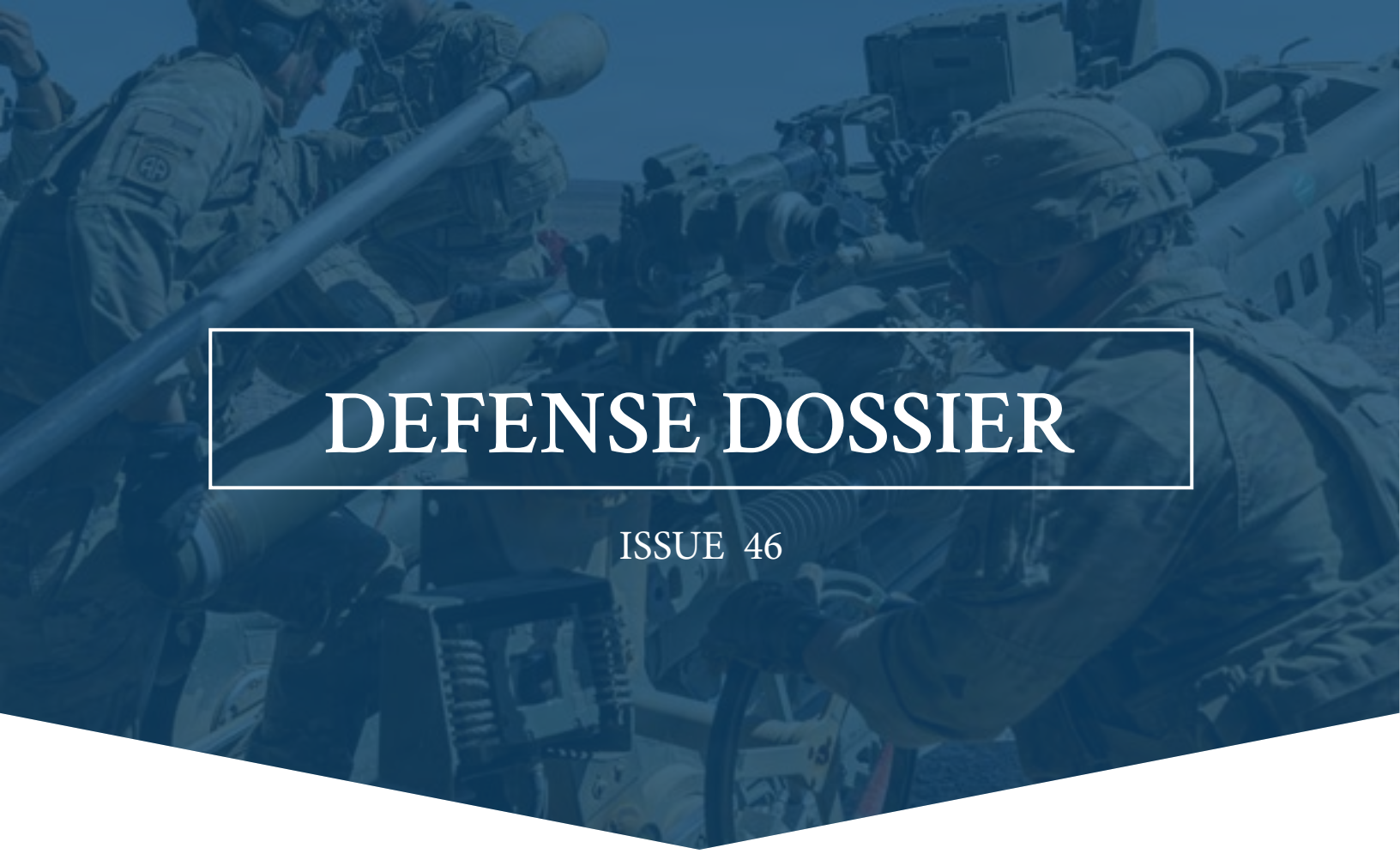


DEFENSE DOSSIER

ISSUE 46

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LETTER FROM THE EDITORS

Welcome to the November 2026 issue of Defense Dossier. After the Cold War, the U.S. and its allies built their industrial capacity with the assumption that wars would be short and a handful of prime contractors could be relied upon to deliver any weapons needed for war. However, the conflicts in Ukraine, the Middle East, and China's rapid military buildup have demonstrated a new reality the U.S. has to contend with.

This issue examines what it will take to rebuild the industrial foundations of American and allied power. We open by tying industrial capacity directly to deterrence, and by surveying the vulnerabilities that an adversary could exploit, from shipbuilding and semiconductors to ports and critical minerals. We then turn to how the Pentagon buys weapons, and why a lasting partnership between traditional primes and new entrants, backed by real contracts, is the ultimate demand signal. From there, we examine what the Navy can do if its shipbuilding plans cannot deliver in time to deter China, before widening the lens to NATO's effort to turn the Alliance's civilian manufacturing might into a distributed arsenal. We close with a concrete proposal to break America's munitions bottleneck by drawing allied suppliers into the munitions supply chain, part by part.

The articles in this issue make a compelling case that new threats and wartime realities have made planning, deterrence, and timely fielding weapons incredibly challenging. The question is not whether the United States and its allies can rebuild their industrial base, but whether they can do so promptly, before an adversary decides to test America's capabilities.

All the best,

Ilan Berman
Chief Editor

Richard M. Harrison
Managing Editor

Deterrence and the Industrial Base

Larry M. Wortzel

Protecting U.S. interests and deterring aggression by other nations requires a credible military capability. This, in turn, necessitates an industrial base capable of sustaining military operations, reconstituting used munitions and combat losses, and maintaining a strong domestic economy. Furthermore, a strong industrial base must be resilient and should not be dependent on materials from potential adversaries.

Deterrence is based on threat assessments, perceptions of risk, and public opinion. Lawrence Freedman of King's College London points out that deterrence has increasingly become "detached from the practice of war… and is still without an agreed upon definition.[1] Deterrence involves more than just military preparations or capacities. It encompasses a wide range of factors that include the strength of a nation's economy, the size of the population, the will of its people, coercive strategies, accurate assessments of one's own strengths and weaknesses and those of the enemy, military capacity, economics, propaganda, political will, alliances, and diplomacy.

For deterrence to be effective, the country or entity to be deterred must sense a credible and dangerous offensive threat and the likelihood that the opponent will carry it out. Still, U.S. policymakers must consider the potential for escalation if a conflict breaks out. A complicating factor of deterrence strategy is that some potential U.S. adversaries have a penchant for preemptive violence to deescalate a crisis. Still, Russia and China together now have a large advantage in the number of nuclear weapons and their delivery systems. Sadly, this is as much a result of U.S. policy as it is the progress of adversary programs.

Escalation of a conflict can be vertical (more intense or different forms of conflict, for instance conventional versus nuclear) or horizontal (in another theater of war or region). Regardless, U.S. policymakers must consider the opponent's approach to escalation. Does the country or entity to be deterred think that a conflict can be contained at a local or regional level, or does it believe expanding a conflict will deplete the U.S. industrial base and military capacity?

In the U.S. doctrinal guide known as the Deterrence Options Joint Operating Concept, deterrence options are designed to "decisively influence the adversary's decision-making calculus in order to prevent hostile actions against U.S. vital interests."[2] The objective is to influence an adversary's decisionmaking process and attempt to alter its perception of the benefits of a particular course of action, the costs of its decisions, and convey the benefits of restraint and the cost of action.

In other words, having the military, political, technological and economic capacity to influence an adversary's decisions is clearly related to the capacity to deter and to conduct and maintain military action. The U.S. industrial base is critical for that capacity.

DEFINING THE INDUSTRIAL BASE

The industrial base involves not only a nation's manufacturing capacity, but also the supply chain that supports it. The industrial base also includes the infrastructure for production and energy, the capacity to move goods, and the availability and skill of the labor force. *The Complete Guide to Production Capacity* (2024) lists the following elements as making up the industrial base:

- Physical assets: The quality and availability of machinery and equipment;
- Human resources: Skills, experience, and number of operational staff;
- Technological tools: Automation and software that support production;
- Raw materials: Availability and quality of necessary goods;

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Having the military, political, technological and economic capacity to influence an adversary's decisions is clearly related to the capacity to deter and to conduct and maintain military action. The U.S. industrial base is critical for that capacity.

- Operational strategies: Production methodologies like Just-in-Time or Lean manufacturing.[3]

In terms of the capacity of a nation to deter or sustain war, however, other factors are critical as well, such as the ability to surge or sustain production. The ability to shift forms of production is an important factor in winning a war, as American industries successfully did in World War II. The 1991 Gulf War was an exception in this regard, because the conflict was sufficiently short-lived for the existing industrial base to be able to support the deployment of U.S. forces. Still, rapid shifts in weapons and tactics made it important to be able to add armor or sensors to existing systems or quickly develop new weapons.

The industrial base also depends on the critical infrastructure of the nation. Critical infrastructure is a broad term that includes all the elements necessary to produce supplies and weapons, and their distribution. Presidential Policy Directive (PPD) 21 of 2013 defines critical infrastructure as including "distributed networks, organizational structures and operating models… interdependent functions and systems in both the physical space and cyberspace, and governance constructs that involve multi-level authorities, responsibilities, and regulations."

The defense industrial base is part of critical infrastructure and the nation's industrial base. However, it differs in that it is specifically related to the production of weapons and armaments.

FALLING BEHIND

According to a 2024 *Congressional Research Service* (CRS) report, "the U.S. defense industrial base (DIB) is the network of organizations, facilities, and resources that provides the U.S. government—particularly the Department of Defense (DOD)—with defense-related materials, products, and services."[4] Thus, the defense industrial base includes not only the arsenals and production facilities run by the Department of War, but "a wide variety of entities, including commercial firms operated on a for-profit basis, not-for-profit research centers and university laboratories, and government-owned industrial facilities. It provides everything from large, technologically sophisticated weapon systems and highly specialized operational support to general commercial products and routine services."[5]

A February 2025 briefing in *The Economist* noted that the number of U.S. defense industries had numbered 51 in 1993, but over the years defense production had shrunk to just five major firms.[6] However, it is important to keep in mind that not all defense contractors manufacture weapons. For instance, according to *Forecast International,* the fifth largest defense contractor in the U.S. in 2022 was Pfizer, Inc., and the seventh largest was Humana, both of which are in the health care sector.North Korea, meanwhile, has a large force of nuclear-capable ballistic missiles. In 2021, it also announced the development of tactical nuclear weapons.[6] And in 2024, the DPRK "unveiled a purported tactical nuclear warhead and claimed it could be mounted on at least eight delivery systems, including an unmanned underwater vehicle and cruise missiles."[7]

In 2025, there was a shift back toward military equipment-focused companies. The top five defense contractors were companies that are among the traditional defense equipment manufacturers: Lockheed Martin, Northrop Grumman, Raytheon, General Dynamics, and Boeing. However, the sixth and seventh largest contractors—Anduril and Palantir—are companies in the emerging field of Artificial Intelligence (AI).

What is more alarming is that in some areas, the U.S. is becoming dependent on distant allied countries

for critical capabilities that would be threatened if a conflict broke out. South Korea provides a good example. Its shipbuilding capacity now dwarfs that of the United States. On the positive side, in June 2024, Hanwha Ocean Co., a major South Korean conglomerate that manufactures cargo and combat ships, "acquired the Philly Shipyard [in Philadelphia, PA] for $100 million and has contracts to repair U.S. navy vessels."[8]

After winning the Cold War, America seemed to focus on its economic interests, or let U.S. corporations do so, often at the expense of its security interests.

INDUSTRIAL REVOLUTIONS AND THE INDUSTRIAL BASE

The strength of the industrial base shifts with changes in technology, and involves many elements, including infrastructure and innovation. Several scholars suggest that the post-18th century world has experienced three industrial revolutions and we are now in the fourth industrial revolution. Each of these has impacted military capabilities and warfare.[8]

In the 21st century, new domains like space and cyberspace and artificial intelligence are critical to the industrial base, leading to the fourth industrial revolution. At the World Economic Forum in 2016, Klaus Schwab (the Forum's founder, a German mechanical engineer) summed it up this way:

> The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production….a Fourth [industrial revolution] is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance.[9]

As Schwab described it in a subsequent *Foreign Affairs* article, "the Fourth Industrial Revolution is building on the Third and is characterized by a fusion of technologies that is blurring the lines between physical, digital, and biological spheres."[10]

INDUSTRIAL BASE SHORTAGES IN THE U.S.

By the end of World War II, the United States had built what may have been the world's most robust and diversified industrial base. That dominance persisted during the decades of the Cold War, when the U.S. was one of two superpowers and certainly the most powerful nation in terms of global reach and economic dominance. However, after winning the Cold War, America seemed to focus on its economic interests, or let U.S. corporations do so, often at the expense of its security interests. The results are marked.

Shipbuilding. The U.S. lags behind China, South Korea and Japan in shipbuilding. Former Secretary of the Navy Carlos Del Toro expressed an openness to assembling parts of U.S. warships at foreign shipyards to help increase U.S. Navy ship production. South Korean and Japanese investment in the supporting military or civil shipbuilding may be a good idea. But creating a dependence on shipyards that are in close missile, air or naval attack range of China, Russia or North Korea is a dangerous approach. In the event of a conflict, U.S. forces, bases and such shipyards would be among the first targets for an adversary.

Semi-conductors. The U.S. is overly dependent on foreign suppliers for microelectronics and semiconductor chips and lacks secure domestic foundries to meet its needs. This state of affairs represents a critical shortfall, because a stronger defense industrial base requires a stronger national industrial base.

Ports. The U.S. is still heavily dependent on foreign suppliers, especially China, for cranes and other container or material handling infrastructure at ports. According to a report from PAMIR, a risk management

Rebuilding elements of the U.S. industrial base, diversifying supply chains, strengthening and protecting the nation's critical infrastructure and ensuring that military capacity is properly supported by domestic production are strategic imperatives.

firm focused on China, "the primary risk from maintaining a Chinese crane presence in U.S. ports is China's exploitation of data acquired through the monitoring of commercial inputs for a trade advantage."[11]

During normal times, China benefits from trade flows through U.S. ports and probably would not attempt to interfere with port operations. However, in a crisis, there are ways that the PRC could impede or shut down port operations, which would affect military deployments and the U.S. economy.

One PRC data management system, the PRC-supported National Public Information Platform for Transportation and Logistics, or LOGINK, tracks logistics information from PRC and foreign ports and can track data from global logistics databases.[12] LOGINK provides information on global logistics activities, potentially giving China's government and intelligence services an opportunity to influence the global transport system, and that of America. According to a study by the U.S.-China Economic & Security Review Commission, LOGINK could give "PRC logistics firms… a key competitive advantage in a third-party logistics market that could be worth as much as $1 trillion a year."[13]

The steel industry. America's steel industry grew at a fast pace after the Civil War, eventually turning the United States into the world's largest steel producer. However, things changed after World War II. When estimated by the International Monetary Fund in 1964, the operating costs of U.S. steel mills averaged about 15 percent higher than those of steel producers in Japan.[14] By 1972, operating costs in the U.S. were about 40 percent higher than those in Japan. Over time, globalization made it cheaper to import steel than to produce it in the U.S. and pay higher wages to American workers.

Critical minerals. Rare earth elements (REEs), or critical minerals, are essential parts of technologies such as electric vehicle motors, batteries and wind turbines. In the military realm, rare earths are the critical minerals used in the manufacture of missile and aircraft guidance and control systems, advanced optics technologies, radar, sophisticated smart or guided weapons and systems, and telecommunications. Although they are present in many places around the world, in 2022, according to Canadian government estimates, China produced 70 percent of the global supply of these critical minerals, the U.S. produced 14 percent, Australia 6 percent, and a few other countries produced the remaining 10 percent.[15]

Supply chain visibility. The U.S. government must be able to identify the sources of materials for the industrial base. Supply chain visibility in areas such as basic computer chips, microelectronics, pharmaceuticals, and biotechnology cannot be manufactured by a potential adversary, like China.

LOOKING AHEAD

As Secretary of State Marco Rubio recently pointed out, hollowing out the U.S. industrial base because it was cheaper to manufacture elsewhere was not the best approach. We "cannot be completely dependent on other nations for the goods needed for national security and prosperity."[16]

Rebuilding elements of the U.S. industrial base, diversifying supply chains, strengthening and protecting the nation's critical infrastructure and ensuring that military capacity is properly supported by domestic production are strategic imperatives. Notably, the Trump administration has opened an Office of Industrial Base Growth in the Pentagon, which is designed to build manufacturing



capacity.[17] But an office alone is insufficient to oversee the necessary effort. Tough decisions must be made on parts of the critical infrastructure and military capacity. And the effort must be supported by Congress as well as understood and supported by the American people. That will take bipartisan cooperation in Congress and with the executive branch.

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Reforming How America Buys Weapons

Robert Swope

Since the start of President Trump's second administration, the Department of War (DoW) has engaged in a meaningful transformation of its acquisition system and the way it procures the capabilities warfighters need. This change is driven by a clear realization: whichever side can produce the most material and out innovate the enemy will have the advantage in a military conflict.

To that end, in November 2025, Secretary Pete Hegseth directed the DoW's newly renamed Warfighting Acquisition System (until then the "Defense Acquisition System") to start operating on a wartime footing with the speed at which capabilities are delivered as the organizing principal. The DoW's reforms, encapsulated in its Acquisition Transformation Strategy, are meant to accelerate the fielding of new and existing capabilities to modernize and increase the readiness of America's military forces, while simultaneously strengthening the ability of the defense industrial base (DIB) to more quickly develop new technologies and manufacture what the military needs at scale.

STRENGTH IN NUMBERS

One of the key tactics the DoW is betting on is expanding the number of defense industry participants. By spurring the creation of new companies and incentivizing existing commercial firms to pursue defense business lines, the DoW believes not only will the size and resiliency of the DIB increase, but innovation and delivery times will improve as firms compete among each other for government contracts.

Rebuilding the DIB is a particularly difficult challenge for the Pentagon, since much of the supply chain for military hardware, from critical minerals to drone motors, semiconductor chips, and even explosive materials, relies on overseas suppliers that can be disrupted or severed once a war begins. Having a domestic industrial base like the United States does now—one that is unable to speedily produce the munitions, drones, ships, or other items servicemembers need—means that, in an extended fight against a serious adversary, our military risks being susceptible to attrition and less likely to achieve strategic victory.

Over the last 21 months, there has been a significant increase in the number of new companies, both existing commercial firms and defense-focused startups, seeking to do business with the DoW, though the trend began in the mid-2010s around the start of President Trump's first administration. This influx has created debate among defense professionals about the relative worth and capabilities of traditional prime contractors versus the new generation of smaller, venture capital-backed companies who claim to be faster, cheaper, and more innovative.

Both sides have a point.

America's defense industry needs its new entrants, whose pioneering products rely more on dual-use commercial technology and are often developed with private capital. These firms tend to engage in greater risk taking and have faster iteration times due to the need to compete in the private sector.

But, in equal measure, the defense industry needs the traditional defense primes, some of which have been doing business with the government for over a century and are experts in meeting military requirements, especially on large and complicated programs.

Each side must learn to complement one another and capitalize on what it does best in support of America's national security. Within the DIB, there exists enough need, and space, for both groups, and some are already showing how they can work together to rapidly move new technology into the defense enterprise.

For instance, last year RTX and Shield AI began

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> **Whichever side can produce the most material and out innovate the enemy will have the advantage in a military conflict.**

a partnership to integrate Shield AI's Hivemind autonomy software into RTX's munitions and sensors. Starting in 2024, Palantir led the industry team for the Army's Tactical Intelligence Targeting Access Node, or TITAN, program, while L3Harris handled integration, providing datalinks, satellite access, and other communications capabilities. Lockheed Martin and Anduril have also teamed up to test Anduril's Lattice command-and-control (C2) software on Lockheed radar systems during a U.S. Central Command exercise.

MODULARITY IS THE FUTURE

One area where collaboration can be especially valuable is in creating more open, modular systems that allow new technologies that leverage advances in the commercial sector to be inserted into existing platforms. Moving forward, the Pentagon should increasingly require military programs to use platform architectures (such as air frames, ship hulls, and vehicle chassis) which permit different companies to compete in providing software, sensors, communications systems, autonomy packages, and other subcomponents over the life of a weapon system.

Doing so would make it easier for new entrants to contribute their cutting-edge technology while allowing traditional primes to remain responsible for large-scale manufacturing and sustaining these complex platforms in addition to integration tasks. It would also reduce the risk of "vendor lock" and the government being forced to rely on a single contractor for decades simply because they built the original platform and its subcomponents.

Competition should also not end when a program enters production. If interfaces are clearly defined and technical standards open and accessible, the Pentagon can continue introducing better technology as it emerges, creating incentives for both primes and new firms to improve their products and lower costs.

Many existing hardware systems in the U.S. inventory made by traditional primes can benefit from the innovation speed at which new entrants to the defense tech space move. This is especially so for systems that leverage technological advances in software and dual-use commercial technologies derived from the private sector, for which there is significantly more research and development funding and a much larger industrial base to spur innovation.

While the basic architecture of military platforms and other hardware may not need to evolve rapidly, the C2 and communications software, processing power, sensors, and other subcomponents these systems use must constantly be updated if military forces are to out compete any adversary.

By leveraging the ability of relatively new defense industry firms which take advantage of commercial technology to more rapidly sense the environment, fuse information, process data, and provide better C2 for existing platforms, the traditional primes can increase the capabilities and value their platforms provide to military customers in a way primes could not otherwise generate internally.

THE BENEFITS OF PARTNERSHIP

One of the major differentiations between the defense primes and new entrants is the former has ability to manage and integrate enormous, technologically complex programs that involve thousands of suppliers, and which have stringent testing requirements and quality controls. These same firms are also able to simultaneously sustain large programs with maintenance services, while adhering to Congressionally mandated and extraordinarily detailed cost accounting systems for weapons costing billions of dollars and which may remain in service for decades.

Additionally, primes often have significantly more manufacturing capability and access to larger, trained work forces and 2nd and 3rd tier suppliers, which allows them to scale more easily, something smaller firms

are unable to do without an infusion of cash from their investors (unlikely absent a production contract) or the government.

Established defense firms also have cash flow and operating capital that many non-traditional defense contractors lack, and deep connections and influence both in Congress and the Pentagon that are essential to succeeding in the defense market.

Having a domestic industrial base like the United States does now—one that is unable to speedily produce the munitions, drones, ships, or other items servicemembers need—means that, in an extended fight against a serious adversary, our military risks being susceptible to attrition and less likely to achieve strategic victory.

By partnering with a large firm, new defense entrants can leverage all the above to alleviate some of the government's concerns related to meeting cost, schedule, and performance, while benefiting from the decades of experience primes have in navigating the Pentagon's convoluted acquisition system.

A teaming agreement can also provide non-traditionals a direct path to working on Programs of Record and access to major defense platforms, something that may take such new entrants operating on their own years to achieve.

The value derived from increased connectivity and credibility with government customers, development of internal company expertise related to sequestered military hardware, the creation of a performance record, and introductions to potentially international customers, are additional reasons why new defense entrants should consider pursuing working with primes.

POLICY PRIORITIES

To build on the great work it has already done to strengthen the DIB (which has the added benefit of reshoring jobs domestically), the DoW should continue expanding the industrial base by creating more incentives for existing and potentially new firms to get involved in building military equipment.

The Pentagon must move even faster to implement its Acquisition Transformation Strategy, with particular emphasis on accelerating commercial preference (i.e., looking first to procure products that exist in the commercial marketplace and can be adapted to meet military needs as opposed to paying for a time consuming and one-off military-only solution), increasing incentives for private capital investment into the defense industrial base, and reforming bid protests, which slow almost every procurement effort down and make leveraging technological advances more difficult.

Acquisition reform must also address how the Pentagon buys successful prototypes once they demonstrate military value. Too often, companies receive relatively small development contracts, perform well in exercises or demonstrations, and then wait years for the funding and acquisition authorities necessary to enter production. This is the infamous "Valley of Death," and it is particularly damaging to firms backed by private capital because investors cannot indefinitely provide financing while waiting for government demand to materialize in the form of a production contract.

Most of all, the Pentagon should work on stabilizing demand signals, which means getting bigger and longer-term contracts out the door quicker while securing stable funding commitments from Congress.

Acquisition leaders within the Office of the Secretary of War and the military services also need to make decisions quicker and assume more risk, which is exactly what they are telling industry to do. It's not enough to make announcements about what the DoW intends or chastise industry by telling them in the Pentagon's opinion they should start expending more of their capital on internal research and development or manufacturing facility expansion.

Saying "if you build it, they will come" may work in baseball movies from the 1990s. But as a rule, it won't fly in the private sector. While many firms are willing to expend capital on developing and prototyping new technologies and may even be willing to set up small assembly lines, most cannot or will not go beyond that due to the risk involved and capital required.

Exceptions exist like Anduril's new Arsenal-1 Hyperscale Manufacturing Facility in Ohio, but most firms, when comes to spending the money needed to build new facilities to scale their products, are going to be unwilling or unable to do so solely based on the possibility that the government may someday issue them a procurement contract.

Corporate executives are responsible to their owners, shareholders, and workforces, and must ultimately do what is needed for their businesses to survive. And as everyone who has ever worked in government managing procurement contracts or been responsible for business development in the private sector knows, when it comes to DoW contracting, "the truth changes."

What a government procurement official promises you one day may change next week. Nothing is official without a signed contract, and even then, the government can terminate for convenience whenever it chooses. Such turbulence sends negative signals to industry which becomes less likely to want to do business with the DoW.

Most of all, if the Department of War wants to continue strengthening the DIB while having the most ready and modern military force possible, it needs to increase the rate at which it is signing contracts and spending money. Doing so is the ultimate demand signal.

What to Do If Navy Shipbuilding Cannot Deliver

Brent D. Sadler

In May, the U.S. Navy released its shipbuilding plan, giving further insight into the President's Golden Fleet, an ambitious effort first announced in December 2025 to revive the nation's shipbuilding and naval fleet. Yet, for years, naval shipbuilding has been beset with delays, cost-overruns, labor shortages, and supply chain disruptions.[1] Given this industrial reality, can the nation keep in check a China racing toward a showdown with the U.S. as soon as 2027 over the fate of Taiwan? Can the other military services pick up the slack?

WHEN A HEDGE STRATEGY FAILS

Bolstering deterrence in the near-term (through 2030) requires unleashing new operational thinking and deploying creative uses of unmanned platforms—an approach that Chief of Naval Operations Admiral Daryl Caudle has called a "hedge strategy."[2] The goal is to buy time for the nation's shipbuilding industry to overcome decades of underinvestment and begin commissioning warships of the classes and in the numbers needed. The maritime revival, directed by President Donald Trump and supported in Congress with legislation like the *SHIPS for America Act*, is a generational endeavor that requires time—something the Chinese Communist Party will not grant to our nation.

The assumption behind the hedge strategy is that armed unmanned ships can be built more quickly and join the fleet before the end of this decade. That said, the numbers of these platforms, if armed with long-range strike and advanced defensive munitions, will not make up for firepower at sea that is lost as the last of the Navy's cruisers and guided missile submarines are decommissioned.[3] Even if enough unmanned ships could be built before this time, it remains an open question if munitions production can meet the demand, further complicating the race for deterrence. This uncomfortable reality has been laid bare by the expenditure of munitions in the current conflict with Iran.[4]

As of November 2026, the Navy stands at 286 warships (above the previous plan's anticipated 2027 low of 280 warships).[5] However, even the current, aggressive Navy shipbuilding plan only delivers modest growth, as warships reach the end of their useful lives faster than can be replaced.[6] At best, by the end of this decade, when the threat from China is greatest, the fleet would number 299 warships and 83 armed medium unmanned vessels.[7] That said, there are key classes of warships not being prioritized in this plan that would prove critical for victory in a war with China.

THE NAVY'S ACHILLES' HEEL

The current Golden Fleet shipbuilding plan contains several long-overdue orders: battleships, submarine tenders, and logistic ships. The battleship would defend carrier strike groups and provide long-range, responsive strike capacity using hypersonic ballistic missiles, replacing the *Ticonderoga*-class cruiser and building on lessons learned from employing hypersonic missile systems on the *Zumwalt*-class destroyer. Submarine tenders and logistics ship orders are finally getting the emphasis they need, but the numbers still fall short: the Navy requires an inventory of 99 logistics ships, but currently has only 77.[8] The deficit was evident in the September 2024 grounding of the *USNS Big Horn* that disrupted carrier strike operations against the Houthis, who were attacking Red Sea shipping.[9]

Beijing has taken note of this vulnerability, making America's logistic ships a likely target in

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any future conflict.[10] A brittle logistics fleet provides the PRC with a tantalizing target that could unravel American military operations, escalating the need for the prioritization of several other classes of ships which are absent in the current shipbuilding plan. At the top of the list are heavy-lift ships, which are vital in securing and transporting heavily-damaged warships to port for repair and return to the fight—a vulnerability made evident after the near loss of the destroyer *USS Cole* as a result of a terrorist attack in October 2000.[11]

Equally crucial is the development of modern destroyer tenders that can re-arm at-sea warships, which must remain within weapons range of the enemy.[12] Finally, the growing use of unmanned platforms, which depend on secure communications, in wider military operations has elevated the importance of modern command ships. Today, there are two antiquated command ships in service, but they will need to be replaced before 2031, when they begin to be decommissioned.

The maritime revival, directed by President Donald Trump and supported in Congress with legislation like the SHIPS for America Act, is a generational endeavor that requires time—something the Chinese Communist Party will not grant to our nation.

WHAT IS THE BACKUP PLAN?

By all accounts, the People's Liberation Army is on track militarily to be ready for war by 2027, as directed by the Chinese Communist Party's General Secretary, Xi Jinping. This leaves too little time for a naval build-up, even with massive adoption of unmanned platforms. This, in turn, necessitates a back-up plan that includes new ways of operating and employing the U.S. military, including the deployment of land forces armed with long-range munitions in the first island chain (stretching from Japan through Taiwan, the Philippines, Malaysia, and ending in Indonesia). It may also mean diverting limited resources long needed for shipbuilding to other military services, such as the Air Force.

Today, U.S. Marine Corps littoral regiments and Army multi-domain task forces are deploying to Japan and the Philippines with newly developed long-range weapon systems, like Dark Eagle hypersonic missiles with a range of 1,725 miles. These forces and weapons have only been possible because of the 2019 abrogation of the Intermediate-range Nuclear Forces Treaty with Russia.[13] But given that this is only a recent development, the Marine Corps and Army currently have limited capacity to affect Beijing's strategic calculus. The Air Force's bomber force could likewise affect that calculus, but here too that capacity is constrained: the tyranny of distance requires robust aerial refueling capacity operating from forward airbases, which are themselves vulnerable to Chinese missile strikes. This leaves changing the method of warfare—the concept of operations—as the next way to mitigate slow shipbuilding.

The driver of the military concept of operations has been the threat of Chinese ballistic missiles, as well as the advent of networked warfare enabled by satellite communications and advanced processing (i.e., artificial intelligence). As such, the U.S. military has sought to disperse forces to limit the danger from saturation missile strikes—a concept introduced in 2015 as "distributed lethality." However, this strategy requires robust logistics and secure communications to enable the needed level of force coordination, both of which can no longer be assumed in modern major war.

This reality of too few warships and munitions will force a new concept of operations onto the U.S. military. In the meantime, should war come this decade, a campaign of delay not unlike the one executed by U.S. submarine forces following the Japanese attack on Pearl Harbor seems the most likely course of action. This makes prolonged war likely, lasting several years and devolving into a competition of industrial military might. This risk makes today's revival of American shipbuilding vital for sustaining a wartime economy and combat operations.

Missing from the current shipbuilding plan is a long-term investment strategy with the specificity to ensure ship orders at shipyards lead to needed capacity expansion.

PREPARING FOR A STRATEGY OF EXHAUSTION

Deterring China's leaders from waging a war this decade will require instilling uncertainty that they would prevail in such a contest. This was the central framing of the book *Naval Power in Action*, which stipulates that deterring China in the near-term requires positioning forces in a way that complicates Chinese war plans, strengthening supply chains and sowing uncertainty of Beijing's ability to maintain control over events.[14] Given today's military and industrial limitations, a backup plan is required. This, however, only buys added time for the revival of the nation's maritime industry and naval shipbuilding. Adequate shipbuilding remains key to building and maintaining the Navy needed to sustain deterrence and secure American sovereignty well into the future. To this end, the United States should:

Accelerate shipbuilding partnerships with treaty allies like Japan and South Korea. This is already underway, and urgent action has been directed in the President's August 13, 2026 memo on "Rebuilding the United States Navy and America's Shipbuilding Industrial Base." The guiding framework is the so-called "Finland Model": seeking shipbuilding investment domestically with allies while near-term ship orders are built overseas. Done right, this will grow shipbuilding capacity in the U.S. while meeting today's urgent need for ships.

Increase the frequency and duration of Army and Marine Corps deployments to first island chain nations. Congress will need to increase exercise and deployment budgets, as well as the procurement of land-based long-range strike and air and missile defense weapons. At the same time, the Secretary of State and Secretary of War should coordinate efforts to improve host nation support, access to domestic logistics, and the provision of needed shipping to sustain deployed American forces.

Fully fund a dynamic and expanded basing network in the Central Pacific. The Air Force is planning to grow its bomber fleet to well over 100 next generation B-21 Raider aircraft, with further increases possible to offset firepower gaps from the Navy.[15] However, this increased reliance on air power must contend with the tyranny of distance in the Pacific, which will drive the need for more forward airfields. Those airfields would need to be beyond Chinese intermediate ballistic missile range in the Central Pacific, and incorporate improved runways for heavy military aircraft, fuel storage, maintenance support, and ammunition storage—all accessible to shipping for resupply.

Develop and practice new joint military concepts of operations. Current approaches to warfighting rely on a military force that has not been available for several years, as chronicled in the annual *Index of Military Strength.*[16] As such, the Secretary of War should direct a comprehensive review of existing concepts of operations, and assess how to best use limited military assets and inventories of munitions to greatest effect in a war with China. This should be completed in time to inform the next *National Defense Authorization Act.*

The nation needs a shipbuilding industrial plan. Missing from the current shipbuilding plan is a long-term investment strategy with the specificity to ensure ship orders at shipyards lead to needed capacity expansion. Additionally, there is no overarching shipbuilding plan or interagency body specified to execute the shipbuilding of the various federal agencies in a coherent way.

NO TIME LIKE THE PRESENT

China is rapidly approaching the culmination of a decades-long national effort to field a military that it is confident would win a war over the fate of Taiwan against the U.S. and its allies. Sadly, the needed investments to meet this rapidly modernizing and growing military threat have been too late in coming, leaving fewer options to continue deterring and, if needed, defeating China in conflict. The reality of the nation's maritime

industrial base necessitates a near-term plan to mitigate shipbuilding delays while sustaining generational strategic industrial investments, all while deterring or delaying China from initiating war.

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NATO's Path to Rearmament

Andrew A. Michta

The United States and its NATO allies are racing to restore their defense industrial base, which has shrunk over three post-Cold War decades amid cycles of consolidation, declining government orders, and the "just-in-time deliveries" philosophy. At a time when Russia has increasingly mobilized its industrial base for wartime production,[1] and China is arming at speed and scale, the central issue is how to transform the combined defense-industrial capacity of the United States and its allies into an integrated strategic asset that can support deterrence, large-scale combat operations, and prolonged war across multiple theaters. Most importantly, the challenge is to do it fast enough to get ahead of the adversaries' curve. Since the Cold War, the United States and its allies in Europe have seen their once-formidable defense industrial base undergo across-the-board reductions, while their militaries have been restructured for out-of-area operations, away from state-on-state conflict against a near-peer competitor.

The era when the United States could count on sequencing military conflicts is over, as the threat grows that major large-scale combat operations (LSCO) will have to be executed in multiple theaters simultaneously. This "crisis of simultaneity" means that the allied defense industrial base will be called upon to supply the United States and partner forces across more than one of the four critical regional theaters: Europe, the Middle East, the Indo-Pacific, and the Korean Peninsula, at a time when the U.S. armed forces are no longer configured to fight in two major theaters simultaneously. Moreover, post-Cold War reductions and consolidation have reduced the number of American prime defense and space contractors—from fifty-one in 1991 to only five today, with attendant stresses on capacity, delivery timelines, and cost.[2]

The rearmament imperative is further complicated by the rapidly evolving nature of cross-domain operations and tactics. The existing defense contracting model, in which the Pentagon buys highly capable but costly platforms and ammunition in limited numbers, must adapt to the modern battlefield, where plentiful, inexpensive, attritable mass can overwhelm precision. To keep pace with the rapid proliferation of UAVs on the near-transparent battlefield, the U.S. military has turned in part to the commercial sector as it shifts from scarcity to cost-effective mass.

At the alliance level, this requires moving beyond traditional defense-industrial cooperation across NATO—joint development programs, licensed production, and foreign military sales—toward a genuinely distributed industrial system that incorporates allied dual-use production capacity into operational planning, force generation, logistics, and wartime replenishment. The key challenge is not simply how much allied industry can produce. It is how much of that production can be made available, at the required speed, in the required quantities, and under the political and operational conditions of a major war, at a time when decades of deindustrialization and offshoring have left the United States with significantly reduced manufacturing capacity overall.[3]

THE RESOURCES AT HAND

Despite the relative decline of manufacturing in the United States and Europe, NATO countries still maintain a considerable R&D base and production capacity. Going forward, NATO should treat its members' commercial dual-use manufacturing capacity as an integral component of collective defense planning—not merely as a source of technologies that U.S. and European de-

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fense contractors might eventually acquire.

To do so, NATO needs to expand its focus on technological and manufacturing depth, industrial scalability, and operational availability for modern platforms and munitions. The allies should conduct a comprehensive assessment of their ability to develop and manufacture critical technologies, including semiconductors, advanced electronics, robotics, aerospace components, and precision machinery. A separate line of effort should focus on AI-enabled systems across the board. Industrial scalability requires the ability to rapidly expand production by building new plants and converting civilian facilities to sustain output during prolonged conflict. Finally, this approach must ensure that production can be reliably delivered to NATO forces during a crisis, accounting for geography, national restrictions, and, most of all, vulnerable logistics.

In such a distributed system, the United States must serve as the indispensable industrial and technology leader, providing the Alliance with the broadest combination of advanced research, aerospace manufacturing, and systems integration.

In such a distributed system, the United States must serve as the indispensable industrial and technology leader, providing the Alliance with the broadest combination of advanced research, aerospace manufacturing, and systems integration. America's contribution must go beyond its existing defense-industrial base; it must integrate commercial dual-use technological innovation into military systems. America must continue to lead in advanced technologies and complex platform integration while focusing on global military supply-chain coordination to avoid situations like the current scarcity of PAC-3 interceptors resulting from the Iran conflict.

In continental Europe, Germany has arguably the greatest potential to integrate its sophisticated manufacturing base into NATO's new distributed defense manufacturing model. The country's comparative strengths include machine tools, industrial automation, automotive manufacturing, precision engineering, chemicals, and heavy machinery. Although most discussion of European rearmament has focused on expanding the capacity of Europe's defense contractors, the civilian sector offers transformative potential, especially in speed and scale. Germany's civilian capabilities extend well beyond its traditional defense companies. For example, the German automotive supply chain has extensive expertise in sensors, robotics, and automated assembly, although China has made significant inroads in those areas in recent years.[4] Expanding Germany's manufacturing infrastructure for defense production should be the first priority, including components, automated production lines, and military vehicles. The same applies to civilian companies across European NATO. Here, allied governments should work to streamline the process, as conversion requires certification and sustained government demand. Civilian manufacturing capacity cannot be automatically converted into military output without guaranteed long-term contracts that attract additional capital investment.

France, the world's second-largest arms exporter;[5] the United Kingdom, which still commands a strong, albeit depleted, defense industrial base;[6] as well as Italy[7] and Poland[8] are also well positioned to play key roles in building the distributed allied production system. France has one of Europe's most comprehensive defense-industrial ecosystems, supported by strong aerospace, nuclear, and electronics sectors. Its advantage is combining civilian technological capability with established military systems integration. French industry can contribute to aerospace, electronic warfare, missiles, and space systems. France's challenge will be not only production scaling, which is a problem for all NATO allies, but, most of all, the tension between its traditional insistence on national industrial autonomy and the multinational standardization required to establish and expand the Allied distributed manufacturing system.

> **The key challenge is not simply how much allied industry can produce. It is how much of that production can be made available, at the required speed, in the required quantities, and under the political and operational conditions of a major war.**

The United Kingdom's traditional strengths lie in aerospace, electronics, and propulsion systems. Its civilian technology and research sectors can contribute significantly to NATO's next generation of unmanned systems and software-defined capabilities, particularly in integrating advanced technologies. The principal current limitation for London is a need to expand the country's industrial scale and supply-chain depth in manufacturing sectors that have atrophied over the past three decades.

Italy is important because of its substantial machinery, automotive, and industrial manufacturing sectors. It has both established defense manufacturers and a broad network of specialized industrial suppliers. These firms can provide precision components, unmanned systems, and naval equipment.[9] Italy's particular contribution to the distributed manufacturing system should lie in precision manufacturing and adaptable supplier networks, assuming Rome can overcome its perennial fragmentation among suppliers and the need to coordinate capacity expansion through long-term procurement, which must address the administrative limitations of Italy's defense acquisition process—an issue facing most of the European NATO members.

Poland has a distinct comparative advantage. Its importance rests on its geographic position, growing defense investments, an expanding manufacturing base, and its potential role as a production and sustainment hub for NATO's eastern flank. Poland is a promising contributor to developing distributed dual-use capacity.[10] It can be especially important in ammunition production, military vehicle manufacturing, repair, and battlefield logistics. The strategic opportunity is to connect Polish civilian manufacturing capabilities with the established defense-industrial ecosystems of Germany, France, the United Kingdom, and the United States. Leveraging defense contracts with South Korea and Scandinavian countries, Poland's success in transforming its economy over the past three decades leaves it well-positioned for production expansion, repair and sustainment, and unmanned systems manufacturing. Warsaw's greatest vulnerability is its continued dependence on imported technologies and critical components, combined with the risk to its forward industrial infrastructure during conflict, as Poland is the key hub on NATO's eastern flank and Russia would likely target it in a war. Other NATO allies are also well positioned to help expand dual-use production capacity across the alliance, with the Netherlands, Finland, Sweden, Spain, and Turkey providing a range of capabilities. Finally, Canada brings its aerospace sector,[11] critical minerals,[12] and, most of all, North America's industrial depth and overall security perimeter.

INNOVATE TO SUCCEED

Developing a distributed industrial system requires a new institutional framework. NATO already has the foundations for such a framework, as several NATO initiatives have laid the groundwork for integrating commercial industrial capacity into collective defense planning. The NATO Industrial Capacity Expansion Pledge, agreed to in Washington back in 2024, commits allies to strengthening defense production, improving demand signals, removing barriers, and protecting critical supply chains.[13] The Updated Defense Production Action Plan, approved in 2025, focuses on aggregated demand, industrial bottlenecks, interoperability, and supply-chain resil-



ience.[14] The 2026 NATO Innovation Scale-Up Package is particularly relevant, as its new NATO Engine initiative aims to connect emerging defense suppliers with manufacturing capacity, including civilian factories, to scale up technologies that meet allied requirements.[15] Finally, the July 2026 Strategy for Industry–NATO Cooperation explicitly supports scalable production, industrial surge exercises, tapping nontraditional suppliers, and prioritizing coproduction.[16] It also recognizes that industrial policy remains a national responsibility. In short, the institutional foundations are in place. The question is whether NATO can translate them into meaningful production commitments.

To move forward, the allies should establish a NATO dual-use industrial capacity map. It should identify critical commercial manufacturing facilities, technologies, supply chains, and production bottlenecks across allied countries. The map should link industrial capacity to NATO's defense planning process to assess not only which military capabilities allies are expected to provide, but also whether they possess the industrial capacity to replenish and sustain those capabilities during prolonged operations.[17]

The next step should be to establish pre-qualified industrial conversion networks. Here, NATO could help participating governments identify civilian manufacturers that can rapidly shift to selected defense-related production, with national authorities providing the necessary contracts and permissions. Creating regional industrial sustainment networks should be a top priority. For European defense, a potential arrangement could link Germany's manufacturing depth, Poland's forward production and sustainment capacity, Czech and Slovak industrial suppliers, and Nordic expertise in sensors, munitions, and advanced materials. Such a network could support NATO's regional defense plans while preserving geographic manufacturing redundancy.

Finally, the Alliance should test the system through industrial mobilization exercises. NATO's planned industry-focused tabletop exercises should assess whether allied production networks can sustain a prolonged high-intensity conflict, including disruptions to energy, transport, critical materials, and communications.

LOOKING AHEAD

Today, technologies developed or used in the commercial economy must also support military capabilities, defense production, and wartime operations. A semiconductor designed for commercial electronics may also be used in military communications, radar, or missile guidance systems. Similarly, commercial drones, artificial intelligence, robotics, and satellite communications have important military applications. Innovative platforms developed in the civilian sector can be quickly adapted for military use to address the specific needs of the evolving battlefield. This approach is even more important because much of today's defense technology lies outside the traditional defense industrial base and can be produced more efficiently in the commercial sector.

Dual-use technology production capacity should be a central pillar of NATO's defense-industrial strategy, not a secondary consideration. In several critical areas, sustaining military operations will depend less on traditional defense contractors and more on commercial industries that produce technologies, components, and materials essential to modern warfare. The strategic challenge is to convert the technological sophistication, manufacturing scale, and innovative capacity of Allied civilian economies into usable military capabilities—rapidly, at scale, and under wartime conditions. This is the key requirement for the United States and its allies, as much of the industrial and technological capacity relevant to future warfare lies outside the traditional defense-industrial base.

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An Alliance Apporach to the Munitions Industrial Base

William Schneider, Jr.

The U.S. and its World War II allies sought to build on their hard-won wartime experience by creating a structure of alliances that would underpin and sustain the collective security of Europe and East Asia. The NATO alliance and a series of bilateral American alliances in East Asia and the Western Pacific created a formidable political-military structure. This structure has successfully contained and deterred threats from an increasingly integrated set of adversaries during and after the Cold War.

The "plumbing" of the alliance is its highly organized logistics, standardization, and defense industrial infrastructure, which supports the sustainment and modernization of its military capabilities in peace and war. But it begs the question: If U.S. and allied logistics and industry are so good, why is it that the alliance has been unable to sustain its commitment to supply munitions to Ukraine —a key diplomatic commitment? And what can be done to enable the alliance to meet its munitions needs for this and future crises?

BUILD-UP TO CRISIS

The security of the United States and that of its European allies is based on a set of bilateral and multilateral alliances built around shared interests and values, diplomatic alignment, and a rigorous political-military approach to deter or defeat of adversary threats. Simultaneously, a similar structure has evolved in the Asia-Pacific through collaboration between the U.S. and its bilateral alliance partners there.

From the outset (1949), NATO was built around a shared commitment to provide ready forces to meet Alliance force goals—an "output" metric for the readiness of the bloc to deter the growing menace of Soviet military power in Europe. These commitments were institutionalized in the "Lisbon Goals."[1] Following China's defeat of the Republic of China in 1949 and the PRC's subsequent invasion of the Korean Peninsula in October 1950, the U.S. negotiated a series of bilateral mutual security agreements with East Asian allies.

Over time, the commitment to develop and field ready forces at the scale proposed in the Lisbon Goals was reduced to reflect post-war economic, financial, and demographic realities in Europe. The U.S. policy of "containment" of Soviet military power in Europe was promulgated by the Truman administration in 1950 via NSC-68, but was reversed in 1982 by President Ronald Reagan. The Reagan administration's policy was to eliminate Soviet military power and authority in Europe by diplomatic maneuver and a change in the deployment of U.S. military power in Europe. To that end, the United States deployed modern nuclear armed ballistic (*Pershing II*) and ground-launched cruise missiles (*Gryphon*) in Europe to deter Soviet threats.

The most decisive change, however, was produced by the Reagan administration's decision to adopt the *Assault Breaker* initiative to defeat the core of Soviet military power in Europe—its ability to move its vast reserve forces from military districts in the western regions of the Soviet Union to reinforce the Group of Soviet Forces stationed on the border between East and West Germany. The *Assault Breaker* initiative incorporated advanced conventional military technology, including stealth aircraft, airborne ground surveillance radars, and long-range precision munitions to interdict the movement of Soviet forces into Europe.

Soviet military power and authority swiftly decayed. By 1989, Soviet military power had collapsed in Europe, and the USSR ceased to exist two years later. Thereafter, the short-lived Russian effort to establish a democratic

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society quickly evaporated when President Vladimir Putin ascended to power in 1999. Putin recreated a Russian autocracy using the same (albeit renamed) institutions of Soviet-era repression, and restored a single-minded obsession with military power. Ominously for peace in Europe, the Putin regime also revived its "historic Russia" campaign to legitimize the seizure territory throughout Eastern and Central Europe.[2] Ukraine was the first step.

Although the manufacturing process to produce the final product is complex and capital intensive, the underlying source of the difficulty in ramping up production is the thin supply chain relative to DoD needs.

The revival of the military dimension of Russia's territorial ambitions emerged in 2014 when Russia used out-of-uniform military forces, intelligence personnel and mercenaries (later known as the Wagner group) to seize the southern Ukrainian territory of Crimea. Russia's non-compliance with the 1987 INF Treaty was acknowledged by the Obama administration in 2013 after Moscow deployed its ground-launched 9M729/SSC-8 cruise missile with a range of 500-5,500-km—thereby sustaining the Kremlin's unbroken record of non-compliance with arms control agreements.[3]

The NATO Wales Summit in 2014 recognized the emerging challenge of renewed Russian territorial and nuclear weapon ambitions by establishing a goal of increasing defense spending to 2 percent of GDP among Alliance members.[4] This commitment was an "input" metric, as compared to the 1952 commitment to a specific number of ready forces—and as such offered little insight into the readiness and sustainability of NATO forces, since the content of the 2 percent investment was never defined.

European (and U.S.) reticence to initiate measures to improve force readiness—including increased munitions production—was institutionalized with the 2014 and 2015 Minsk Agreements, establishing a ceasefire in Ukraine and other measures. The agreements were never implemented, but Russia's preparations for its February 2022 invasion of Ukraine began.

A MUNITIONS LAG

There are two dimensions to the problem of U.S. and allied inability to meet their shared need for a responsive munitions development, production, and support infrastructure. One is structural—the way in which the United States and allied nations develop, manufacture, and procure modern munitions. The other is institutional: the practices of the DoD, the Congress, and associated legislative processes that affect the allocation of resources to the development, acquisition, and stockpiling of reserve stocks of munitions.

Structural Issues

The collapse of Soviet military power in Europe in 1989, and the subsequent implosion of the Soviet State in 1991, led to a transatlantic burst of optimism about enduring peace in the entire region. At the same time, widespread belief that China's preoccupation with its economic development was reinforced by the PRC's admission to the World Trade Organization in 2001 after 15 years of negotiation. China's admission was conditional on its adherence to global international trade norms, but its accession sustained a brief period of optimism regarding the feasibility of a prolonged period of peace in the Asia-Pacific as well.

China, of course, never complied with the terms of its accession to the WTO. Nor did Russia's path to modernization evolve on democratic terms. Thus, pervasive post-Cold War optimism offered little insight into the adversarial four-nation Eurasian coalition that would emerge coincident with Russia's invasion of Ukraine a few years later.

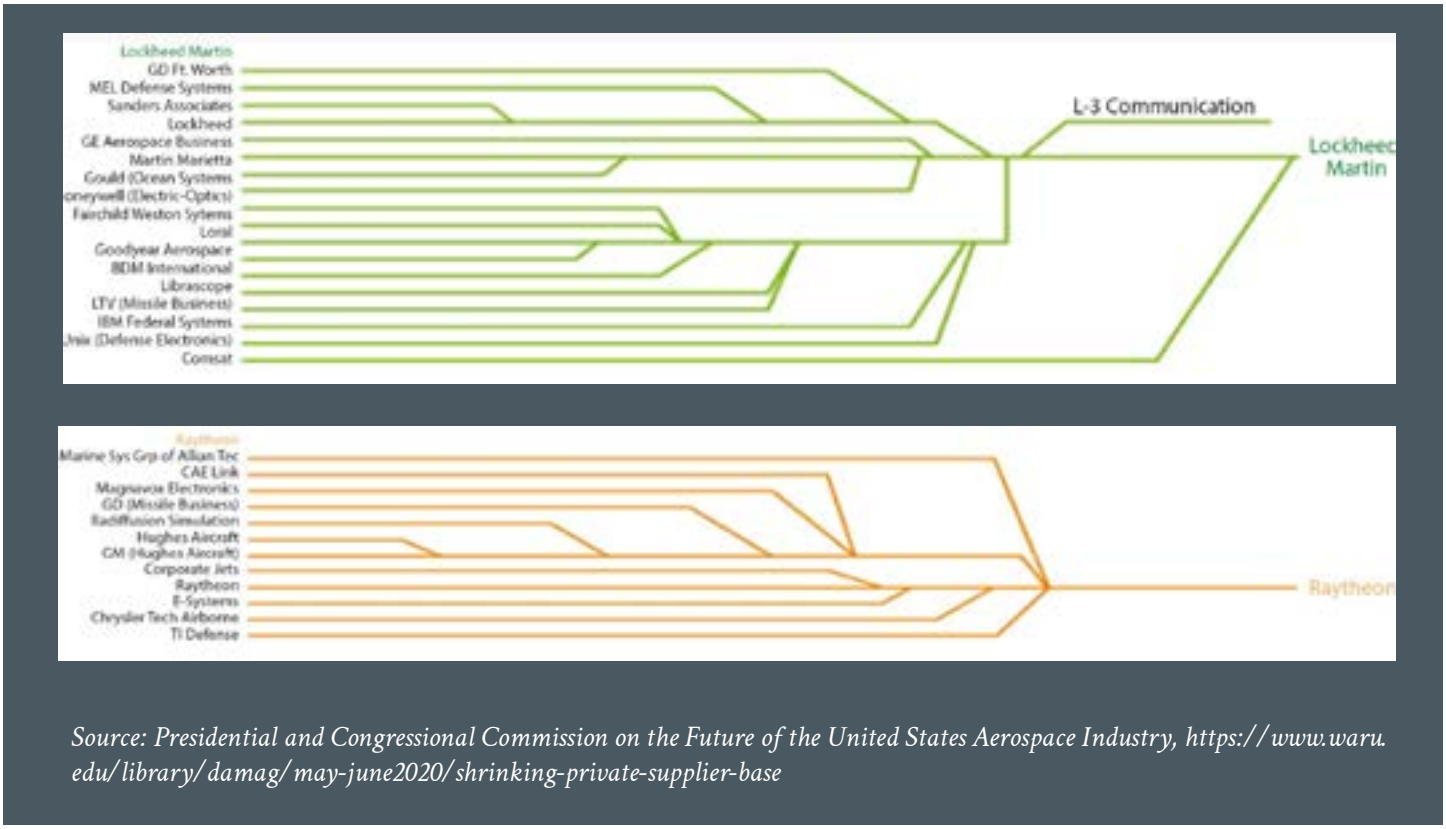
Nevertheless, America's response to this optimism created the conditions we now face in munitions production. The U.S. did not simply slow down orders and production in the defense industry. In 1993, the industry was restructured and substantially downsized in expectation of the diminished defense needs in a time of prolonged peace.

The restructuring process can be illustrated in the case of two of the leading firms who are among the major producers of advanced munitions, Lockheed Martin and Raytheon/RTX. These two firms produce several types of the advanced air and missile defense munitions. They are also among the surviving prime contractors in the wake of the restructuring of the U.S. defense industry.

These two firms produce several of the most important—and costly—air and missile defense systems in the inventory of both U.S. forces and our European and East Asian allies. The restructuring encouraged and enabled the consolidation of firms within the industry to the five surviving prime contractors who constitute the core of major U.S. defense systems integrators today. The figures below illustrate the consolidation of both contractors through acquisition of the firms who were both competitors and subsystem and component suppliers.

The consolidation of the defense sector eliminated the cost to the DoD of funding a larger-than-needed defense industrial base. However, its most significant consequence, from the perspective of future defense-industrial readiness, was that it also shrunk the supply chain for the surviving prime contractors. In the U.S. defense market, there are financial penalties for maintaining excess production capacity, as the cost of doing so makes the firm less competitive. When the United States needed to rapidly increase the production of critical air and missile defense systems and long-range precision munitions for both Ukraine and operations in the Middle East, it lacked sufficient stocks above war-reserve inventories to meet the needs of U.S. and allied munitions customers. Although the manufacturing process to produce the final product is complex and capital intensive, the underlying source of the difficulty in ramping up production is the thin supply chain relative to DoD needs. The supply chain for the thousands of items that are included in a complete air and missile defense system and long-range precision munitions could not meet neither the U.S. nor allied demand for U.S. munitions as the Ukraine and later, the series of Middle East crises,

Figure 1: Post-Cold War Industry and Supply Chain Consolidation: Lockheed Martin and Raytheon



Source: Presidential and Congressional Commission on the Future of the United States Aerospace Industry, https://www.waru.edu/library/damag/may-june2020/shrinking-private-supplier-base

Figure 2: Cost of Major U.S. Air Defense Missiles

Next Generation Interceptor (NGI)	$111,000,000
Ground Based Interceptor (GBI)	$90,000,000
Standard Missile 3 (SM-3) Block IIA	$27,915,625
Standard Missile 3 (SM-3) Block IB	$9,698,617-$12,500,000
Standard Missile 6 (SM-6)	$9,574,400 (FY2024)
Patriot PAC-3	$3,729,769
Arrow 3	$3,000,000
Standard Missile 2 (SM-2) Block IV	$2,100,000
Aster 30 (SAMP-T)	$2,000,000
Meteor BVRAAM	$2,398,000
Evolved Sea Sparrow Missile (ESSM)	$1,809,933
NASAM AMRAAM 120	$996,736
RolIing Airframe Missile (RAM)	$917,894
48N6 (S-300)	$1,300,000
BARAK-8	$553,435
IRIS-T	$450,000
NASAM AIM-9X	$1,181,018
Mistral M3	$545,600
Aspide Mk1/Mk2	$100,000
Stinger Missile/MANPADS	$480,000
VAMPIRE Missile/MANPADS	$1,400,000
Tamir (Iron Dome)	$20,000-100,000
*C-RAM	$8,100
Directed Energy (Iron Beam)	$3.50

*Based on an avg. 300 rounds per interception at $27 a round

Source: Missile Defense Advocacy Alliance, https://www.missiledefenseadvocacy.org/missile-defense-systems/missile-interceptors-by-cost/

intensified in scope and scale. (Figure 2 illustrates the high cost of most modern air defense munitions.)

The high cost of these munitions is a fiscal disincentive to building an appropriate level of war reserve stocks. The underlying technology in modern air and missile defense systems is dynamic and subject to frequent upgrade and adaptations needed to address the rapidly evolving tactical and operational environment. Hence, maintaining large war reserve stocks poses a significant fiscal risk as costly and large-scale modernization needs will occur throughout the life cycle of the missile. Moreover, commitments made to U.S. allies through the Foreign Military Sales System (FMS) to update their missile inventory is in the shared interest of both the United States and its allies.

Today's circumstances provide the justification for broadening the defense industrial base to incorporate the entire alliance in order to mitigate the consequences of China's manufacturing capacity dominance.

Institutional Issues

Historically, munitions were produced in U.S. government arsenals. Funds were also appropriated to acquire specialized tooling and other enabling capabilities to be stored to facilitate meeting surge or wartime munitions needs. Over time, the kinetic aspect of modern munitions, explosive fill, arming and related subsystems, and command-and-control related equipment for the launch platform (aircraft, ship, artillery, etc.) became overshadowed by highly capable but expensive advanced sensors, datalinks, command-and-control, guidance technology, and other features that offered advanced capabilities compared to "dumb" munitions. These capabilities were developed by the defense industry, often in collaboration with DoD laboratories and other parts of the Pentagon's munitions-industrial infrastructure.

The advanced capabilities, however, were increasingly expensive and became the highest cost component of modern munitions.[5] In turn, the high cost of modern air and missile defense missiles became the dominant disincentive to the large-scale procurement of the most advanced and effective modern air and missile defense and long-range precision strike munitions.

To date, the DoD has taken some constructive steps to rectify the current shortfall. However, these steps are—and will be—insufficient to meet DoD and allied munitions needs. The President signed an Executive Order in July 2026 directing that allied nations be permitted to produce U.S. munitions.[6] In addition, the DoD will place multi-year procurement orders for munitions that will relieve the defense industry of the burden of making annual production adjustments depending on the availability of appropriated funds in a specific year.

The DoD initiative will be helpful in establishing additional production facilities for munitions used by both the U.S. and its allies. It could also enable the commitment of increased defense investment under the Hague NATO Summit agreement—5 percent per year by 2035—to increase training, operations, and war reserve stocks.[7] However, the same process that has reduced the depth, breadth, and resilience of the U.S. defense industrial supply chain has also affected the allied capacity to respond to the increased demand for munitions for operations as well as war reserve stocks.

AN ALLIANCE APPROACH TO THE DEFENSE-INDUSTRIAL SUPPLY CHAIN

One of the most significant factors in assessing the capacity of the industrial base to meet urgent national needs is the rise of China as a manufacturing superpower and the relative decline of manufacturing capacity, not only in the U.S. but across the G7 group of major industrial nations. Figure 3 summarizes the trend.

The U.S. no longer has the vast infrastructure of excess manufacturing capacity it had before and during

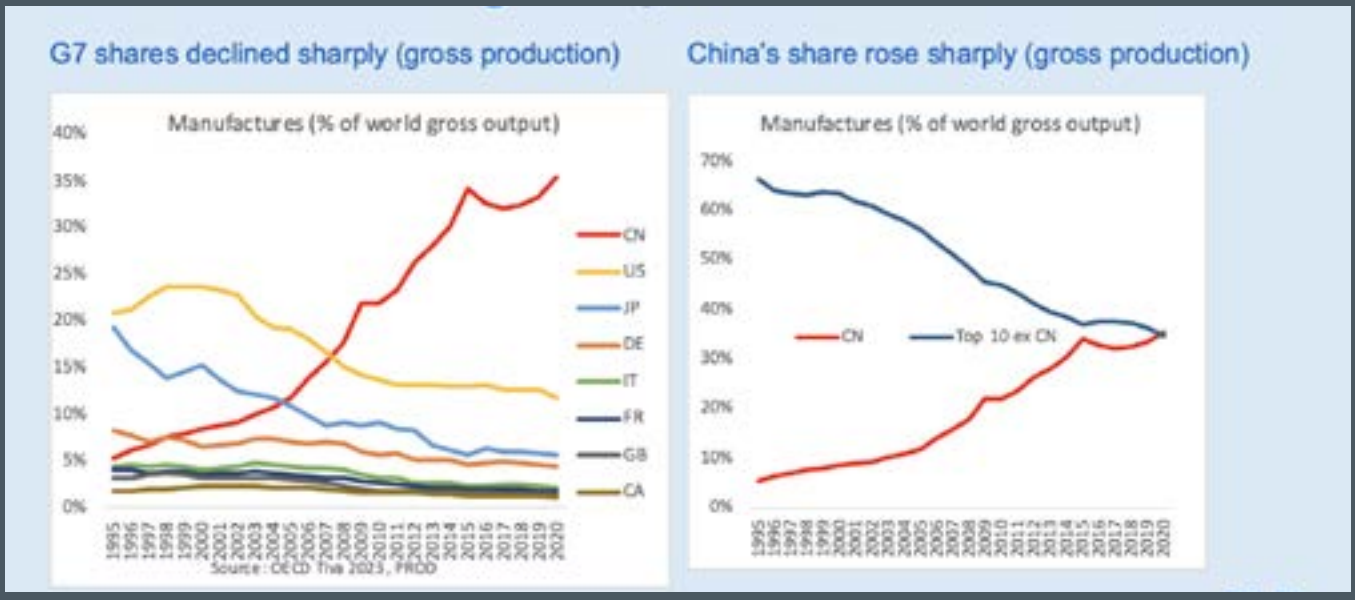
World War II. As such, today's circumstances provide the justification for broadening the defense industrial base to incorporate the entire alliance in order to mitigate the consequences of China's manufacturing capacity dominance.

This would represent a marked evolution. The U.S. alliance has remarkable economic, scientific, and industrial capabilities, but these as yet have not been brought to bear to mitigate what is predominately a supply chain issue—munitions manufacturing. In the past, the U.S. enjoyed mixed success in increasing allied industrial participation in major weapon systems. Successful examples include the F-35 and the Rolling Airframe Missile. However, on the whole, allied industrial participation has been the exception rather than the rule.

An alternative approach involves disaggregating U.S. (and allied) munitions needs from the complete system to its component parts, which are produced by thousands of subsystem and component suppliers. Many of these suppliers are not in the defense industry, but these components and subsystems are used by successive levels of producers of weapon subsystem and system integrators to produce and deliver the final product. The disaggregated components and subsystems are identified by National Stock Numbers with complete information concerning product specifications, and a host of other important details about the product that can enable the product to be produced by suppliers.[8] These suppliers or others able to produce the product can help meet the specifications reflected in the NSN. This process has been reinforced for decades by the Alliance commitment to NATO and other defense-related manufacturing and employment standards that enable the forces to interoperate effectively in armed conflicts.

Tapping into allied industry to mitigate the supply chain shortfall is the most significant potential measure that could enable the entire munitions production process to meet current U.S. and allied needs. Japan is perhaps the most broadly capable in this regard, because of its large electrical, electronic, chemical, and automotive and aerospace sectors. By seeking industrial partners able to produce products based on identified shortfalls, the supply chain could be broadened on an

Figure 3: World Shares of Gross Production



Source: OECD TiVA database, 2023 update, https://cepr.org/voxeu/columns/china-worlds-sole-manufacturing-superpower-line-sketch-rise

alliance-wide basis. Such a defense industrial infrastructure, in turn, could mitigate the risk of a munitions crisis in wartime.

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