universities, large and small companies, and investors supporting quantum activity.[42]

The National Quantum Initiative Act, signed into law in December 2018, calls for the creation of research centers

across the country to accelerate foundational quantum R&D.[43] In February 2026, the National Science Foundation launched the National Quantum and Nanotechnology Research Infrastructure program, which will invest up to $100 million to establish a nationwide network of open-access research facilities for quantum and nanoscale technologies, with 16 sites to be selected over five years.[44] And in May 2026, the Trump administration awarded $2 billion in funding to a portfolio of two quantum foundries and seven quantum computing companies, with the federal government taking equity stakes in several.[45] Four of the nine recipients—**GlobalFoundries**, **Atom Computing**, **PsiQuantum**, and **Rigetti Computing**—are in the Bay Area.

Executive Order 14413, signed in June 2026, aims "to ensure that the United States maintains a strategic technical advantage" across multiple quantum technologies, directing the Department of Defense to deploy quantum sensors by September 30, 2028.[46] In September 2025, Palo Alto-based PsiQuantum secured an initial $31.8 million contract from the Defense Advanced Research Projects Agency (DARPA) through its Quantum Benchmarking Initiative to advance the company's quantum computing technology, an agreement that was expanded with an additional $125 million agreement signed in July 2026.[47] Quantum's applications with defense parameters include enhancing cybersecurity, precision navigation that circumvents GPS jamming, and enabling sensors to pick up subtle signals that more conventional methods miss.[48]

## Drones and Autonomous Systems

Autonomous systems (airborne, maritime, and ground-based) represent perhaps the fastest-growing segment of the defense technology market, driven by lessons from the war in Ukraine—where both sides have deployed drones at unprecedented scale—and a growing Pentagon consensus that autonomous platforms will be central to future warfare. Significantly, many of these systems are AI-driven.

Using PitchBook data from 2015 to 2025, J.P.Morgan reports that cumulative venture capital investment in autonomous systems in the U.S. reached $26 billion, making it one of the four largest categories of defense technology investment alongside advanced computing and software ($90 billion), sensing, connectivity, and security ($43 billion), and space technology ($24 billion).[49] The Bay Area hosts a number of the most prominent companies in this space, combining the region's AI and software capabilities with physical manufacturing operations.

**Spotlight**

### Skydio

Skydio, headquartered in San Mateo with a manufacturing facility in Hayward, has become the leading American-made autonomous drone company and one of the Bay Area's most significant defense technology enterprises. Founded in 2014 by MIT graduates with deep expertise in computer vision and robotics,[50] Skydio developed AI-powered autonomous flight capabilities that distinguish its drones from the manually piloted systems that dominate the global market.[51] In February 2022, the U.S. Army selected Skydio as the platform for its Short Range Reconnaissance (SRR) Program of Record (the gold standard for defense procurement)—a contract valued at up to $99.8 million.[52] The company's flagship X10D platform now serves every branch of the U.S. military and is deployed by 25 allied nations[53] and 1,200 public safety agencies. Current applications include asset inspection, sensing grids to gather data, squad level deployment to support tactics and strategy, and base perimeter defense.[54]

The company's Hayward manufacturing facility is one of the largest drone manufacturing operations outside China,[55] a strategic distinction given growing congressional concern about the U.S. military's dependence on Chinese-manufactured drones from DJI. Skydio has raised $850 million in funding at a valuation of $4.4 billion, with investors including Andreessen Horowitz and NVIDIA.[56]

SPOTLIGHT

## Dedrone

Headquartered in Sterling, VA (just outside Washington, D.C.) but with a substantial presence in the Bay Area, Dedrone (acquired by Axon in 2024) produces AI enabled drone detection technology.[66] Its DedroneTracker.AI security software uses sensor input to detect and locate the presence of unauthorized drones, and by analyzing behavior, imagery, and flight data provides operators with a spread of risk-prioritized targets. Where authorized it also enables threat removal by jamming, cyber-takeover, or kinetic action.[67] Its dual use systems have been deployed by the Louisiana State Police for security at Super Bowl LIX and by utilities such as Con Edison for facilities security, as well as by the military.[68]

SPOTLIGHT

## Perennial Autonomy

Perennial Autonomy, a company founded by former Google CEO Eric Schmidt (at one time using the names White Stork, Project Eagle, and Swift Beat),[80] builds AI-driven autonomous drones with a particular focus on Ukraine.[81] Its drones have been tested in both Silicon Valley and on battlefields in Ukraine, with Schmidt frequently visiting Ukraine to oversee operations. Production costs are low, with strike/kamikaze drones carrying small explosive payloads costing about $400.[82]

In 2025, Swift Beat signed a long-term strategic partnership agreement with Ukraine to co-produce drones.[83] With over 80,000 deployed in Ukraine and hundreds of thousands planned,[84] the drones have reportedly been used by the Ukrainian National Guard's 1st Corps "Azov" unit to strike Russian targets in the Donetsk region up to 65 kilometers behind front lines. Battlefield targets are identified automatically, with selected targets approved by an operator before the drone proceeds with the strike, allowing for precision targeting while operators maintain control through the Starlink satellite system.[85] A new AI interceptor drone developed and deployed in Ukraine is capable of destroying enemy drones in mid-flight and has reportedly been used to shoot down more than 1,000 Iranian-made Shahed drones launched by Russian forces.[86]

In May 2026, Perennial Autonomy received a $500 million Pentagon contract to deliver a range of counter-unmanned aerial systems currently used by U.S. forces, including the company's Merops interceptors, Bumblebee quadcopters, and Hornet midrange strike drones.[87]

SPOTLIGHT

## Saildrone

Saildrone, headquartered in Alameda, is pioneering autonomous uncrewed surface vessels (USVs) for maritime domain awareness, intelligence, surveillance, and reconnaissance. Founded in 2012, Saildrone has developed ocean-going autonomous systems that can operate for months without human intervention, collecting oceanographic, weather, and surveillance data across vast stretches of ocean using renewable wind and solar energy.[57] The U.S. Navy first deployed Saildrone vessels in 2021,[58] and the company's platforms have since logged more than 2.5 million nautical miles and 65,000-plus days at sea.[59] In October 2025, Lockheed Martin invested $50 million in Saildrone[60] to enable the integration of air-to-ground missile launchers onto its autonomous vessels[61]—a development that would transform a surveillance platform into an armed combatant. Saildrone has raised $299 million in total funding at a valuation of approximately $600 million.[62]

SPOTLIGHT

## Scout AI

Headquartered in Sunnyvale, Scout AI describes itself as the premier frontier AI lab for war. Its singular focus is the AI brain for unmanned warfare, translating commander intent into coordinated autonomous action across large mixed fleets.[63] Scout AI is building Fury, a Vision-Language-Action foundation model that can allow a field commander to effectively direct coordinated action across fleets of drones, ground vehicles, and unmanned craft, even in GPS-denied and communications-jammed locations.[64] Founded in 2025, the company has booked $11 million in contracts with the Pentagon, and in April 2026 secured a $100 million Series A round from investors co-led by Draper.[65]

SPOTLIGHT

## Astranis

Astranis, headquartered at Pier 70 in San Francisco, produces MicroGEO geostationary communications satellites[99] and holds a $13.2 million U.S. Space Force contract to make its satellites compatible with Protected Tactical Waveform, a military-grade jamming-resistant communications standard.[100] Astranis was also selected to design Astranis Nexus, a next-generation resilient GPS satellite system intended to protect against jamming, spoofing, and kinetic attack[101]—a priority that has grown as adversaries demonstrate increasingly sophisticated anti-satellite capabilities.

Founded in 2015, the company builds advanced satellites for high orbits (GEO and MEO) that provide dedicated, secure networks serving the commercial market through more than $1 billion of commercial contracts.[102] Telecommunications companies are its primary clients. Its dedicated communications satellites are designed to deliver broadband connectivity at lower cost than traditional GEO systems. The company's technology is also dual-use. For military applications, Astranis hasn't changed its products or underlying technology, but instead draws on its expertise in designing, building, and operating highly-maneuverable small satellites in high orbits with the same capabilities that governments now look for to support security applications.[103] In August 2026, the company announced a new product, Perceptor, designed as a space domain awareness and maneuverability solution operating in GEO and higher orbits, with the ability to observe and inspect objects and activity in orbit and respond in real time to nearby activity. Designed for a contested space environment where spacecraft built by other countries may approach or interfere with U.S. satellites, Perceptor is built on the same MicroGEO platform as the Astranis commercial satellites already in orbit.[104]

The Astranis workforce today is roughly evenly divided between the commercial and defense markets, with teams focused on both.

Astranis satellites are all dedicated to a single customers (not shared). As with the U.S. customers, the baseline application for international customers is commercial, but the technology can support both commercial and secure military uses on the same platform by providing a firewall between separate channels.[105]

With $450 million raised in a recent Series E round and total funding of $1.2 billion, funders include Andreessen Horowitz (a16z), BlackRock, and Franklin Templeton.[106]

**Latent AI**, based in Menlo Park, produces AI solutions that can support a wide range of vehicles and missions from drones to larger systems, enabling autonomous capability for stand-alone units or coordinated swarms in network-denied, forward-deployed environments. Systems include the ability to hunt, track, detect and engage targets in the field while auto-correcting for inaccuracies, and data collection for post-operation analysis. Federal clients include the Army, Navy and Air Force.[69]

**Aurelius**, based in San Francisco, is developing AI-powered sensing, robotic directed-energy platforms to autonomously acquire, detect, track, and neutralize aerial drones. A $40 million Series A investment in August 2026 was co-led by Draper Associates, with participation from Hanwha Asset Management Venture Fund.[70]

**Foundation Future Industries** is developing next-generation humanoid robotics for defense and industrial applications. Founder Michael LeBlanc observes that "Humans are dual-use, built to work in both peace and war. Robots are similar." Commercial applications such as factories are one kind of environment, he says, but using robots in military settings calls for more strength and resilience. Discussions are underway with Ukraine to deploy the company's first production humanoid robot, Phantom MK1, for field testing by operational units. Foundation Future Industries has received $73 million in SBIR Phase 1 and 2 funding, with a third SBIR contract in line with the Air Force to test for applications.[71]

**Sentradel**, a San Francisco-headquartered startup developing autonomous counter drone systems,[72] entered the game in 2025. With experience in the robotics industry, its founders are using off-the-shelf components to develop cost effective portable systems to down drones in the field at close range.[73]

**Amprius Technologies**, based in Fremont, produces high-density, high-performance silicon anode batteries that extend flight times and mission ranges for unmanned aerial vehicles (UAVs) beyond the limits of conventional graphite-based cells, with applications across defense, aerospace and drones.[74]

**ANELLO Photonics**, headquartered in Santa Clara, develops and manufactures high-precision inertial navigation systems that enable autonomous navigation in GPS-denied environments. Powered by its proprietary Silicon Photonic Optical Gyroscope (SiPhOG™) and advanced sensor fusion, ANELLO's technology delivers resilient positioning and orientation for crewed and uncrewed platforms across multiple domains, including ground vehicles, aircraft, surface vessels, and underwater vehicles.[75] In January 2026, the company was awarded a $20 million contract under the government's Accelerate the Procurement and Fielding of Innovative Technologies (APFIT) program to scale production and deployment of its GPS-denied navigation technology.[76]

It should be noted that while the Bay Area leads in drone autonomy software, a number of prominent companies producing autonomous systems are also headquartered elsewhere. Shield AI, for example, which produces the Hivemind AI pilot software for autonomous aircraft, is headquartered in San Diego.[77] Even when a company is located in another region, however, there is often a Bay Area connection through research or finance. For example, CHAOS Industries, a developer of rapid-response, low-cost drone interceptors based in Los Angeles and El Segundo, supports an engineering hub in San Francisco.[78] Accel Partners is an investor.[79]

## Anduril

Anduril is an important example of an advanced autonomous systems and AI-powered software company that was incubated and financed in the Bay Area[88] but is now headquartered elsewhere. Based in Costa Mesa, it produces autonomous systems incorporating AI and robotics, including unmanned aerial systems, autonomous surveillance systems, and networked command and control software.[89] Palmer Luckey, who created the virtual reality headset Oculus Rift that was later sold to Facebook,[90] was a co-founder and Founders Fund was the first investor, followed by other investors such as Andreessen Horowitz. Early contracts came from the UK's Royal Navy, Royal Marines, and the U.S. Air Force, and later from the Marine Corps, Air Force, Army, and the Royal Australian Navy.[91] Anduril announced in 2025 a joint venture with Emirates weapons company EDGE Group to produce next-generation autonomous systems to support civil and defense missions in the Middle East.[92]

Its core product is Lattice, a software platform that uses AI to connect sensors, drones and cameras to detect real-time threats. Lattice serves as a platform for other products including Altius (an attack-configured unmanned aerial vehicle that can be launched from air, land, or sea), Anvil (an unmanned aerial vehicle that can be used to attack other UAVs), Barracuda (a cruise missile), Bolt (a surveillance UAV that can be carried in a backpack), Copperhead (an autonomous underwater vehicle), Dust (a portable ground sensor using radar, imagery, and edge computing to detect and classify targets), Fury (a long-range military drone that can autonomously fly with and protect other military aircraft), Roadrunner (a jet-powered reusable vertical take-off and landing operator-supervised autonomous air vehicle), Ghost (a helicopter-style UAV with a low acoustic signature used for reconnaissance and surveillance), and Ghost Shark (an autonomous submarine). Anduril is also investing in space domain awareness, announcing in March 2026 the acquisition of ExoAnalytic Solutions, enabling it to access missile-tracking sensors and software and a global network of more than 400 global telescopes that track space objects in GEO, where many defense satellites are stationed.[93]

In June 2026, Anduril's FQ-44 fury drone was one of two models (along with the FQ-42 by San Diego-based General Atomics) chosen by the Air Force for use in its Collaborative Combat Aircraft (CCA) program, which is developing a strategy of human-machine teaming that pairs autonomous aircraft with crewed fighters to extend reach, awareness, and survivability in contested environments.[94] The Air Force wants the drones to cost approximately one third of a manned fighter (an F-35 currently costs $82.5 million) and has requested $1 billion for this type of drone in its FY2027 budget and $9.5 billion over the next five years.[95] Anduril and Shield AI (along with North Carolina-based Collins Aerospace) were separately contracted to develop the software that will control the CCA drones.[96]

Overtly pro-defense, Anduril moved its headquarters to Southern California at a time when much of Silicon Valley was skeptical of working with the Pentagon. Its success, however, is representative of technology companies that are incubated in the Bay Area and have drawn heavily on Silicon Valley talent and venture funding.

## Space

The Bay Area's commercial space sector—discussed in depth in the Economic Institute's 2025 report *Space in the Bay Area*—has increasingly pivoted toward defense and intelligence applications, reflecting the Pentagon's growing investment in space-based capabilities for communications, surveillance, and positioning. Cumulative U.S. venture investment in space technology between 2015 and 2025 reached $24 billion,[97] and the military space market is expanding rapidly as the U.S. Space Force looks to diversify its satellite architecture away from a small number of large, expensive, and potentially vulnerable systems toward resilient constellations of smaller, more affordable commercial platforms.[98] Space is perhaps the clearest example of the growing role of dual-use technologies that are initially developed for commercial purposes but also have military applications. Access to both commercial and defense markets offers emerging companies a degree of resilience against changeable federal budgets and potentially saturated commercial markets. The Bay Area hosts one of the nation's densest concentrations of commercial space companies.

**Planet Labs**, headquartered in San Francisco, operates a constellation of hundreds of Earth observation satellites that provide continuous high-resolution global imagery.[107] In the second quarter of 2026, the company's defense and intelligence revenue grew by more than 90% year-over-year.[108] Planet has signed more than $500 million in multi-year government agreements in 12 months alone, including a €240 million satellite services contract with the German government, a low nine-figure deal with the Swedish Armed Forces,[109] a seven-figure NATO AI-enhanced surveillance contract,[110] an eight-figure National Geospacial Intelligence Agency contract for AI-enabled maritime solutions,[111] and a U.S. Navy maritime surveillance contract covering the Pacific.[112] This sovereign demand has been largely catalyzed by the war in Ukraine, where Planet's unclassified imagery has deeply influenced modern warfare by enabling unprecedented open-source intelligence and real-time situational awareness.[113]

**Astra**, an Alameda-based company making commercial satellite engine systems and a rocket and mobile launch system,[114] has pivoted to defense under its RAIDS framework (Rockets, AI, Drones and Satellites) and is

under contract with the defense department to test its Rocket 4 vehicle, with the goal of deploying drones from a re-entry vehicle at operational altitude anywhere on Earth in under an hour. With a focus on mass production and mobility, the entire mobile launch system fits in a shipping container, enabling access to space from almost any location without relying on fixed infrastructure.[115]

**Capella Space**, founded in 2016 in San Francisco[116] and acquired by IonQ in July 2025, produces synthetic-aperture radar (SAR) Earth observation satellites capable of imaging through clouds and at night[117]—a critical capability for military applications where optical satellites are limited by weather and daylight. Capella holds a $15 million U.S. Air Force contract for a next-generation SAR sensor[118] and was awarded a contract under the National Reconnaissance Office's (NRO) Radar Commercial Augmentation (RCA) program in August 2026 to provide commercial SAR imagery and data services in support of U.S. National security missions.[119]

**Muon Space**, founded in 2021, designs, builds and operates satellite constellations that deliver critical data and enable real-time compute and decision-making in space.[120] Its proprietary Halo technology stack integrates spacecraft platforms, payload management, and a software-defined orchestration layer.[121] Designed for commercial remote sensing used for wildfire and weather monitoring, Muon's satellite constellation platform now serves national security customers as well, including the U.S. Air Force and United States Space Force.[122] The company has Silicon Valley production facilities in both Mountain View and San Jose.[123]

**Loft Orbital** is a San Francisco-based space infrastructure company, founded in 2017, that simplifies the deployment of satellites by integrating, launching, and operating spacecraft for a range of clients without the complexities of satellite ownership and operation. With services that include the launching of microsatellites, payload integration, and satellite operation, its Loft Federal arm supports national security space missions.[124]

**LeoLabs**, founded in 2016 and based in Menlo Park, tracks objects in low earth orbit, including satellites and space debris. Originally focused on commercial markets, in a classic dual-use play the company expanded its focus in 2024 to defense. Offering both ground-based radar systems and data analytics, it now characterizes and tracks satellites in low earth orbit launched by countries such as China and Russia. While it works with the U.S. government, the majority of the company's revenue comes from overseas, with clients and investors in countries that are U.S. allies.[125]

**Antaris**, based in Los Altos, provides a cloud platform for satellite mission design, simulation, and operation, enabling government and commercial operators to build, launch and operate satellite constellations. Founded in 2021, the company has received $42 million in funding over three rounds.[126]

**Aeonyx**, which was spun off from Antaris in July 2026 and moved its headquarters to Colorado Springs, produces a mission virtualization software platform[127] that supports mission outcomes by creating virtual representations of systems, networks, and operational environments. The company has successfully validated its self-healing satellite capability, developed under contract with the U.S. Space Force. Space Systems Command (SCC) uses the Aeonyx Cloud Platform to produce large satellite constellations telemetry data at scale, which Aeonyx then uses to create AI-based models that detect and categorize spacecraft anomalies, enabling vehicles to react in real-time to protect both themselves and other vehicles in the constellation.[128]

## Cybersecurity

In an era when cyberattacks represent one of the most immediate threats to national security—the Salt Typhoon campaign infiltrated eight or more U.S. telecommunications companies in 2024, in what some officials described as the worst telecommunications hack in American history[129]—the Bay Area's cybersecurity sector is increasingly central to defense. The connection builds from a strong base, as each year tens of thousands of delegates from more than 100 countries meet in San Francisco for the RSA Conference, the cybersecurity industry's premier global event and a focal point for security discussion.[130]

Two key players in the industry are Palo Alto Networks and CrowdStrike.

**Palo Alto Networks**, headquartered in Santa Clara with a market capitalization of approximately $330 billion as


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of October 2026,[131] achieved Federal Risk Authorization Program (FedRAMP) High Authorization across all three of its cybersecurity platforms (network security, cloud security, and AI-driven security operations) in December 2024, making it the most comprehensive suite of AI-powered cybersecurity solutions authorized for federal use at the highest impact level.[132] Its products are in the defense department's Enterprise Software Initiative (ESI) portfolio.[133]

**CrowdStrike**, while headquartered in Austin since relocating from Sunnyvale in December 2021, maintains Sunnyvale as what it describes as a "critical innovation hub,"[134] and had a market capitalization of roughly $277 billion in October 2026. Its Falcon platform provides enterprises with a unified view to detect and respond to security threats across their IT infrastructure[135] and is widely deployed to secure critical endpoints and workloads for the Cybersecurity and Infrastructure Security Agency (CISA) and multiple other major civilian agencies and ".gov" networks.[136] CrowdStrike's Bay Area origins and continued innovation presence illustrate the region's role as an incubator of cybersecurity companies even when headquarters eventually migrate to lower-cost locations.

## Defense Logistics

Logistics is another field where Bay Area commercial companies are active.

**Armada** is a purpose-built edge computing platform company founded in 2022 and headquartered in San Francisco.[137] It produces forward deployed, AI enabled, fully sovereign modular data centers for operating in remote, logistically challenged (e.g., roadless) locations where cloud infrastructure can't reach. Customers include the U.S. Navy.[138]

**Archer Aviation**, a producer of autonomous eVTOL (electrical vertical takeoff and landing) aircraft originally developed for use as air taxis, has broadened its focus to defense, announcing in November 2025 that it would expand its business lines to supply its proprietary electric powertrains to third parties for defense applications, starting with Anduril.[139] Founded in 2020 and headquartered in San Jose,[140] the company has contracts with the Air Force worth up to $142 million to provide eVTOL technologies for defense purposes, including Archer's Midnight aircraft, which provides a quieter and cost-effective alternative to helicopters for military transport, operation, and maintenance in the field.[141] A strategic partnership was also announced with Boeing in August 2026 where, in an exchange of stock, Boeing is transferring to Archer its drone subsidiary Insitu, air traffic management company SkyGrid, and Bay Area-based autonomous eVTOL company Wisk Aero (once a competitor of Archer). The deal, which is expected to close by the end of 2026,[142] strengthens Archer's position in both commercial and defense markets. Insitu makes small drones for military users and has sold its technology to the armed forces of 35 countries, generating approximately $200 million in annual revenue.[143] Archer has also partnered with Anduril to build a loyal wingman (protective combat) drone for helicopters.[144]

**Joby Aviation**, an eVTOL startup based in Santa Cruz, has partnered with the Air Force since 2020 under a $75 million contract to test its technology for possible defense applications. Developed by Joby for use as a commercial eVTOL passenger rideshare system, which is still its primary focus,[145] the technology could also address the military's need for a light intra-theater aircraft, and successful demonstration of its Superpilot autonomous flight technology for the Air Force has opened the door to future procurements. The Army, Navy, Air Force and Marine Corps have all identified eVTOL as an area of critical interest.[146]. In 2025, Joby announced a partnership with defense contractor L3Harris for a military-specific version of its S4 air taxi, with a modified hybrid-electric powertrain to accommodate military applications. The S4 can take off and land vertically like a helicopter, then rotate its propellers to fly like an airplane.[147] In August 2026, Joby acquired Resonant Sciences, a Dayton, Ohio based radio frequency and mission systems company that will become Joby's defense arm, parallel to its ongoing efforts to build a commercial air taxi business. Joby also enjoys a long-term research partnership with the NASA Ames Research Center at Moffett Field.[148]

**Spotlight**

## Glīd

Glīd Technologies, a veteran-founded dual-use technology company headquartered in Riverside, California, is an example of a company headquartered outside the Bay Area that is supported by Bay Area investment, in this case The Veteran Fund. Founded by U.S. Army veteran Kevin Damoa, whose experience includes military logistics operations in Iraq and advanced transportation development at SpaceX, the company develops autonomous-capable road-to-rail mobility platforms and intelligent logistics systems designed to modernize critical infrastructure and improve supply chain resilience. Its technology addresses a persistent challenge in freight transportation: the costly and infrastructure-intensive transfer of cargo between road and rail networks.

Glīd's dual-mode technology enables purpose-built vehicles to operate across existing road and rail infrastructure, reducing dependence on conventional intermodal terminals, cranes, and material-handling equipment. Its fleet includes GlīderM, a road-to-rail container handler; Rāden, an autonomous dual-mode ground vehicle designed for lighter payloads and remote operations;[170] Stōrm, a heavy-duty hybrid-electric platform and infrastructure solution configurable to transport 10- and 20-foot ISO containers;[171] and Tōr, a super-heavy platform under development for 40-foot container mobility. These vehicles are supported by EZRA-1SIX, Glīd's intelligence, command-and-control, and orchestration platform, designed to coordinate vehicle operations, route planning, and freight movement across distributed transportation networks.[172]

The technology has applications in commercial freight, port operations, industrial transportation, emergency response, and military operations. Its architecture is particularly relevant to contested logistics, where disrupted supply routes, constrained infrastructure, and dependence on fixed logistics facilities can create operational vulnerabilities. By leveraging existing road and rail networks, Glīd aims to enable more flexible and distributed movement of critical supplies, including equipment, fuel, construction materials, and containerized freight. The company is advancing commercial pilots with railway partners, including Mendocino Railway and Sierra Northern Railway, alongside planned demonstrations with U.S. Army organizations, including the 3rd Cavalry Regiment, to evaluate dual-mode mobility across commercial and defense environments.[173]

**Elroy Air**, founded in San Francisco in 2016, produces a hybrid unmanned long-range eVTOL aircraft (drone), Chaparral, designed to move heavy cargo by air between flexible locations with minimal infrastructure. In addition to commercial logistics, industrial cargo, and humanitarian aid delivery, its applications include autonomous support for forward operating military bases and ships.[149] Manufacturing will be done in Sacramento by Kratos Defense & Security Solutions.[150] Elroy has been awarded contracts by both the U.S. Army and the U.S. Air Force and was selected for the FAA's eVTOL Integration Pilot Program that will define standards for autonomous heavy-cargo drones in the National Airspace System.[151]

**SiFly** Aviation, a startup headquartered in Santa Clara, is developing AI-supported vertical-takeoff, long-endurance drones capable of helicopter-level performance.[152] In July 2025, its all-electric Q12 quadcopter achieved a Guinness World Record of 3 hours, 11 minutes in flight.[153] Deliveries are expected to begin in the first quarter of 2027, with initial production in Sunnyvale, and a larger heavy-lift drone expected to follow. SiFly raised $20 million is Series A funding in August 2026 led by Shield Capital.[154]

**Poseidon Aerospace**, headquartered in San Francisco, builds and operates full-sized autonomous cargo aircraft: Heron, a seaplane, and Egret, a STOL (Short Takeoff and Landing) aircraft, each capable of carrying two tons of payload such as food, medical supplies, or ammunition over a thousand nautical miles. Applications range from the supply of remote communities to supply chain support in contested environments.[155] Poseidon secured $11 million in seed funding in 2024 and $60 million in Series A funding in September 2026 from funders including Draper Associates and Starship Ventures.[156]

Other Bay Area dual use logistics companies include **Applied Intuition**, which produces software for vehicular autonomy,[157] and **Compound Eye** , which develops computer vision and situational awareness and sensing systems for autonomous machines.[158]

**Grid Aero**, based in San Leandro, builds long-range autonomous cargo aircraft for the defense, commercial and humanitarian sectors designed to operate in contested and austere environments.[159] Its Lifter Lite system, an autonomous cargo drone, is designed to carry 1,000–8,000 pounds of payload for up to 2,000 miles.[160] Production is based on conventional materials and manufacturing methods, to support scalability and lower costs.[161] Following $6 million in seed funding raised in 2025,[162] the company closed a Series A round in January 2026 co-led by Bison Ventures and Geodesic Capital.[163] To date, Grid Aero has secured $1.32 million in federal obligations through two Air Force Research Laboratory SBIR awards: a $1,245,807 contested logistics automation SBIR contract in 2025 and a $74,887 ATAK (Android Team Awareness Kit) integration contract in 2026.[164]

**Havoc** builds collaborative autonomy software and systems for defense and commercial customers. Headquartered in Rhode Island with locations in Austin, San Diego, and in the Bay Area through its Teleo business unit in Palo Alto, its core technology integrates real-time data from vehicles and sensors, identifying trends and anomalies and enabling one operator to supervise tens, hundreds, or even thousands of autonomous assets, even when communications are disrupted.[165] Teleo, which was acquired by Havoc in March 2026, applies AI, robotics, machine learning, and computer vision to heavy equipment operations in logistics, construction, and mining, enabling one operator to supervise multiple machines simultaneously.[166]

In September 2026, Havoc signed an agreement with Taiwan shipbuilder CSBC to integrate its collaborative autonomy software with CSBC's maritime platforms.[167] The companies intend this model to be replicable by other Indo-Pacific partners seeking to build autonomous maritime capability by integrating U.S. technology into their industrial base.[168]

In May 2026, Havoc raised a $100 million Series A round, with investors including Lockheed Martin Ventures and The Veteran Fund, bringing its total capital raised since 2024 to $200 million.[169]

## The Broader Ecosystem

The more than 285 defense technology companies in the Bay Area identified by market intelligence platform Tracxn in September 2026[174] represent an ecosystem that extends well beyond the major players profiled above. The emergence of what industry observers have termed "neoprimes"—venture-backed companies like Anduril and Palantir—has been particularly linked to the Bay Area.[175] While some of these neoprimes are headquartered outside the region—Anduril in Costa Mesa and Shield AI in San Diego—many were funded by Bay Area venture capital firms, recruit from Bay Area talent pools, and maintain Bay Area engineering offices, creating an ecosystem whose boundaries extend beyond corporate headquarters.

The more consequential story is not any single company but the ecosystem itself: a self-reinforcing concentration of AI talent, venture capital, research institutions, and defense-focused entrepreneurs that is producing an accelerated pipeline of new defense companies and capabilities. This convergence of frontier AI development, autonomous systems engineering, space-based sensing, and cybersecurity in a single metropolitan area creates a density of defense-relevant innovation that no other U.S. region currently matches.

## Issue: Federal Procurement Processes

While the growth of defense venture capital has been dramatic, the difference between the scale of investment in defense tech companies and traditional defense procurements remains large. The Pentagon's FY2025 discretionary budget (from the continuing appropriations and extensions act) totaled $831.3 billion, including $167.5 billion for procurement and $141.2 billion for research, development, testing, and evaluation (RDT&E).[176] The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are the main routes available to startups seeking to procure defense department contracts, but the demands on startups' time and capital can be significant as they move through the three program phases toward the goal of achieving Program of Record (POR) status. Less than 1% of the startups that enter the programs ultimately achieve POR status—a figure that underscores both the challenge and the opportunity.[177] Yet the emergence of companies like Anduril and Palantir demonstrates that venture-backed companies can compete for and win the kind of large-scale, long-term contracts historically reserved for the Big 5 primes.

The Pentagon is actively restructuring its procurement apparatus to accommodate this shift. Other Transaction Agreements (OTAs), which bypass the Federal Acquisition Regulation's lengthy contracting process, have become the preferred mechanism for engaging commercial technology companies. The SBIR and STTR programs continue to fund early-stage defense innovation,[178] and the recently established Office of Strategic Capital is exploring ways to address investment gaps—including loans, loan guarantees, and strategies to attract investment[179] to support companies in the "valley of death" between prototype and production. These institutional reforms, combined with the growing scale of private capital, are gradually widening the aperture through which startups can enter the defense market. The question is whether these mechanisms can scale fast enough to match the pace of technological change, the urgency of the threat environment, and the need for ROI on the part of investors.



# 9

# Defense and National Security Policy: Stanford University and UC Berkeley

The Bay Area's defense research infrastructure extends beyond federal laboratories to its leading research universities, which have developed substantial—and growing—programs at the intersection of technology and national security.

Stanford University and the University of California, Berkeley occupy a distinctive position in the American defense landscape—one defined less by the volume of the defense department research funding they receive than by the ideas they generate and the leaders they produce. Universities such as Johns Hopkins receive far higher levels of funding than Stanford and UC Berkeley for direct defense research.[1] Yet Stanford's and Berkeley's influence on defense and national security policy is disproportionately large. Their impact flows through three channels that are harder to quantify but arguably more strategic in their long-term effect: training the military officers, intelligence professionals, and policymakers who shape defense strategy, ideas, and frameworks; research, diplomatic engagement, and governance models that inform how the United States approaches security challenges; and a talent pipeline to defense technology—connecting elite STEM students and researchers to the Silicon Valley and national defense technology ecosystems. This "ideas-plus-talent" model of defense contribution is different from the "lab-and-contract" model found elsewhere.

## Stanford University: AI, Startups and Defense Strategy

Stanford University's defense and national security ecosystem is concentrated primarily within the Freeman Spogli Institute for International Studies (FSI), with significant additional capacity at the Hoover Institution and the Institute for Human-Centered Artificial Intelligence (HAI).

At the core is the **Center for International Security and Cooperation (CISAC)**, established in 1983 as one of the nation's first university centers dedicated to international security research.[2] CISAC hosts up to 20 fellows per year, and many of its hundreds of alumni have gone on to careers in government, diplomacy, and national security organizations.[3] CISAC's research spans nuclear nonproliferation, arms control, biosecurity, and cyber threats, and its faculty involved in Track II diplomatic dialogues with China, North Korea, Pakistan, and Russia on nuclear and security issues[4]—back-channel engagements that complement and sometimes inform official diplomatic processes. The Center's production of security scholars and its role in shaping arms control discourse have made it one of the most influential university-based security research programs in the world.

The **Hoover Institution's National Security Affairs Fellows (NSAF)** program, founded in 1969, operates one of the longest-running civil-military bridge programs in the United States. Each year, approximately ten senior military officers, intelligence officials, and diplomats are embedded at Stanford for an academic year of reading, writing, and engagement with the university's broader intellectual community. Over 56 years of operation, the program has produced more than 200 alumni, including 16 general officers, 2 flag officers, 13 United States ambassadors, one National Security Advisor (H.R. McMaster), and one member of Congress (Representative Chris Gibson). Other notable alumni include John Negroponte, the first Director of National Intelligence and former UN Ambassador, and General John Abizaid, former Commander of United States Central Command and later Ambassador to Saudi Arabia. The program's extraordinary track record of producing senior defense and diplomatic leaders—from a single university fellowship of roughly ten participants per year— illustrates the concentrated impact of Stanford's human capital model.[5] Condoleezza Rice, former National Security Advisor and Secretary of State, serves as the Tad and Dianne Taube Director of the Hoover Institution,[6] further anchoring the institution's role in national security discourse.

**Stanford HAI** (Human-Centered Artificial Intelligence), established in 2019,[7] has emerged as the most influential university voice on AI governance and its implications for national security. The institute's concrete output is striking: more than 80 Congressional staff members trained through annual three-day bipartisan Congressional Boot Camps at Stanford; more than 8,000 government employees trained through symposia and educational programs;[8] more than 10,000 government employees having attended the Artificial Intelligence Training Series for Federal Employees offered by HAI in partnership with the U.S. GSA and the White House OMB, with a second AI Fundamentals for Public Servants online course having enrolled an additional 1,700 participants; and 35 California state policymakers trained through a dedicated state-level Boot Camp.[9] The AI Index report, published annually, has become the most comprehensive assessment of global AI trends and a key reference for legislators and regulators in the United States, the United Kingdom, and the European Union.[10] Faculty member Fei-Fei Li has served on the UN Secretary General's scientific advisory board[11] and has been a member of the White House and NSF co-chaired National AI Research Resource Task Force[12]—roles that translate academic research into policy influence.

The **Gordian Knot Center for National Security Innovation**, co-founded by Steve Blank and Joe Felter,[13] bridges academic research and defense applications through its signature Hacking for Defense (H4D) program.[14] First offered as a course in 2016, H4D applies lean-startup methodology to national security problems, pairing student teams with defense department and intelligence community sponsors to foster student entrepreneurs developing solutions for real defense challenges.[15] The program has trained more than 3,000 students at over 70 universities across three continents, producing 70 startups—including the Bay Area's Capella Space, which has reached unicorn status — that have collectively attracted more than $350 million in funding.[16] More than 62 H4D teams have gone on to form dual-use companies.[17] The Gordian Knot Center also sponsors the annual student-planned Stanford DEFCON, a forum that brings together students, military officials, technology funders, and private industry leaders to address the issues shaping modern conflict, which drew more than a thousand participants in 2026.[18]

Stanford's **Technology Transfer for Defense (TT4D)** program, which transitions emerging technologies from university laboratories to defense and commercial markets,[19] has helped researchers secure tens of millions of dollars in defense department grants.[20] TT4D's primary agency partners are the U.S. Army Research Lab and the Office of Naval Research[21] (which was also an initial sponsor of the Gordian Knot Center),[22] and it brings together faculty members and staff scientists from across the university's seven schools, CISAC, and the Hoover Institution to work on security-relevant research.[23]

## UC Berkeley: Nuclear Security, Startups, Space, and Technology Policy

While Stanford university's defense policy influence is concentrated in international security and AI governance, UC Berkeley brings strength in nuclear science, cybersecurity, and homeland security—fields where the Department of Energy and the National Nuclear Security Administration (NNSA), rather than the defense department, are the primary federal sponsors.

The **Nuclear Science and Security Consortium (NSSC)**, led by UC Berkeley and funded by the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA) at $25 million per five-year cycle,[24] is the nation's primary university-led pipeline for nuclear security professionals. Now in its fourth cycle (2026–2031), with a cumulative federal investment of approximately $100 million over 15 years,[25] the NSSC links 9 universities and 6 national laboratories ,including Lawrence Livermore, Los Alamos, Lawrence Berkeley, Sandia, and Oak Ridge.[26] Since 2011, the NSSC has trained 637 students and 78 faculty. Of the undergraduates, graduate students, and postdocs who have completed the program, 48% have gone on to jobs in government, the nuclear security industry, or academic nuclear security[27]—indicating the consortium's key role as a workforce pipeline.

Housed at the UC Berkeley Goldman School of Public Policy,[28] the **Berkeley Risk and Security Lab (BRSL)**, led by Professor Andrew Reddie,[29] focuses on the threats emerging from frontier military technologies—assessing how emerging capabilities such as autonomous weapons systems and AI-driven warfare will affect the future of conflict and what governments can do to address their risks.[30] In partnership with LLNL, Sandia, and other government partners, BRSL supports technology and security policy fellowships[31] and also engages with San Francisco-based consulates through summits, panels and workshops on issues of technology policy.[32] Also at the Goldman School, the **Institute for Security and Governance**, directed by former Secretary of Homeland Security Janet Napolitano,[33] offers a Graduate Certificate in Security Policy that trains the next generation of security professionals[34] and leads Berkeley's Hacking for Defense program.[35] **Mission Applied**, a new platform, is a partnership of the Institute for Security and Governance with the Berkeley Gateway Accelerator that connects the university's deep-tech ecosystem and venture capacity.[36] Programs focus on R&D commercialization, with the goal of creating a deep tech pipeline matched to the priorities of the defense department. Supporting activities include convenings, hackathons, design sprints, mentorship, technology demonstration and testing, and non-diluted capital.[37]

The Berkeley **SkyDeck** accelerator program supports an Air and Space Track focused on aerospace and air mobility.[38] The program draws on advisers in UC Berkeley's engineering and computer science departments and connects to the Berkeley Air & Space Center being developed in partnership with NASA at Moffett Field.[39] The university's Haas School of Business hosts the **Tusher Strategic Initiative for Technology Leadership**, that includes a Technology Leadership and Geostrategic Risk program that, among other objectives, aims to support government in developing effective national security policies impacting innovation.[40]

Similar to the student-led program at Stanford that hosts its annual DEFCON conference, students at Berkeley have organized around the Defense and Dual-Use Technology Club, which provides a platform for students to engage with alumni, technologists, researchers and policymakers at the intersection of innovation and global security.[41]

**SPOTLIGHT**

## Berkeley Air & Space Center

> "Berkeley Air & Space Center will be Silicon Valley's new air and space tech hub, where the brightest minds from across the globe come together to explore, ask questions, and improve our understanding of and access to space."
>
> Victoria Coleman
> Associate Provost, Berkeley Air & Space Center

Berkeley's technology will become more deeply embedded in Silicon Valley with the development of the Berkeley Air & Space Center (BS&SC) at NASA Research Park, a collaboration of UC Berkeley and NASA Ames Research Center first announced in October 2023. Its 36 acre campus at Moffett Field[42] will bring Berkeley's academic and research programs to the heart of Silicon Valley, creating a focal point for collaboration with NASA and industry across the region's aerospace, technology, and defense innovation base. BA&SC's research and development scope spans artificial intelligence and machine learning, quantum technologies and high-performance computing, robotics and autonomy, advanced aviation, aerospace systems, and technologies for operating in extreme environments[43]—applicable across national security priorities such as autonomous systems, aerospace infrastructure, mission planning, and analysis. By connecting fundamental research with government mission requirements and industry engineering and development capabilities, the center aims to help move promising technologies from the laboratory toward testing, validation, and practical deployment.

UC resources will be leveraged with NASA's wind tunnels, thermal testing facilities, flight simulators and other labs to accelerate discovery and talent development. As described by Darek DeFreece, the Center's founder, "For Berkeley this represents a new business model. The collaboration with NASA is about strengthening and enabling research and doing bigger and better things. The other leg of the stool is engagement with private industry and connecting basic research to the market through public-private partnerships."[44]

Programs developed in Silicon Valley will bridge to UC Berkeley engineering, the university's Space Sciences Lab, and the aerospace engineering major launched on the Berkeley campus in the fall of 2022.[45]

The center's focus on dual-use and defense strengthened in 2026 with the university's appointment of Victoria Coleman, a former director of DARPA and Chief Scientist of the U.S. Air Force, as Associate Provost responsible for the project. Since then, it has built a growing R&D portfolio including four programs supported by DARPA and one by the Air Force. Plans are underway for a DARPA incubator in 2027, and for the buildout of campus systems that will facilitate participation of UC Berkeley faculty and students in federal research programs.[46]

# Faculty as Policy Actors

Stanford University and UC Berkeley faculty maintain significant presences on defense and national security advisory boards, extending institutional influence well beyond their campuses. The concentration of defense policy expertise at Stanford and Berkeley—spanning nuclear security, AI governance, cybersecurity, technology innovation, and international security—creates an important intellectual infrastructure. The Bay Area's combination of world-class defense policy programs with proximity to the nation's leading technology ecosystem and venture capital community produces a distinctive convergence that shapes not only how the United States thinks about defense, but increasingly how it builds, deploys, and governs the technologies that underpin national security. These intellectual frameworks have implications that extend well beyond American borders—informing and enabling the international defense cooperation partnerships that represent one of the Bay Area's most significant strategic opportunities.




# Engaging the Veterans Community

The large community of veterans in the Bay Area and across the U.S. is a rich source of entrepreneurs with military experience and a national security orientation.

The Bay Area's defense technology sector faces a significant constraint that the venture capital system can't resolve on its own. Approximately 200,000 service members transition out of the military each year, and roughly 80% do so without secured employment. That cohort brings two important attributes to potential defense tech employers: security clearance eligibility and operational familiarity with the technology categories the defense department now prioritizes—uncrewed systems, cybersecurity, and AI-enabled decision support. Post-9/11 service members have routinely operated drones, robotics, precision targeting systems, and networked communications.

**VetsinTech**, headquartered in San Francisco, supports a pipeline connecting that community with the regional technology economy. Its national network of over 125,000 veterans and military spouses are supported by more than 60 chapter leaders across 28 U.S. cities, four of which are in California—San Francisco, Los Angeles, San Diego, and Sacramento, and its training arm places more than 3,000 veterans and military spouses annually into programs in web development, cybersecurity, cloud computing, data science, and machine learning. This activity is funded through corporate and philanthropic sponsorship and delivered at no cost to participants. Graduation rates exceed 90%, with 91% of participants hired or upskilled within six months of completion. Average starting salaries for cybersecurity graduates are $112,974, while web development graduates average $74,742. The organization reports that demand for its programs exceeds current capacity—a constraint resulting from funding rather than applicant supply.

The employer coalition surrounding this pipeline is unusual in spanning both sides of the regional economy. Participating companies include Google, Apple, Microsoft, Adobe, LinkedIn, Genentech, and Uber, as well as at the national level Boeing, General Dynamics, Lockheed Martin, Leidos, Tanium, Tenable, Scale, Saronic, and X-Bow Systems.[1] The employment connection is significant for a region whose defense engagement depends on talent moving fluidly between commercial and defense work. Veterans trained on commercial curricula and placed at commercial firms retain military clearance eligibility and mission familiarity, making them among the most mobile workers in the regional defense labor market and a partial answer to the sector's most persistent workforce problem.[2]

Veteran entrepreneurship is a second and less visible channel through which this population contributes to the sector. Veterans are 45% more likely than non-veterans to be self-employed. Of veteran entrepreneurs surveyed by VetsinTech, 35% are running early-stage companies and 24% remain at the ideation stage, compared to just 10% whose businesses are established. Bay Area programs target that gap. VetsinTech has served roughly 3,000 veteran entrepreneurs through its startup network and capital-access workshops, in partnership with the Nasdaq Entrepreneurial Center and a group of Bay Area venture firms including Andreessen Horowitz and Shield Capital.[3] Alongside The Veteran Fund's dedicated capital investment, this constitutes a regional infrastructure for veteran founders that no other metropolitan area currently matches.

Related entrepreneurial support that specifically engages veterans includes the **Military Veterans Startup Conference** (MilVet Startups), set for its sixth year in 2027 at the Marines Memorial Club in San Francisco, which pairs veterans with investors.[4]




# Filling a Gap: Maritime and Advanced Manufacturing

The region's stake in national defense also extends into a domain that might at first glance seem unexpected—shipbuilding and associated advanced manufacturing.

## A Rich Maritime Legacy

The Bay Area has been home to a storied shipbuilding industry dating back to the late 1800s. The Union Iron Works, in what is now the Dogpatch neighborhood at San Francisco's Potrero Point, initially produced barges and river boats to navigate the Sacramento River. The *Arago*, the first steel-hulled ship built on the West Coast and the shipyard's first vessel, was launched in 1885.[1] With the launching of the Naval cruiser USS *Charleston*, its first government contract, Union Iron Works became the major shipyard on the U.S. West Coast.[2] Dozens of other naval contracts followed, including the USS *Olympia*, Admiral Dewey's flagship in the Spanish-American War. Other major ships produced at the Potrero yard prior to World War II included the battleships *Oregon*, *California*, and *Ohio*. Besides naval vessels, the yard also built fifteen ferries.[3]

During World War I, the Potrero yard launched an average of three destroyers a month, and Bethlehem Steel Corporation, which purchased the yard in 1905, produced 66 destroyers and 18 submarines during the conflict. The advent of World War II brought another surge in production, when the yard employed 18,500 workers. Over the duration of that conflict, Bethlehem built 72 vessels (52 for combat) and repaired over 2,500 naval and commercial vessels including the destroyer escort Fieberling, which was constructed in a record 24 days. Bethlehem also ran the Hunters Point Naval Shipyard in San Francisco, which served as a major repair and construction facility.[4]

World War II led to a massive expansion in activity beyond the industry's historic base in San Francisco. Over the war's duration, shipyards in the San Francisco Bay Area produced nearly 1,400 vessels, a remarkable achievement in industrial mobilization.[5] Kaiser shipyards in Richmond, the largest complex on the West Coast, launched 747 ships from four shipyards with 27 basins and dry docks,[6] employing more than 79,000 workers at its peak.[7] Vessels launched from Richmond included 519 Liberty Ships (close to a quarter of total national liberty ship production) and 142 Victory Ships, as well as tank landing ships, frigates, and troop transports.[8] The Richmond shipyards, which were closed by 1946,[9] are now commemorated in the Rosie the Riveter World War II Home Front Historical Park.[10]

Another storied Bay Area shipyard was Mare Island Naval Shipyard in Vallejo, which evolved from a single floating dry dock in 1854 to one of the busiest naval shipyards in the world and the leading submarine port for the West Coast. Mare Island built more than 500

vessels and overhauled thousands more before closing in 1996.[11] That included 44 submarines between 1930 and 1970[12] and the first nuclear submarine constructed on the West Coast, the USS *Sargo*, in 1957.[13]

As part of the U.S. Maritime Commission's 1940 Emergency Shipbuilding Program, the W.A. Bechtel Company built the Marinship yard in Sausalito. During its 41 months of operation between 1942 and 1945, Marinship built 93 vessels, including 15 Liberty ships and 78 tankers, employing 20,000 workers at its peak.[14] Street names on Sausalito's northern waterfront commemorate the location of the shipyard's gates.[15]

As a center of maritime commerce and national defense, the Bay Area has also been a source of remarkable innovation in the shipbuilding industry, presaging its innovation in the technology sector today. In 1900, the Union Iron Works launched the coal-powered *Arkansas*-class coastal defense monitor USS *Wyoming* (BM-10). In 1908, in a first for the Navy, workers at Mare Island modified the ship to run exclusively on oil.[16] This propulsion technology was appropriate for the Bay Area, where, at the time, oil was easier to come by than coal. Renamed the USS *Cheyenne*, the vessel's new power plant paved the way for the Navy's wholesale shift away from coal and toward petroleum as a power source.[17]

Built at Mare Island and commissioned in 1913, the collier ship USS *Jupiter (AC-3)* became the Navy's first experiment with a new turboelectric propulsion system.[18] Its cutting-edge propulsion system went on to power future U.S. battleships and aircraft carriers, giving them the range and power they needed to operate in the Pacific.[19]

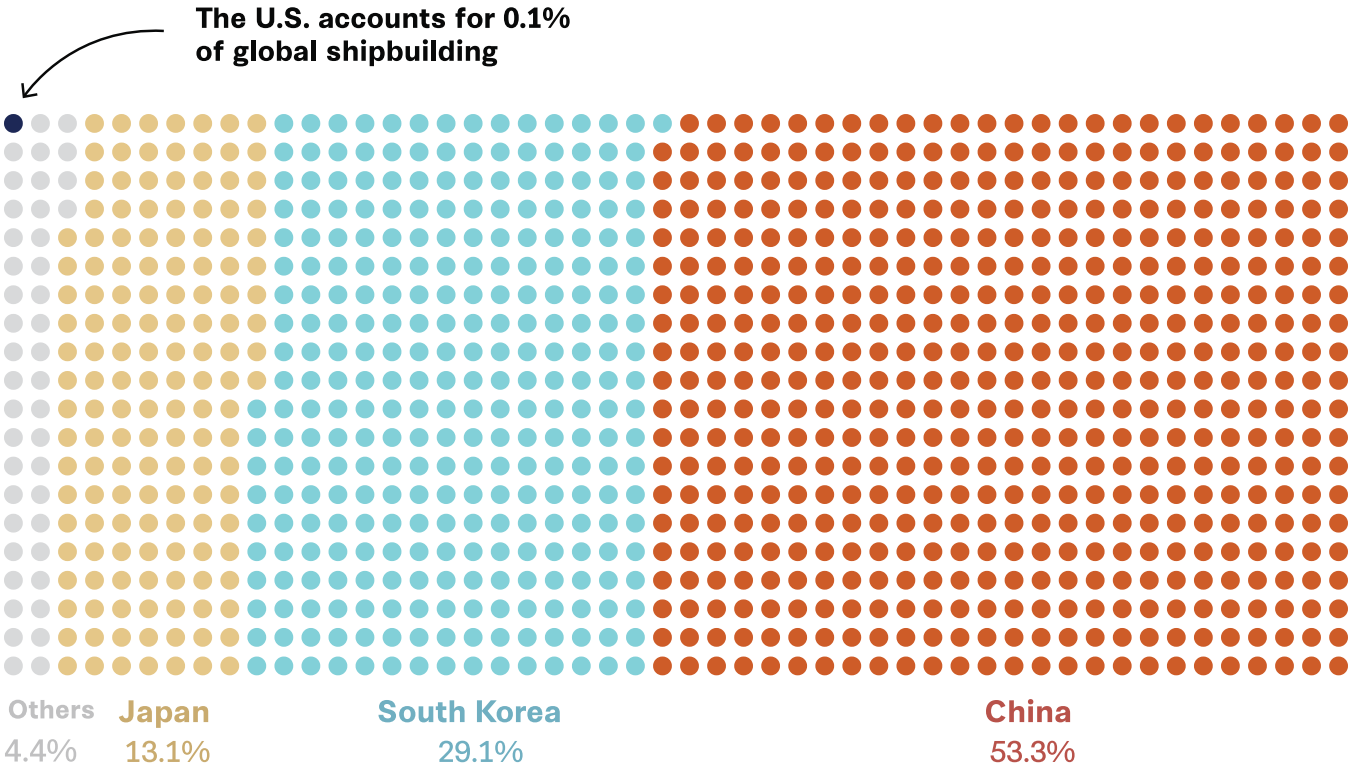
In 1956, the SS *Ideal X*, a converted T-2 tanker originally built in Sausalito's Marinship yard, began the first commercial cargo service using shipping containers—an innovation that revolutionized maritime cargo.[20]



Richmond Shipyard No. 2, 1944. Image from the Cochrane Collection

**EXHIBIT 5**

## China Dominates the Shipbuilding Industry




Source: CSIS Charts; CSIS calculations and S&P Global Sea-web

A mix of financiers, industrialists and international collaborations played a key role in advancing maritime technologies and scaling up Bay Area vessel manufacturing. Industrialist Henry Kaiser's Richmond shipyards pioneered the region's efforts to scale new technology, developing modularized construction techniques that broke one production record after another. After World War II, Kaiser's production methods were adopted to establish Asia's massive integrated shipbuilding centers such as Busan, Korea.[21] International collaboration on shipyard development remains an important topic as America looks to revitalize its maritime production base.

## A New Imperative: Maritime Security in the 21st Century

An array of influences is coming together that could bring shipbuilding back to the Bay Area.

Friction in the Taiwan Strait and South China Sea, coupled with wider public awareness of China's industrial capacity and its maritime buildup, has grown. In 2024, China accounted for 53.3% of global commercial shipbuilding activity, followed by South Korea (29.1%) and Japan (13.1%). The United States accounted for 0.1%,[22] producing only three of the 5,448 large commercial vessels on order that year.[23]

The Navy's shipbuilding budget has nearly doubled over the past 20 years, but the fleet has not grown in size, a gap the GAO attributes to cost overruns, workforce shortfalls, and supply chain fragility.[24] Only four public naval shipyards remain—Pearl Harbor, Puget Sound, Portsmouth, and Norfolk—down from eleven during World War II.[25] The Congressional Budget Office projects that the submarine fleet's maintenance requirements will exceed shipyard capacity in 25 of the next 30 years.[26]

In Washington, the march towards a reinvigorated maritime industry has focused in part on the bipartisan

Shipbuilding and Harbor Infrastructure for Prosperity and Security for America Act of 2025, otherwise known as the SHIPS for America Act. Congressman John Garamendi from the Bay Area is a sponsor.[27] The SHIPS Act is intended to modernize existing authorities, bolster employment and maritime workforce training, incentivize the acquisition of U.S. cargo ships, and advance new areas of maritime technology. It has yet to pass through Congress.[28]

In the meantime, the Trump Administration has taken a range of executive actions that focus on the maritime sector. A presidential Executive Order on Restoring America's Maritime Dominance, issued in April 2025, called for the development of a Maritime Action Plan (MAP) and for investment in the nation's Maritime Industrial Base, including commercial and defense shipbuilding.[29] That was followed by legislative provisions in the National Defense Authorization Act and the Reconciliation Act of 2025, and by the issuance of America's Maritime Action Plan in February 2026. Trade deals with the allied shipbuilding nations of Korea and Japan offer the promise of extensive capital investment and future shipbuilding collaborations. An August 13, 2026 "Presidential Memorandum" encourages international collaborations in shipbuilding, a 5th Naval Shipyard, a new "Component Repair Center," and reforms to reduce the challenges posed by bureaucracy in government shipbuilding oversight.[30]

The FY 2027 Budget Request proposes $65.8 billion for shipbuilding alone.[31]

## Bringing Shipbuilding Back to the Bay Area: The Solano Shipbuilding Complex

In 2023, the energy around a reinvigoration of American shipbuilding produced a proposal by California Forever to develop a major shipbuilding complex facility in Solano County, where the Sacramento River meets Suisun Bay. The idea is linked to a parallel proposal to create a new city of 400,000 that would bring with it over 200,000 jobs and 174,000 homes, anchored by a 2,100-acre advanced manufacturing zone (Solano Foundry). The shipyard proposal includes a 7-mile frontage on the Sacramento Deep Water Ship Channel, offering a potential site for maritime industrial development. The site was targeted in the early 1960s for industrial development and was zoned for water dependent industries.

With deep water access ensured by the federally maintained ship channel, an adjacent manufacturing zone, and a nearby residential community (now going through entitlements) that would provide workforce housing, the region has an opening to replicate Henry Kaiser's vision to build efficient, technologically advanced shipyards.

As a business case, a January 2026 analysis by the Bay Area Council Economic Institute found that the shipyard project by itself could support more than 10,000 direct and indirect jobs by 2031, growing to 20,000 by 2035, 46,000 by 2045, and 72,700 by 2055. Those jobs would come from a range of sources, including construction. At full build-out, the shipyard could support 40,000 direct on-site jobs.[32] An adjacent manufacturing zone could support an integrated local supply chain where companies could produce components for advanced maritime vessels.

According to the U.S. Maritime Administration (MARAD), each direct job in the private shipbuilding and repairing industry is associated with another 2.67 jobs elsewhere in the U.S. economy[33] through supplier purchases and worker spending—roughly 3.7 jobs in total for every shipyard job.[34]

## A Workforce Gap

Any expansion of shipbuilding or other defense-related manufacturing, however, will face a constraint: skilled workers. The labor force underpinning this industrial base has contracted and is aging out. The U.S. Bureau of Labor Statistics reports approximately 149,600 workers in ship and boat building nationally in August 2026, down from 198,600 in August 1980—a 25% decline over four decades.[35] The average age of skilled shipyard workers has reached 55, and attrition among younger workers exceeds 20%.[36] A McKinsey study on the future of the U.S. shipbuilding workforce found that replacing retiring workers and scaling to meet Navy requirements would

require recruiting and training tens of thousands of new welders, pipefitters, electricians, and marine engineers—a challenge compounded by competition from other advanced manufacturing sectors for the same talent pool.[37] While the defense department has identified workforce readiness as one of four priorities in its 2023 National Defense Industrial Strategy, the shipbuilding sector illustrates how far the gap between aspiration and capacity has widened.[38] Other manufacturing sectors confront a similar problem. This places a premium on workforce development and training as a key element of any revived industrial strategy.

## The Case for a Fifth Naval Shipyard

Since 2018 when the U.S. Navy unveiled its Shipyard Infrastructure Optimization Program (SIOP) to modernize its existing shipyards, a case has been building at the national level for a fifth naval shipyard.

In an August 13, 2026 Presidential Memorandum, President Trump directed the Navy to explore the development of a new shipyard "proximate to the United States Pacific Fleet" with "sufficient drydock capacity to service the planned growth of the fast attack submarine fleet over the next two decades."[39] This presents an opportunity for the Bay Area. What distinguishes a new Bay Area shipyard is the potential to integrate the region's technology and innovation strengths into next-generation shipbuilding. A Bay Area shipyard could potentially draw on the region's leadership in robotics, AI-driven design and manufacturing, advanced materials, and autonomous systems—a model combining industrial scale with digital technology in ways that could significantly advance how naval and commercial vessels are designed.

## Space, Aerospace and Defense Manufacturing

Industrial and advanced manufacturing opportunities extend to aerospace, another field where the Bay Area has a rich history.

Large-scale manufacturing could particularly grow in the East and North Bay, as it already has in Hayward, Fremont, and Alameda, and as it could in Solano County, where connecting the region's engineering talent and investment capital with Travis Air Force Base could bring advanced aerospace innovation and production at industrial scale.

The launch sector offers a particular opportunity. Activity at Southern California's Vandenberg Space Force Base is rising, yet flight hardware still reaches the launch range from factories in other states, in some cases from the East and Gulf coasts by sea through the Panama Canal. California would benefit from waterfront manufacturing within reach of Vandenberg, with the proposed Solano complex offering a potential site to build and service space infrastructure for the Western Range.

Defense production is already growing in the region and particularly in the East Bay. Skydio, the nation's largest drone manufacturer, builds its autonomous drones at a 36,000-square-foot factory in Hayward that has increased its manufacturing capacity tenfold since it opened in 2023.[40] In April 2026, the company announced plans to invest $3.5 billion in domestic manufacturing over five years, with most of more than 2,000 new jobs expected to be in California.[41] In Alameda, Saildrone builds uncrewed ocean vessels[42] and Astra is developing and testing its rocket and mobile launch system,[43] while Fremont-based Amprius won a defense department grant of up to $75 million in September 2026 to convert an EV battery production line into a high-volume manufacturing facility for drone batteries.[44] Muon Space manufactures in Mountain View.[45] Astranis has shown that even a dense urban center like San Francisco can host spacecraft manufacturing: it does roughly 70% or its satellite production in-house at its campus in the historic Pier 70 shipyard complex.[46] Planet Labs also manufactures satellites in downtown San Francisco.[47] The East Bay brings a different advantage: room to build manufacturing capacity at scale.

Travis Air Force Base is a potential anchor. Home to the 60th Air Mobility Wing, the largest air mobility organization in the Air Force by personnel, and the

largest aerial port on the West Coast, Travis operates heavy lift aircraft that connect California to the Indo-Pacific and the wider global mobility network.[48] Its maintenance personnel, logisticians, aerial-port specialists, and aircrew have skills that overlap closely with commercial aerospace and space work. However, unlike the majority of Air Force Bases across America, including Robbins AFB, Tinker AFB, Hill AFB, and many others, which are supported by extensive aerospace industrial clusters around them, Travis does not have a supporting aerospace cluster. This gap presents an opportunity to establish an advanced co-located aerospace manufacturing complex, giving veterans, military spouses, reservists, and separating personnel compelling reasons to build civilian careers locally.

It is important to note that the imperative of scaled manufacturing isn't limited to space, aerospace, or autonomous systems. Venture investors increasingly see a need to revitalize the American industrial base through production that moves beyond the prototype stage to large scale deployment, as well as by addressing gaps in the underlying industrial supply chain on which at-scale defense production ultimately depends. This includes products such as batteries, hardware, and other components where the pool of suppliers that supports them is shallow and dependence on China is high. Investors and government agencies considering industrial parks will need to consider not only high-tech tenants but also how to attract and support their enabling supply chain.




# Global Connections

The world is seeing the most significant military spending increase since the end of the Cold War. The Stockholm International Peace Research Institute (SIPRI) reports that world military spending grew by 41% over the past decade (2016–2025) to reach $2.877 trillion in its 11th consecutive year of growth. Not a short-term spike, this constitutes a structural shift reflecting Russia's war in Ukraine and its probing of NATO defenses through drones and cyber attacks; China's accelerating military modernization and aggressiveness in the South China Sea, Sea of Japan, and Taiwan Strait; conflict in the Middle East; and a broader recognition among democracies that the post-Cold War peace dividend has been exhausted. Statements and actions by the Trump administration have also caused U.S. allies—from NATO to South Korea—to question the durability of the U.S. commitment to shared defense, adding further pressure to accelerate defense budgets. For the Bay Area, whose strengths align closely with the technological priorities driving this global rearmament—artificial intelligence, autonomous systems, cybersecurity, and space and satellite technology—the surge sets a new foundation for international cooperation.

## Allied Rearmament

### NATO and Europe

With war on its eastern borders, and questions regarding the durability of U.S. support, Europe's military spending surged 14% in 2025 to $864 billion—the highest ever recorded for the continent—making Europe the main engine of global military spending growth according to SIPRI's figures. European NATO members accounted for $559 billion of that 2025 spending total,[1] with much of it spent on weapons ordered from U.S. companies. [2] The International Institute for Strategic Studies (IISS) has calculated that between January 2020 and December 2025, more than a third of military procurement by European NATO members involved at least one American supplier.[3]

Expenditure targets are rising. In 2014, NATO established a target of 2% of GDP for defense spending, at a time when only three allies met it; in 2025, all allies met or exceeded the 2% target, with Europe and Canada having increased their collective investment from1.4% of their combined GDP in 2014 to 2.3%.[4] The longstanding 2% target, however, has been overtaken by events with the establishment of a new 5% target for defense and security set by NATO in June 2025, with a minimum of 3.5% going for "pure" defense expenditure alone (and the remainder going to security and defense-related "critical infrastructure")[5]—signaling that the rearmament trend will continue to accelerate.

**Canada** is undertaking a major defense transformation. Having reached NATO's 2% spending benchmark and now working toward the Alliance's broader 5% target by 2035, it is rebuilding the Canadian Armed Forces (CAF) through targeted investments in military personnel, readiness, equipment, and infrastructure, as well as the defense industrial base. That includes NORAD modernization through over-the-horizon radar,[6] Arctic surveillance,

advanced communications, and space-based capabilities,[7] supporting deeper defense cooperation with the United States, NATO, Five Eyes, and the European Union.[8]

The transformation extends beyond military capabilities to Canada's defence industrial and innovation base. Backed by an initial C$6.6 billion (US$4.8 billion) budget allocation in 2025, Canada's Defence Industrial Strategy is organized around a "Build–Partner–Buy" framework to expand domestic production, accelerate innovation, and strengthen allied supply chains. A new Defence Investment Agency aims to streamline procurement and strengthen industry partnerships,[9] while the admission of BDC (Business Development Bank of Canada) into the NATO DIANA (Defence Innovation Accelerator for the North Atlantic) Capital Network is connecting Canadian innovators with allied investors and emerging technologies.[10] Canada is playing a leading role in efforts to establish the Defence, Security and Resilience Bank (DSRB) to mobilize private capital, reduce financing costs, and expand defense industrial capacity,[11] and is prioritizing secure and resilient critical mineral supply chains that support defense manufacturing, advanced batteries, semiconductors, and other strategic technologies.

Lessons from Ukraine and growing cyber threats are broadly reshaping defense priorities, accelerating investment in artificial intelligence, cybersecurity, quantum technologies, advanced communications, space systems, and autonomous platforms. Canada's growing investment in military drone capabilities reflect the increasing importance of unmanned systems and the broader shift toward dual-use technologies.[12]

**Germany** represents the most dramatic case of defense transformation in Europe, increasing its military spending by 24% in 2025 to $114 billion, making it the world's fourth-largest defense spender.[13] With annual spending on defense expected to reach €190 billion (~$212.5 billion) by 2030[14]—a tripling of the average of recent budgets[15]—the government has pledged to spend more than $500 billion on defense in the coming decade.[16] The **United Kingdom** has committed to grow defense spending from 2.3% of GDP in 2024 to 2.6% by 2027,[17] and the Strategic Defense Review put forward by the government of former Prime Minister Keir Starmer proposes raising defense spending to 3% of GDP by the 2030s. Its investment plan includes a focus on digital warfare through a £400 million annual innovation budget.[18] As in Germany, military spending is seen as a stimulus to industrial and economic development. **France** is aiming to reach the NATO-wide goal of spending 3.5% of GDP by 2035.[19] With 2025 defense spending at 4.5% of GDP, **Poland**, which borders Ukraine, leads NATO in proportional spending.[20]

Economic pressure, geopolitical risks, and rising competition from China are leading heavy industries such as railcar and automotive manufacturers in Germany to pivot production to military vehicles and other defense technologies, supporting a turnaround in the troubled manufacturing sector.[21] In France, carmaker Renault is teaming with defense company Thales to produce a tactical military vehicle.[22] European missile giant MBDA is planning to invest $5.8 billion to increase weapons production over the next five years. CEO Eric Béranger describes that capacity as critical in "the shift from an international order to brute force, which has crossed a new threshold with the conflict in Iran." [23] Germany's Rheinmetall—which produces an array of equipment from artillery shells to air defense systems and naval vessels[24]—has become the world's fastest growing large defense company.[25]

## A European Defense Tech Sector Emerges

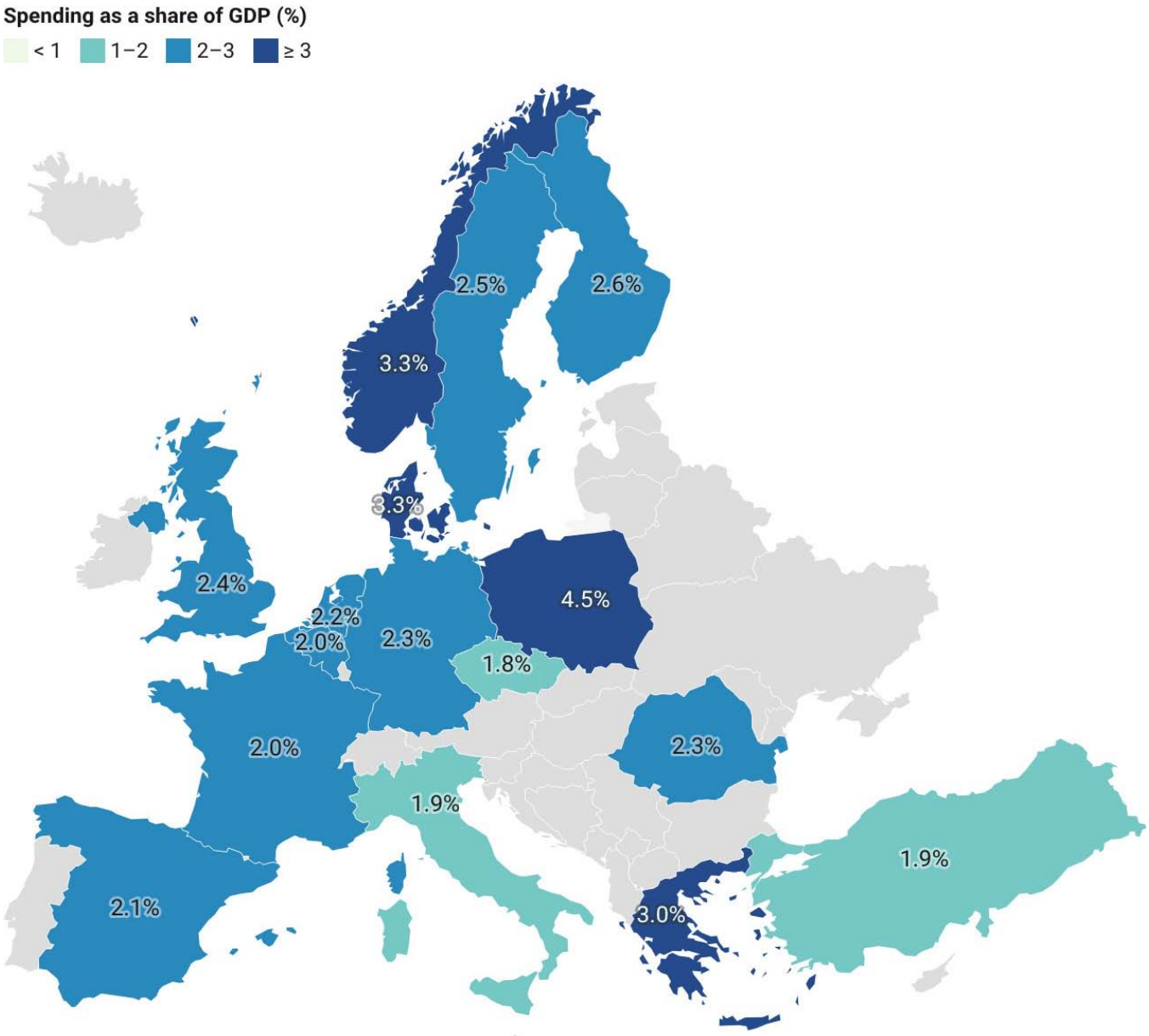
In 2025, the European Commission launched a multi-initiative plan to strengthen European defense capabilities and boost defense funding. The core ReArm Europe plan is underpinned by the White Paper for European Defence–Readiness 2030, which supports a collective surge where EU member states aim to mobilize €800 billion in "made in Europe" defense spending to ensure both long-term security and economic benefits.[26]

While the scale of European rearmament is unprecedented in the post-Cold War era, the defense venture capital system that could translate that spending into innovation is still nascent. For many years, investment in the defense sector was off the table due to restrictions put on VCs by their LPs (often public entities), and the lack of a unified military agenda in Europe. That changed with the war in Ukraine. Investment in defense is now growing, reaching $1.5 billion in 2025, or 6.2% of total European investments (compared to less than 1% before 2020 )[27] The number of unique investors in European defense startups has grown an estimated 4x since 2019,

accelerating after Russia's Ukraine invasion. Deal size is also growing. Over the course of 2025, the size of the average Defense Tech investment round grew from $300,000 to $1 million.[28] In dollar terms, this investment clusters in several hubs: the UK ($4.8 billion), Germany ($4.8 billion), France ($2.3 billion), Finland ($1.1billion) and Switzerland ($1billion).[29] Deep-tech, including AI for defense robotics and autonomous systems, is a major focus. In 2025, deep-tech captured approximately one-third of all venture funding in Europe, a share that has doubled in the last ten years, and attracted significantly more funding than any other sector (over 20% of total funding). Of that, 43% went to companies in the defense, security and resilience sector, up from 20% in 2022.[30]

**Exhibit 6**

## Top 16 European NATO members' defense spending as a share of GDP, 2025

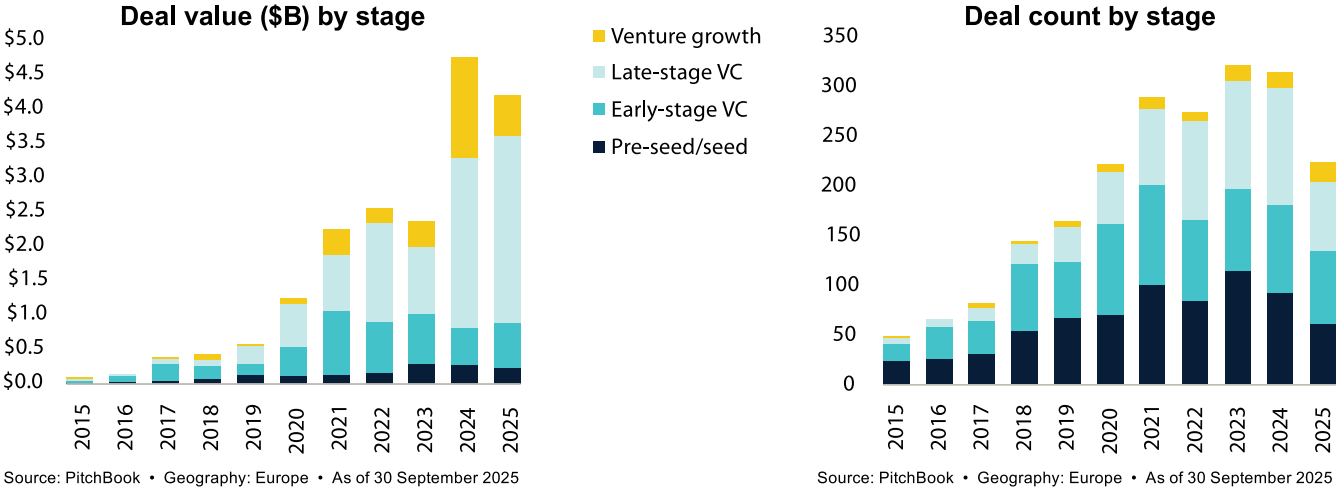



Data Source: SIPRI, "Trends in World Military Expenditure, 2025," SIPRI Fact Sheet, April 2026

Companies such as Helsing, a German AI defense startup that produces software supporting sensors, electronic warfare, and autonomy systems with funding from the Bay Area's Accel and Lightspeed Venture Partners,[31] and ICEYE, a Finnish SAR satellite constellation manufacturer, represent a defense technology wave[32] that creates partnership opportunities for Bay Area firms with complementary capabilities. Connections are also growing between large enterprises and emerging startups. As one example, German automotive supplier Schaeffler has signed a deal with Helsing to help scale the production of drones, targeting a production capacity of 10,000–20,000 drones a year with an additional surge capacity of 10,000 in a crisis.[33]

**Exhibit 7**

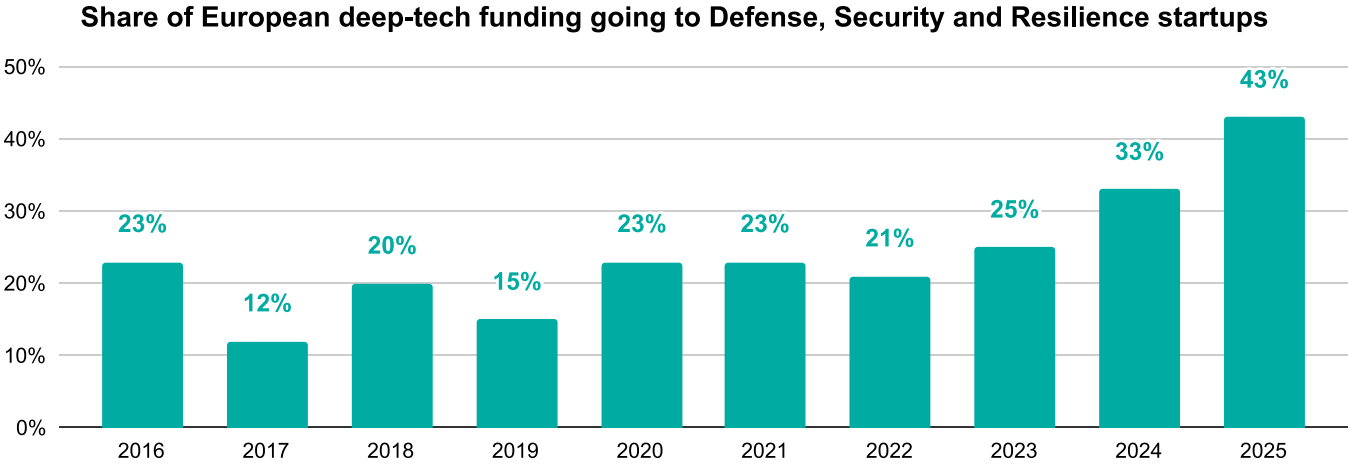
## European Defense Tech Deals, 2015–2025




Source: Ali Javaheri, "The Rise of European defense Tech," PitchBook, October 24, 2025.3, 2025

**Exhibit 8**

## Defense, Security, and Resilience accounted for 43% of deeptech funding in 2025, up from 20% in 2022




Data Source: "Defence, Security and Resilience in Europe Report 2026" by Dealroom and NATO Innovation Fund (NIF)
Note: Defense, Security and Resilience includes defense, space, quantum, nuclear energy, critical materials, biodefense, and other technologies for security and resilience.

In July 2026, eight European countries and Canada jointly announced the formation of a Defence, Security and Resilience Bank (DSRB), a multilateral lending agency to support defense projects that compensates in part for low interest from traditional agencies like the World Bank.[34] The European Defence Tech Hub (EDTH) has also become an enabler as founder-led companies emerge. Its first hackathon was held in Munich in June 2024, with 150 people attending. According to co-founder Benjamin Wolba, "We thought Munich would be a one-off. Then people asked us to come to Paris, Copenhagen, Warsaw and beyond. The community created the series itself." Since then, EDTH has organized 35 hackathons in multiple cities, involving more than 400 teams of which 40 have gone on to found companies. Investors attend regularly. About half the companies that have emerged have already completed some form of operational testing in Ukraine.[35]

Notwithstanding this progress, the level of funding available for defense tech and dual use startups in Europe remains far below that in the United States. Efforts to achieve large-scale production through the development of pan-European defense systems—such as a recent French-German plan to build a stealth fighter-jet[36]—have often foundered on national differences, hobbling efforts to reduce dependence on U.S. technology, which anchors NATO systems. The lack of EU-level procurement standards is another obstacle.

In July 2026, France and Germany announced plans to develop a "European sovereign digital backbone" designed in part to reduce dependence on systems developed by Palantir. Spain's government has barred Palantir from future public procurements, and the French government recently chose small domestic company ChapsVision to support its intelligence systems over Palantir.[37] This represents a continuing effort by European governments to strengthen technology sovereignty and reduce dependence on the United States, spurred by the Trump Administration's message that European countries should rely on themselves more for defense and by uncertainty about the strength of the U.S. commitment. In the long term this could impact the European market for U.S. defense suppliers. In the near-to-medium term, however, the pervasiveness and quality of U.S. technology, much of it coming from the Bay Area, and the deep integration of the defense industrial bases in Europe and the United States suggest that the process won't be fast or easy and that Europe will for the foreseeable future remain an important market.

## The Indo-Pacific

**Japan** is embarking on a dramatic defense transformation. Under Prime Minister Sanae Takaichi, the cabinet has approved a record FY2026 defense budget of 9 trillion yen ($58 billion), a 9.4% increase from 2025, as part of a five-year plan to double defense spending to 2% of GDP by 2027, bringing annual spending to around 10 trillion yen ($64 billion)[38]—a level that puts Japan among the world's top 10 defense spenders. A key element of the strategy aims to advance dual-use technologies, strengthen Japan's defense innovation system, and expand both industrial competitiveness and defense capabilities through investment in advanced technologies. A 2026 Ministry of Defense white paper cites the need to utilize advanced technological capabilities such as AI and unmanned systems developed by both its public and private sectors in the area of national security "without being constrained by existing approaches".[39] Japan's evolving posture aims to increase technological autonomy, but in the context of strong U.S. engagement and an open door to U.S. technologies.

**South Korea**'s defense budget for 2026 rose 7.5% from the previous year, and President Lee has pledged to increase defense spending from 2.3% to 3.6% of GDP. The government has committed $25 billion to U.S. weapons purchases by 2030,[40] and 10.1 trillion won ($7 billion) to AI investment for the defense and technology sectors.[41] South Korean shipyards also have expanded assignments to maintain and repair U.S. Navy ships,[42] reflecting broader efforts by the U.S. and South Korea to deepen cooperation in shipbuilding and maritime logistics.[43] The United States has signaled support for South Korea's nuclear submarine ambitions,[44] deepening a bilateral defense technology relationship that extends to areas such as AI where Bay Area companies are among the world's leaders.[45]

**Australia** is investing massively through the AUKUS (Australia-UK-US) framework,[46] with its 2025 defense spending of $35.3 billion (representing 1.9% of GDP)[47] projected to rise to approximately $100 billion by 2034.[48] The AUKUS submarine program alone could

cost up to AU$268–368 billion over its lifetime, making it the largest defense procurement program in Australia's history.[49] The treaty, signed in Geelong, Australia in July 2025 as a 50-year bilateral UK-Australia defense agreement, underpins the submarine program: the United Kingdom has committed to building up to 12 SSN-AUKUS submarines, with Australia expecting its first domestically-built SSN-AUKUS in the early 2040s and receiving 3 to 5 Virginia-class submarines from the United States as an interim capability.[50] While the submarine program commands the most attention, AUKUS Pillar II—covering advanced capabilities in AI, quantum computing, cybersecurity, hypersonics, and undersea warfare[51]—may be more immediately relevant for Bay Area technology companies.

**India's** defense budget reached INR 6.81 lakh crore ($78.3–78.8 billion) in FY2025–26, a 9.53% increase[52] that also puts India among the world's top 10 defense spenders. While the scale of India's defense market is enormous, 75% of the modernization budget is earmarked for domestic procurement[53] under the government's "Make in India" defense manufacturing initiative[54]—a policy of onshoring that creates both complexity and opportunity for foreign partners. Bay Area companies willing to co-develop technologies or establish manufacturing partnerships within India may find openings, particularly in AI, cybersecurity, and unmanned systems, but the domestic procurement mandate means that straightforward export models face constraints.



INSIGHT

# The Nordics

The Nordic nations—Denmark, Norway, Sweden and Finland—are strategically positioned on Europe's northern flank adjacent to Russia, Ukraine, and the Baltic members of NATO. Technologically advanced, they collaborate on defense, actively support Ukraine, and are closely connected to Silicon Valley. As such, they are emblematic of the developments that link the Bay Area with global security partners.

With the continuing war in Ukraine, existing patterns of defense cooperation within the region are being strengthened. NORDEFCO was established in 2009 as a platform to enable Nordic countries to collaborate on shared defense and security priorities. The entry of Sweden and Finland into NATO after Russia's invasion of Ukraine strengthened cooperation across the region.[55] That cooperation is both bilateral and multilateral, with increasing coordination around regional defense plans, exercises, logistics, capability development and joint procurement, and an ambition for the Nordic countries to operate as a more integrated regional force within NATO.



## Denmark

Denmark has embarked on a significant and sustained increase in defense spending, focused both on meeting targets set by NATO and accelerating procurement to support deployable capacity and industrial capacity. Under Denmark's 2024–2033 Defence Agreement, the Agreement on Strengthening the Combat Power of the Danish Armed Forces (February 2025) and the Consensus to Further Strengthen the Danish Armed Forces (October 2025) expenditures are programmed to rise from DKK 12.5 billion in 2024 to DKK 34.7 billion in 2030,[56] with accelerated expenditures in 2025 and 2026 designed to achieve the allocation of more than 3% of GDP to defense. Shared responsibility (collective defense) in NATO, particularly in the Baltic Sea and NATO's Northern/Eastern flank, frames the consensus on which the expanded commitment to defense is built.[57]

In addition to rebuilding land forces, integrated air and missile defense, maritime and anti-submarine capabilities, and munitions stockpiles, plans embrace a growing emphasis on drones and autonomy, AI, cyber, space, resilient supply chains, and the ability to adopt new technology faster than traditional procurement cycles would allow.

Support for Ukraine is central to Danish defense and security policy. Since Russia's full-scale invasion in 2022, Denmark has provided €10.3 billion in military support and €1.1billion in civilian support to Ukraine,[58] delivering F-16s, artillery, air defense, training, ammunition and maritime support. It has also pioneered the "Danish Model" under which funding is used to procure equipment directly from the Ukrainian defense industry.[59] Increasingly, the relationship is becoming two-way, with Denmark drawing on Ukrainian operational experience, technology, and defense industrial innovation.[60]

Denmark is now building a structured defense and dual-use presence on the West Coast. As part of that broader effort it has moved the North American Head of Defense and Dual-Use from the Danish Ministry of Foreign Affairs to the Bay Area to strengthen Denmark's direct engagement with the West Coast defense, technology, investment and innovation ecosystem.[61]



## Norway

Norway's defence and space capabilities offer further avenues for cooperation with U.S. West Coast companies, from maritime autonomy and secure communications to satellite infrastructure and Arctic operations. A founding member of NATO,[62] Norway borders Russia in the High North and plays a key role in monitoring the North Atlantic and the operations of Russia's Northern Fleet.[63] In 2024, Norway's parliament unanimously adopted a Long-term Defence Plan for 2025–2036[64] worth about US$167 billion. In 2026, the government added roughly US$12 billion[65] and

extended the plan to 2040, putting Norway on track to spend 3.5% of GDP on defense by 2035.[66] Investment priorities include submarines, anti-submarine frigates, long-range rockets, drone defense, electronic warfare and air defense.[67]

Norway's defense relationship with the United States spans military access, equipment programs and industrial cooperation. Under the Supplementary Defense Cooperation Agreement (DCA), U.S. forces have access to twelve agreed facilities and areas in Norway.[68] Similar DCAs are in place with Sweden, Denmark and Finland. Norwegian defense companies are deeply integrated into the U.S. market through investments, acquisitions, manufacturing and long-term defense programs. On the corporate side, Kongsberg is connected through missile systems used by the U.S. Navy and Marine Corps and manufacturing and technology development in the United States.[69] Nammo also has a substantial U.S. presence, with approximately one-third of its workforce based in the country[70] and ongoing investments in U.S. production capacity.[71]

Norway's defense industry comprised approximately 400 companies[72] and more than 17,000 employees in 2025. Annual revenue in 2025 totalled approximately US$6.5 billion, with exports accounting for roughly 75% of industry sales. The industry ranges from established companies such as Kongsberg, Nammo and Thales Norway to deep-tech startups in maritime autonomy, sensors, space and secure communications. The Norwegian Defence and Security Industries Association (FSi) has more than 390 corporate member companies,[73] 85% of them small and medium-sized businesses.[74]The United States is the largest market for Norwegian defense exports, which rose from about $195 million in 2023 to about $325 million in 2024 and roughly $465 million in 2025.[75] Despite its size, Norway has in recent years consistently been ranked among the largest foreign suppliers of defense materiel to the United States.[76]

Space is another area with strong potential for West Coast cooperation. For Bay Area companies in the small satellites, Earth observation analytics and space-based AI sectors, Norway offers launch capacity, and Arctic ground infrastructure and test ranges.[77] Its Arctic location provides exceptional access to polar orbits. Kongsberg Satellite Services (KSAT) operates SvalSat on Svalbard at 78 degrees north, one of the world's best-placed ground stations for downloading data from polar-orbiting satellites.[78] Andøya Spaceport provides European launch capacity for polar orbits. On September 5, 2026, Isar Aerospace's Spectrum rocket reached orbit from Andøya Spaceport, the first successful orbital launch from continental Europe,[79] giving allied satellite operators a sovereign European route to polar and sun-synchronous orbits. Norway's space industry includes approximately 40 companies with an annual turnover of US$1.1–1.2 billion,[80] and the government is building a complete national value chain for small satellites.[81]

Led by the Norwegian Consul General in San Francisco, Team Norway West Coast brings together the Consulate General and Innovation Norway's San Francisco office, and works closely with the Norwegian-American Defense Industry Council (NADIC) and partners across the U.S. defence ecosystem, including the Defense Innovation Unit (DIU).[82] A complementary route for collaboration is the LINC (Launchpad for Innovative Norwegian Companies) accelerator, run by FFI, Innovation Norway and NADIC. Since 2019, it has supported more than 41 Norwegian defense technology companies.[83] From the Bay Area, Innovation Norway's Invest in Norway team helps U.S. companies find partners, establish themselves and grow in the Norwegian market.[84]

Norway works closely with its Nordic partners to strengthen collective defense and security in Northern Europe. With all five Nordic countries now members of NATO, cooperation has entered a new phase, enabling deeper joint planning, training and exercises, greater military mobility across borders, and increased operational integration. Nordic Defence Cooperation (NORDEFCO), the framework for defense cooperation among Denmark, Finland, Iceland, Norway and Sweden, supports this increasingly close coordination alongside NATO.

The Nordic countries are also expanding cooperation in areas including air operations, drones and counter-drone systems, defense innovation and technology development. This increasingly integrated defense environment creates opportunities for collaboration with U.S. technology and defense companies, including Bay Area firms developing scalable dual-use technologies.

Like its neighbors, Norway strongly supports Ukraine and has committed to long-term military, civilian and humanitarian assistance through the Nansen Support Programme for Ukraine, with NOK 205 billion allocated through 2030. The war has underscored the connection between technological leadership, industrial capacity and national security, strengthening the case for deeper cooperation with U.S. partners, including the Bay Area's innovation ecosystem[85]



## Sweden

In the wake of Russia's invasion of Ukraine in February 2022, Sweden abandoned its position of non-alignment dating back to 1814 and joined NATO in 2024.[86] Since then, it has deepened its alignment with the United States. In alignment with NATO goals, its defense budget grew 18% from 2025 to 2026, reaching $18.4 billion or 2.8% of GDP. Defense expenditure is expected to grow to 3.1% of GDP by 2028 and 3.5% by 2035.[87]

In March 2026, Sweden joined the Pax Silica initiative that aims to unify leading technological nations around secure digital infrastructure and secure supply chains for emerging technologies. Launched by the United States in December 2025, its other members include Australia, India, Japan, the United Kingdom and South Korea.[88] The alignment deepened further in May 2026 when Sweden and the United States signed a memorandum of understanding (the Technology Prosperity Deal) to cooperate on advanced technologies including 5G and 6G, AI, space, quantum, and defense innovation, with the agreement on defense encompassing R&D, technology transfer, and the commercialization of emerging defense technologies.[89] The agreement was signed on the sidelines of a NATO foreign ministers' meeting.[90]

Laid out in 2025, the government's Defense Industry Strategy emphasizes defense innovation, the development of procurement methods that promote innovation, cooperation between civil and military research, a space program for deeper defense, joint production with partner countries where possible, the improvement of defense companies' access to capital, and strengthened relations and cooperation with key partner countries.[91] That process, modeled on Silicon Valley following a Ministry of Defence visit to the region in 2023,[92] was advanced by the announcement in May 2026 that NATO had added a Swedish accelerator to its Defence Innovation Accelerator for the North Atlantic (DIANA) network that supports the conversion of civilian innovations into military capability.[93] The country's shift toward defense innovation and investment represents a significant pivot from earlier government policies that largely excluded defense from its science and innovation and investment strategy; defense innovation was happening, but was concentrated in the defense budget. Now its innovation agency Vinnova has been tasked to work with the armed forces to strengthen the development of innovative defense technology by financing small business innovation projects where industry and the military can collaborate to modernize defense systems through the development of dual-use technologies.[94] More broadly, the government has tasked the country's defense innovation actors—the Armed Forces, the Defence Materiel Administration (FMV) and the Defence Research Agency (FOI) to form a common structure for defense innovation.[95]

Small business innovation in Sweden builds on a heritage of advanced defense technologies developed by Saab,[96] which has been awarded multiple contracts by NATO and the U.S. military for equipment ranging from radars and sensors to ground combat support weapons and training systems.[97]



## Finland

Like other European nations, Finland's defense posture was transformed by Russia's full-scale invasion of Ukraine in 2022, prompting Finland, like Sweden, to abandon its historic neutrality and join NATO. With a shared border extending 1,340 kilometers (830 miles),[98] Finland has the longest contiguous border with Russia of any European NATO country. Due to Russia's use of migration as a form of political pressure, in late 2023 Finland closed its official border checkpoints and built a 200 kilometer (124 mile) 4.5 meter high steel fence in the most vulnerable areas, supported by patrol roads, sensors, radar overlays and drones.[99]

Defense spending in 2025 was 2.9% of GDP, with the intention to increase that number to at least 3% by 2029. As a NATO member, Finland has committed to the collective objective of increasing defense expenditure to 5% of GDP by 2035, with core defense accounting for 3.5% (the remaining 1.5% being allocated to related expenditure such as civil preparedness, infrastructure, and cybersecurity.)[100]

Membership in NATO has also stimulated a growing defense sector. A 2026 survey found that the country is home to more than 574 defense industry companies, of which 200 are growing defense or dual-use startups, with 10-20 dual use firms being founded every year,[101] and with roughly 40 being established companies whose core business is defense.[102] A record six defense tech companies were founded in 2025. Most prominent among the emerging companies is ICEYE,[103] an aerospace manufacturer and earth observation company that operates the world's largest commercial constellation of Synthetic Aperture (SAR) satellites, capable of seeing through clouds, smoke and severe weather to deliver high-resolution imagery and data for any location on Earth multiple times a day.[104] Having received the largest Finnish defense funding round to date in June 2026, making it Finland's first defense decacorn,[105] ICEYE provides persistent monitoring and situational awareness for governments and tactical military units[106] and has partnered with Nokia and Ukraine's Ministry of Defense to co-develop a secure, sovereign, Low Earth Orbit (LEO) high-speed satellite broadband communications network. The company has heavily supported the Armed Forces of Ukraine since 2022.[107] A newer entrant in the market is Kova Labs, an autonomous drone company whose low-cost vehicles can fly independently inside forests using camera data to perform computer-vision and machine-vision tasks onboard, and are undergoing testing in Ukraine.[108]

## Ukraine

Through all this, Ukraine remains a touchpoint for defense technology development. According to its Ministry of Defense, more than 2,500 defense-tech startups have been registered in the country since 2022,[109] while approximately 900 defense enterprises (over 800 of which are private companies) are currently engaged in active manufacturing operations across Ukraine's defense industry.[110]

In 2026, Ukrainian state procurement of weapons and military equipment alone stands at approximately $52 billion,[111] with the Ministry of Defense, intelligence agencies, and major charitable foundations such as Come Back Alive[112] active buyers. Allied governments also procure materiel through the "Danish model," under which donors finance orders directly with Ukrainian manufacturers to supply the Ukrainian military.[113]

A comprehensive ecosystem supporting defense innovation is taking shape, where the state provides non-dilutive grants, while venture funds supply investment capital. The Brave1 state defense cluster identifies priority operational needs from the frontline and runs competitive grant programs, coordinates proving-ground testing, and assists with production scaling.[114] Specialized funds, including D3 Venture Capital, MITS Capital, and Green Flag Ventures, invest in high-potential teams.[115] International investors primarily deploy capital through holding companies established by Ukrainian founders in the United States, the United Kingdom, Poland, or Estonia.[116]

These frameworks allow defense startups to rapidly validate products with end-users and access international capital markets. In 2024–2025, Ukrainian defense-tech companies raised over $145 million in private venture funding,[117] with average rounds shifting from hundreds of thousands of dollars to multi-million-dollar transactions.[118] By 2026, the ecosystem was producing scale-ups and institutional exits: UForce raised $50 million at a $1 billion valuation, becoming the sector's first unicorn.[119] Autonomous swarm software developer Swarmer raised $32 million, including $15 million through a Nasdaq IPO,[120] while Buntar Aerospace secured $30 million to scale reconnaissance drone systems,[121] and geospatial intelligence startup Farsight Vision closed a €7.2 million seed round.[122]

The «Drone Deal» intergovernmental framework encompasses long-term agreements that bridge joint manufacturing, procurement, technology transfer, and the sharing of battlefield operational doctrine for unmanned systems. Agreements are in place with several European nations: Denmark, the Netherlands, Norway, Estonia, Latvia, Lithuania, and Finland[123] as well as Saudi Arabia, the UAE, and Qatar.[124]

Ukraine has 16 active defense-tech partnerships with U.S. companies, out of 180 international deals overall, ranking the U.S. third behind Germany (36) and Denmark (18).[125] In Ohio, Ukrainian Defense Drones (the U.S. arm of F-Drones) is investing $18.4 million for a 300-job plant.[126] In New Hampshire, another Ukrainian company, General Cherry, and Wilcox Industries have agreed to form Wilcox Cherry Defense to build drones at Wilcox's Newington facility.[127]

Testing in Ukraine runs on two tracks. Brave1's "Test in Ukraine" platform, launched in 2025, gives established manufacturers structured access to frontline units and operational feedback.[128] Through defense tech venture studio Victoria, earlier-stage teams are supported bench-to-range with demand data, expert review, and a unit champion in place before a field testing.[129]

## Global Defense Engagement

The global conversation with the San Francisco/Silicon Valley Bay Area on defense technology takes many forms. One is through accelerators such as Plug and Play, Y Combinator, SkyDeck, and Deep Tech Security Accelerator (DTSA) at SRI that support both domestic and international dual-use and defense tech startups. Venture investors such as Lockheed Martin Ventures are finding growing defense opportunities in Europe.

Building on 60 years of working with the Japanese government, SRI has also collaborated with the Japan Ministry of Defense to the stand-up the Defense Innovation Science and Technology Institute (DISTI), Japan's new technology research center that opened in October 2025[130] to pursue research on deep technologies supporting national security.[131]

Another set of conversations happens through DIU, which has developed a range of strategic partnerships with allied countries including

- **The United Kingdom**'s Strategic Command, embedding a UK liaison at the DIU headquarters in Silicon Valley and a U.S. liaison at the UK's jHub Defence Innovation headquarters in London;[132]
- **Singapore**'s Ministry of Defence, through an MOU on Defense Innovation Cooperation focused on scaling technologies like shipboard counter-unmanned aircraft systems and electromagnetic interference resilience;[133]
- **Japan**'s Acquisition, Technology and Logistics Agency (ATLA), through an MOU for Defense Innovation Cooperation to promote the integration of commercial technologies at speed and scale into defense systems for operational demands in the Indo-Pacific;[134]
- **The United Arab Emirates**' Tawazan Council, through an MOU to foster shared ecosystem scaling and private capital cooperation;[135]
- **Taiwan**'s Defense Innovation Office (DIO), with plans to exchange technology liaison envoys to coordinate on drones, semiconductor military applications, and information security;[136]
- **NATO**'s innovation efforts in support of Ukraine, through coordination with the NATO Innovation Unit and participation in the inaugural NATO-Ukraine Defense Innovators forum in Poland.[137]
- **India**'s Innovations for Defence Excellence (iDEX), through an MOU to deepen industry, research, and investment partnerships.[138]

A fourth and distinctive set of conversations is happening with growing frequency through the Bay Area's large diplomatic community. In contrast to most consular offices in the U.S., diplomatic offices in San Francisco have technology as a major focus, looking to facilitate investment and partnerships with the region. The European Union also maintains an office in

San Francisco,[139] the only EU office in the world outside a national capital with the specific role to build technology relationships. These missions serve as bridges between Bay Area research and defense technology companies and overseas research institutions, companies, and allied and aligned governments.

Significantly, **Ukraine** has an active presence in the region, through programs such as Ukraine Defense Tech Ecosystem Night (October 13, 2026), startup pitches (YEP Accelerator Demo Day, October 20, 2026), and the Deep Tech Security Accelerator (DTSA) at SRI that with support from the Consulate General of Ukraine in San Francisco and Ukraine's Ministry of Defense helps battle-proven Ukrainian and allied startups connect with defense markets and funding. Defense tech venture studio Victoria, based in San Francisco, bridges the U.S. tech community with Ukraine, bringing allied innovation to Ukrainian defenders.[140] It launched with a Defense Tech Hackathon aboard the USS Hornet in 2024, which drew over 700 participants.[141] What began as a community platform for facilitating connections is now formalizing into a venture fund, building on collaboration with U.S.-based accelerators. Victoria's partners in the Ukrainian defense ecosystem include the IT Ukraine Association, the Ukrainian Startup Fund,[142] Militarnyi (an established military media organization), Boryviter (a nonprofit center of excellence and military school), KOLO (a tech community charity fund designed to bring innovations to the Armed Forces of Ukraine), the Unmanned Systems Forces (a dedicated branch of the Ukrainian Armed Forces focused on UAVs, robotic systems, and marine drones), and Brave1 (a government initiative bringing together Ukraine's defense cluster—the security and defense forces, and the scientific and business community—to develop and fund advanced defense technologies).[143]

The dialogue with partner countries on defense is evident in a growing flow of defense-related delegations visiting the region, ranging from ministerial level visitors to startup cohorts. Discussions often focus on how to connect defense innovation ecosystems.

European industry groups are holding conversations with dual-use technology founders and investors, and Italian shipbuilding and maritime security company Fincantieri has opened an Innovation Antenna center at the Mind the Bridge Innovation Center in San Francisco to support the development of dual-use technology solutions to both civilian and military maritime challenges.[144]

National delegations combining senior government leaders, industry representatives, accelerators, and defense tech startups are also visiting the region with increasing frequency, including Norway (January 2026), Denmark (March 2026),[145] Sweden (November 2026),[146] and Finland (November 2026).[147] In September 2026, the Japanese Chamber of Commerce of Northern California was a co-sponsor of the Third U.S.-Japan Dual-Use Tech Collaboration seminar with participation from DIU and Japan's Ministries of Foreign Affairs and Defense.[148] The American Chamber of Commerce in Australia plans to lead a defense innovation delegation to Silicon Valley in March 2027.[149]

Discussions often focus on strategies to advance defense innovation, align ecosystems, and identify investment market opportunities. In many cases, collaboration with U.S. partners on defense technology—through research and aligned procurement processes—offers countries an opportunity to develop and deliver innovative technologies at a scale not possible domestically.




# Conclusions and Recommendations

The Bay Area stands at a distinctive intersection of technological innovation, defense research, and global security partnerships. No other region in the United States combines to the same degree a world-leading technology and venture capital ecosystem with two of the nation's premier defense policy universities, the headquarters of the Defense Innovation Unit, major national laboratories, one of the largest diplomatic communities in the United States, a defense industrial legacy , and a concentration of venture capital and defense technology startups that is reshaping how the defense department and other national security agencies acquire and deploy advanced capabilities. California supports more than 511,000 aerospace and defense-related jobs generating over $100 billion in annual economic activity,[1] and while statewide data does not specify the Bay Area's share, the region's concentration of assets makes it a primary driver.

The opportunity is substantial. Global military spending reached $2.877 trillion in 2025, its 11th consecutive year of growth.[2] Venture capital for startups in the defense technology sector—defined to include dual-use AI, autonomous systems, space cybersecurity, advanced hardware and materials, and mission operations and intelligence tech—reached $17.9 billion in 2025, according to CB Insights,[3] reflecting a market that has grown from negligible levels a decade ago to one of the most active segments of the venture landscape. Allied nations from Europe to the Indo-Pacific are increasing defense budgets at rates not seen since the Cold War, with spending priorities focused on technology domains where Bay Area excels. The Defense Innovation Unit's budget has surged,[4] reflecting the Pentagon's growing appetite for commercial technology. And programs like Stanford University's Hacking for Defense are producing a generation of technologists and policymakers who see defense engagement not as a moral compromise but as a compelling opportunity for public service.

## Constraints

While the alignment of factors is compelling, the challenges must be acknowledged. There are workforce constraints, particularly for shipbuilding and advanced manufacturing. State regulatory barriers, while easing with recent CEQA reform,[5] continue to elevate costs and generate uncertainty for manufacturing and other facility development. The Bay Area's cost of living, driven primarily by housing, creates further challenges for attracting and retaining the skilled technical workforce that defense companies require—a constraint that has already driven some defense and dual use technology companies to move or expand in other regions.[6]

## Recommendations

Several steps can strengthen the Bay Area's position as a national defense innovation center, building on the assets and opportunities identified throughout this report.

**1. Accelerate procurement reform in defense agencies**. While progress has been made in streamlining access for emerging defense tech companies to the Pentagon's procurement system, change needs to come

faster. More projects need to move more quickly from the level of research and pilots to acquisition at scale.

**2. Develop industrial zones for maritime, space, aerospace, and other manufacturing**. The Bay Area often leads in R&D, software, and now in artificial intelligence, but when it comes to manufacturing itself—whether of ships, planes, drones, rockets, or components—Bay Area companies currently have few options for where to locate large-scale production, particularly in places that can provide the necessary land, workforce, and housing. This forces companies as they grow to locate manufacturing in other states. The Bay Area and California should support and facilitate zones where defense and maritime companies can quickly break ground and scale.

**3. Streamline regulatory pathways in California for defense production.** While California's 2025 CEQA reform represents progress, defense-related manufacturing and facility development continue to face regulatory timelines that create competitive disadvantages relative to states with more open environments.[7] Leaders should advocate for continued state-level regulatory reform and expedited permitting for facilities with demonstrated defense or national security applications.

**4. Invest in supportive workforce development.** The workforce challenge in shipbuilding—an estimated shortfall of 146,000 workers nationally, an average age of 55, and 20% attrition among younger workers[8]—is a microcosm of a broader defense workforce challenge that extends to advanced manufacturing.[9] The Bay Area should develop a coordinated defense workforce strategy linking community colleges and workforce agencies, university programs, apprenticeship initiatives, and employer partnerships. The state's Employment Training Panel can fund customized training for defense manufacturing workers. NSSC, which has a 48% placement rate into nuclear security jobs, is a model for how university-workforce pipelines can be built at scale when federal investment is sustained.

5. **Create new testbeds where emerging defense tech companies can test technologies with potential military applications in a classified setting**. SRI is currently the only place in the Bay Area where this kind of testing happens in a secure classified setting. With the growing number of defense and dual use companies and technologies emerging from the region, this base needs to be expanded.

**6. More deeply connect the region's defense innovation system with partners in allied and aligned countries**. The Bay Area's 43 consulates-general from 42 countries provide a strong diplomatic infrastructure for international defense technology cooperation,[10] This infrastructure should be leveraged more deliberately. AUKUS Pillar II—covering AI, quantum computing, cybersecurity, hypersonics, and undersea warfare—creates immediate opportunities for Bay Area companies to participate in trilateral technology-sharing with Australia and the United Kingdom. Japan's $58 billion defense budget and focus on unmanned systems and AI, South Korea's $7 billion AI investment, and the EU's €800 billion ReArm Europe initiative create markets that align with Bay Area capabilities.

**7. Consider the creation of a Bay Area Defense Commercialization and Allied Innovation Platform to support and strengthen an integrated allied innovation ecosystem.**

## Looking Ahead

The Bay Area has built ships that helped win a world war, developed the electronics that won the Cold War, and created the digital technologies that have defined American economic leadership for half a century. The question now is whether the region will play a comparable role in meeting the defense challenges of the coming decades—challenges that will be fundamentally technological in character and demand the combination of innovation, talent, capital, and international connectivity that the Bay Area possesses in abundance.

The alignment of surging global defense spending, expanding allied cooperation frameworks, growing defense venture capital, federal policy support for innovation-driven defense acquisition, and a new generation of technologists ready to engage with national security creates a window of opportunity that is unique in its breadth and urgency. Fully capturing it will require concerted action across the public and private sectors, and sustained investment in workforce and supporting infrastructure.

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Chapter 1
## Introduction

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Chapter 2
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Chapter 13

## Conclusions and Recommendations

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