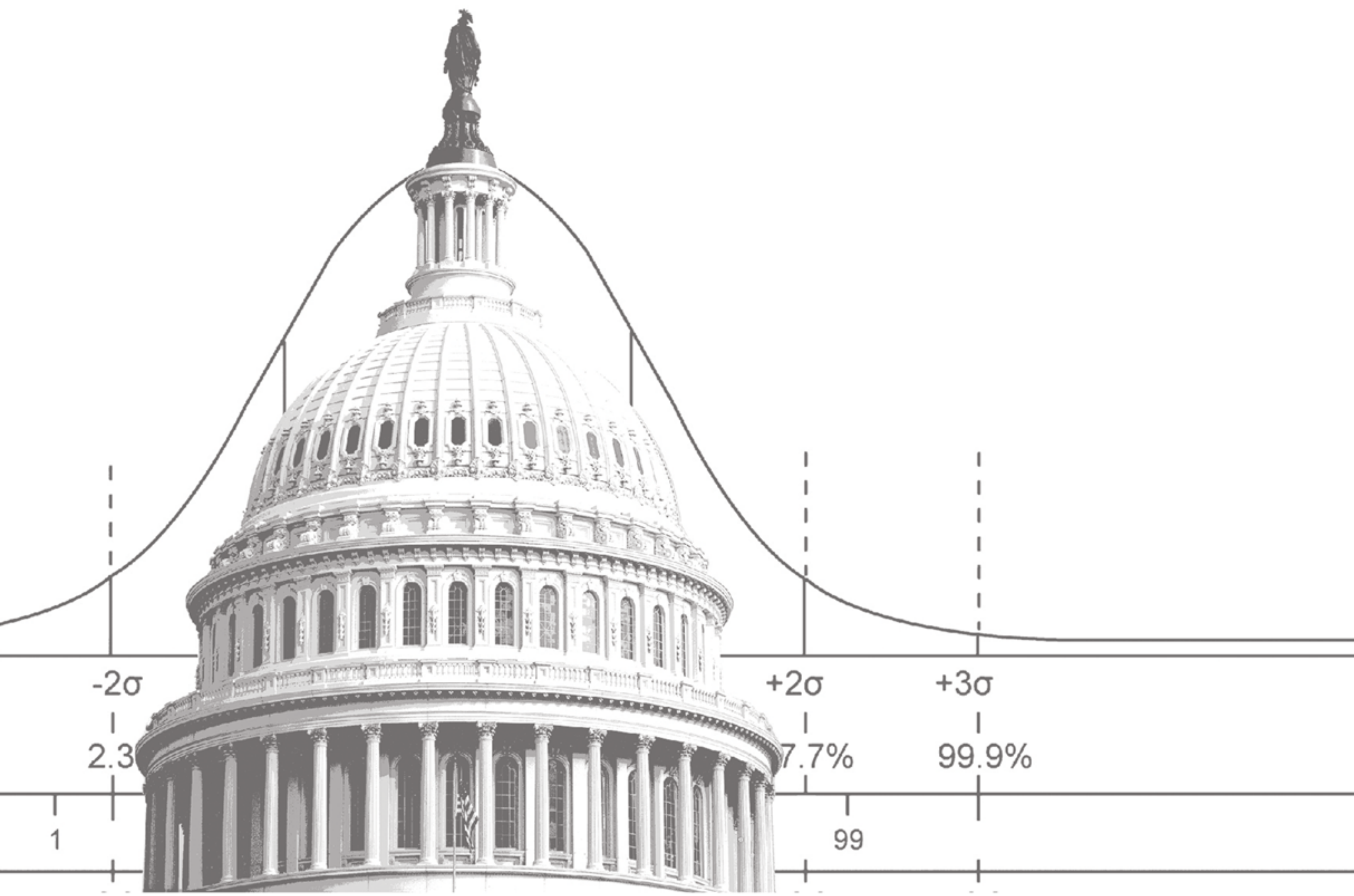
FROM FACTORY TO FIGHT

A MODERN FRAMEWORK FOR DEFENSE LOGISTICS



govini

INTRODUCTION

General John J. Pershing admonished: "Infantry wins battles; logistics wins wars." True to this maxim, the U.S. logistics enterprise has underpinned American military dominance since the Second World War. Its ability to project and sustain the Joint Force across vast distances has long been the envy of the world. The Joint Logistics Enterprise remains the backbone of U.S. military power. But it faces a stark new reality.

Great power competition and rapid technological change now define the modern battlefield. Operating environments are more contested and complex, demanding a profound shift in how the Joint Logistics Enterprise does business. At the same time, weaknesses and vulnerabilities in the Defense Industrial Base (DIB) and defense acquisition system—which adversaries can exploit—challenge our ability to surge production and deliver new war materiel to meet warfighter demand. The disconnect between the needs of the warfighter in theater and what industry can produce in the U.S. and allied homelands could prove catastrophic in a protracted conflict.

As a result, the Department of Defense can no longer afford to view logistics solely as a theater problem. To ensure the U.S. can prevail in a great power war, the DoD must treat logistics as an end-to-end problem—one that begins at the factory floor, not at the water's edge. While the challenges facing the DIB are multifaceted and the DoD alone cannot fix all of them, part of the solution lies squarely within the DoD's control. Leveraging AI-enabled software to power a real-time, data-driven feedback loop between industrial supply and warfighter demand is a capability that exists in the commercial sector, which the DoD can take advantage of today. Under this framework, every battlefield expenditure functions as an immediate, data-rich signal, allowing AI models to predict future needs and giving acquisition officials and manufacturers the visibility they need to prioritize production and initiate resupply well before the warfighter ever has to ration rounds. From the factory floor to the tactical fight, every action—every demand signal—can activate a synchronized response across acquisition and sustainment systems.

MODERN FRAMEWORK FOR DEFENSE LOGISTICS

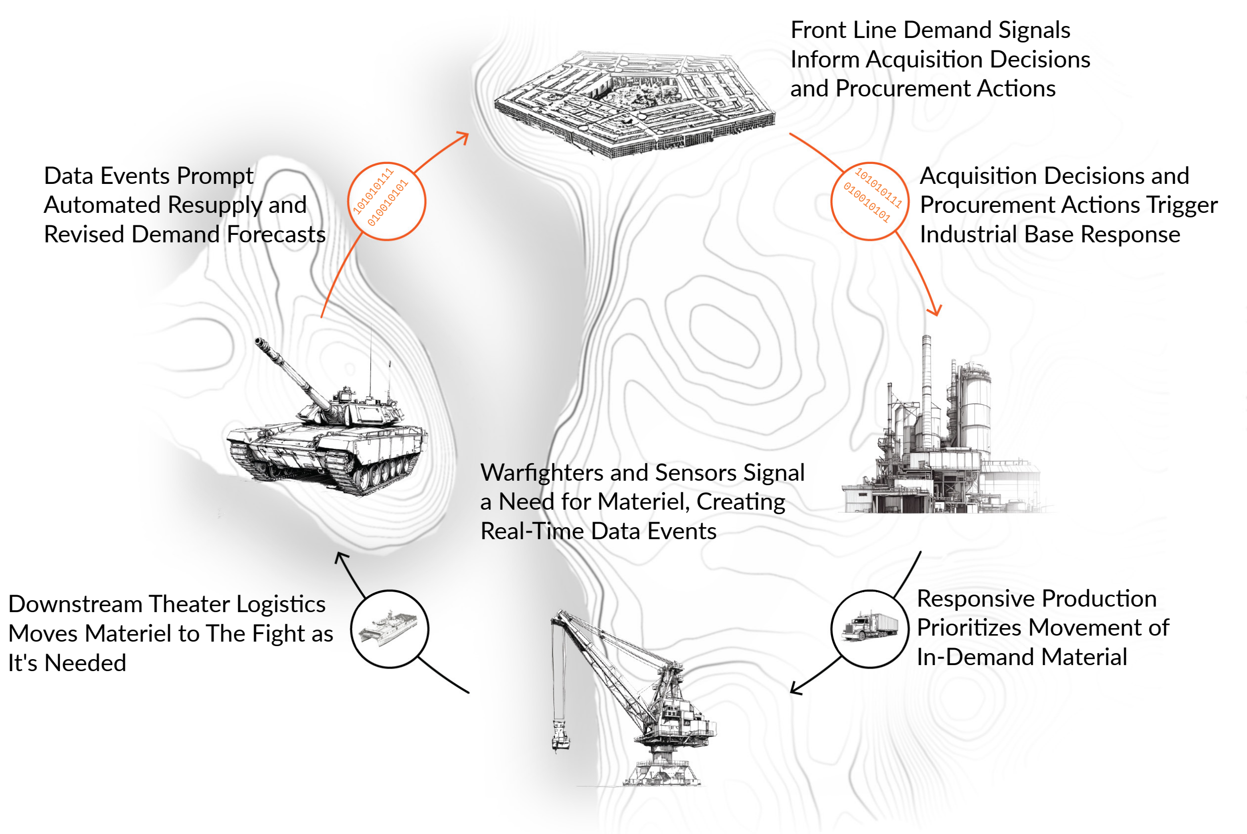


Figure 1. A modern Defense Logistics framework connects the warfighter directly to the Defense Acquisition system and the Defense Industrial Base. The resulting feedback loop enables real-time, proactive, and predictive sustainment that ensures the right materiel is available at the speed of relevance.

WHY THE CURRENT MODEL BREAKS

Until recently, U.S. logistics planning has relied on the assumption of a largely permissive or semi-permissive operating environment—secure bases and open lines of communication in theater.[1] This approach worked in the post-Cold War era of U.S. primacy. However, these assumptions are increasingly untenable. Future wars with peer adversaries will unfold in highly contested environments, where the logistics enterprise will be subject to both kinetic and non-kinetic attacks across the breadth and depth of the theater.[2] The prevailing "pull" model of sustainment, which depends on pre-positioned stockpiles and assumed mobility, creates vulnerable targets that adversaries will exploit. This "Everything, Everywhere, All at Once" approach cannot hold up when operations are highly dispersed and information networks are continually disrupted.[3] The Joint Logistics Enterprise is keenly aware of this new reality and shifting how it does business in order to operate effectively under such conditions.[4]

Despite its critical importance, logistics has long been underfunded and technologically neglected in defense strategy, leaving logistics officers to manage complex operations with outdated tools.[5] Within the Army, logistics systems such as the Army's Global Combat Support System (GCSS-Army), Total Ammunition Management Information System (TAMIS), and Logistics Modernization Program (LMP) do not reliably interoperate, leading to latency, duplication, and gaps in visibility.[6] Consumption data is often entered manually, hours or days after the event, decoupling demand from planning. The technology in a smartphone is more powerful at connecting demand to supply than most of the systems used by our sustainers, maintainers, and logisticians today. Even modern, commercially-developed logistics systems operate in silos, focused narrowly on optimizing movement based on assumptions about available assets, routes, and threats. While an improvement to disparate, spreadsheet-based asset tracking, such systems lack the integrated part-level sustainment and industrial base visibility to dynamically prioritize long-term operational needs.

But the deeper problem lies in the fundamental disconnect between theater logistics and the DIB. The availability of critical materiel at the front line is determined long before it reaches a port or warehouse. Theater logistics is downstream of industrial logistics. It is shaped by industrial capacity, production schedules, supply chain responsiveness, and strategic stockpiles.[7] Logistics is the natural expression of the acquisition system: what we buy, when we buy it, where we field it, and how we sustain it. No amount of innovation to theater logistics can compensate for absent or delayed supply.

While the disconnect between theater logistics and the DIB is a long-standing issue, two factors make it acutely dangerous today. First, the homeland is no longer a sanctuary. China and Russia both possess the capability to kinetically and non-kinetically strike the continental U.S., exacerbating existing vulnerabilities within the DIB.[8] Second, as the war in Ukraine has shown, conflicts between nation-states are often protracted. The U.S. cannot bank on a quick victory against another great power. In a protracted war, victory or defeat will hinge on the DIB's ability to produce materiel at scale.[9]

Today, however, warfighter demand does not easily nor quickly translate into production from the DIB.[10] Indeed, even support for external conflicts in the Middle East and military aid to Ukraine has overwhelmed the DIB, forcing the U.S. to draw down stockpiles that will take years to replenish at current production rates.[11] This vulnerability has not gone unnoticed: Chinese officials believe that by protracting a conflict, they can neutralize America's technological edge and win a war of industrial attrition.[12] In a great power war, the lag between industrial production and warfighter demand would prove fatal.

This fundamental disconnect creates a cascade of critical vulnerabilities. First, it obscures foundational weaknesses in the industrial base, leaving planners blind to DIB fragility and sustainment risks lurking in the sub-tiers of the supply chain. Second, it creates inconsistent demand signals that drive industry consolidation, thinning out the supply base. When major weapons systems are dependent on a few inter-dependent sub-tier suppliers, the DIB becomes susceptible to bottlenecks that introduce significant production delays, undermining the DoD's ability to surge production when necessary. Finally, these hidden risks and production delays converge at the worst possible moment, forcing inefficient, reactive scrambles in wartime that fail to meet operational needs and put missions at risk.

IGNORING UPSTREAM RISK: BLIND SPOTS IN THE DIB

Sustaining operations in a contested environment requires sufficient resources including munitions, fuel, and spare parts as well as the ability to perform maintenance and withstand disruption to supply. Logistical operations assume the requisite materiel will be available, not accounting for factors originating in the DIB that make procurement difficult or even impossible. Such acquisition-level risks are invisible to logistics officers, leaving them unprepared for shortages and critical delays.

Over the past decade, the DoD has lost over 40% of its small business suppliers, making it heavily reliant on single- and sole-source suppliers vulnerable to disruption and shortages.[13] Such reliance compromises the ability of forces to quickly repair or replace necessary equipment.[14] For example, a 2021 explosion at the only U.S. black powder mill in Minden, Louisiana, rendered the plant offline for two years, forcing manufacturers to draw from existing stockpiles to produce munitions.[15] Such bottlenecks and dependencies are often identified only after there is a problem, at which point it's too late for proactive mitigation.

Vulnerabilities in the DIB are compounded by downturns in the economy, which increase the likelihood that companies exit the market or go out of business. Figure 2 shows that the combination of rising inflation, higher interest rates, and the unwinding of COVID-19 financial assistance in FY2023 led to a spike in bankruptcies in the critical U.S. aerospace industry. Among the 57 companies that have filed for bankruptcy since FY2018, half are authorized part suppliers to the DoD and 10 are single- or sole-source suppliers for 764 parts. Moreover, 30 of these companies are direct suppliers to one or more major prime contractors, including Boeing, Rolls Royce, Textron, and Lockheed Martin. By disrupting the supply chain for critical components, such bankruptcies have the potential to significantly degrade mission readiness leading to parts shortages, maintenance delays, and reduced operational availability of weapon systems.

Further, the DoD has largely outsourced supply chain visibility to prime contractors, who themselves lack visibility—84% report no visibility beyond Tier 1.[16] Problems often originate in these blind spots. In 2022, F-35 production was halted when a sub-tier supplier disclosed it had used a non-compliant specialty metal manufactured in China—a flaw the DoD discovered only after multiple reporting layers.[17] F-35 delivery resumed only after the DoD granted a security waiver for aircraft already containing the part.[18] Problems with sub-tier suppliers, where visibility is extremely limited, tend to surface late, which slows—or halts—the delivery of major weapon systems.

Poor visibility over an increasingly fragile DIB makes it particularly difficult to sustain legacy weapons systems, which form the overwhelming bulk of our military order of battle. Due to parts shortages and delays, most legacy aircraft (47 of 49 reviewed by GAO) did not meet their mission capable goals in FY2021.[19] Moreover, 26 of them failed to meet this goal in *any* year between FY2011 and FY2021.[20] Simply put, if a system is not "mission capable," it is irrelevant. It cannot be mustered for battle or deterrence. Without visibility into the factory-to-fight continuum, logistics planning relies on outdated and insufficient data, meaning that issues with part availability are discovered reactively, leading to significant readiness problems.

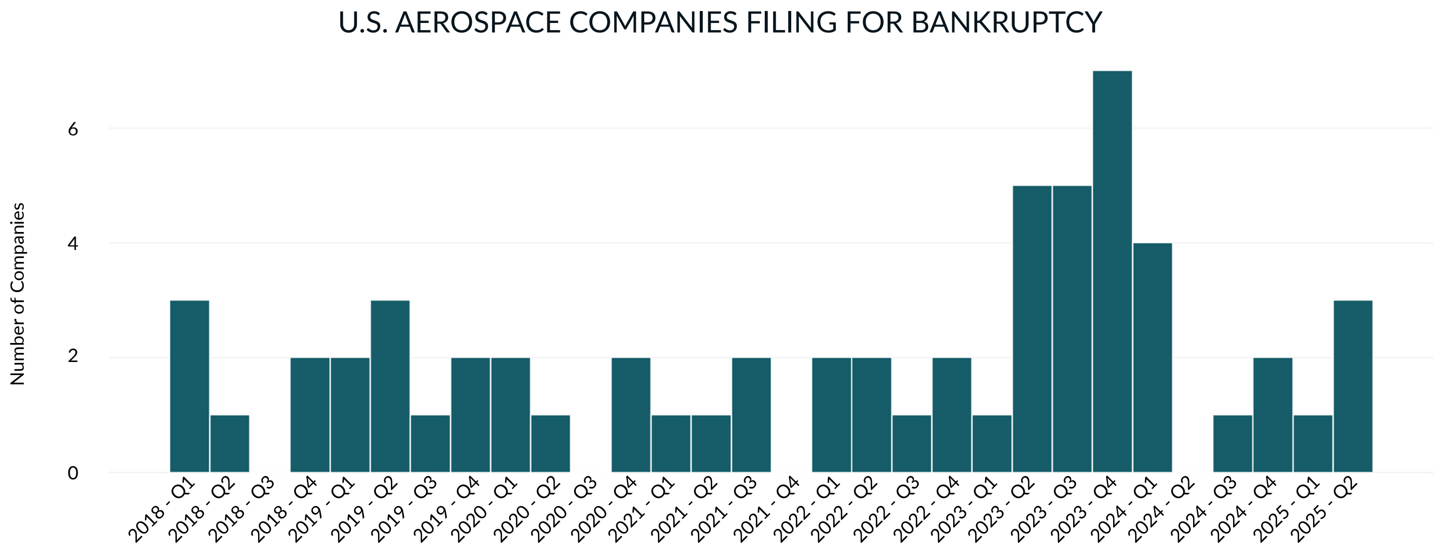


Figure 2. Recent economic headwinds accelerated bankruptcies of U.S. aerospace companies.

LIMITING PRODUCTION: BOTTLENECKS AND SHARED POINTS OF FAILURE

The fragility of the DIB is further weakened by inconsistent stop-start acquisition patterns from the DoD. This erratic demand signal leads to industry consolidation, which weakens redundancy and resiliency in the supply chain, increases foreign reliance for critical materials, and reduces overall production capacity.[21]

In a contested environment, integrated logistics and acquisition systems can significantly enhance operational resilience and ensure sustained readiness under pressure. For instance, the Army's FY2024 allocation of $69 million to boost the domestic production of boron carbide fortified the supply chain for advanced body armor while reducing foreign supply chain reliance and mitigating adversarial disruptions to supply.[22] Such examples are an exception to the norm, however. The acquisition system largely fails to integrate operational and industrial planning into a real-time common operating picture that facilitates seamless feedback between supply from the DIB and demand from the warfighter. Operating in silos results in procurement volatility that disincentivizes industry investment in surge capacity, consolidates the supply chain, and fails to integrate sustainment planning in the early stages of weapon system development.[23] Production of solid rocket motors is a prime example of this.

Case Study: Solid Rocket Motors

Between 1995 and 2017, the solid rocket motor industrial base for DoD weapons systems consolidated from six U.S. manufacturers to two.[24] Today, solid rocket motor manufacturing is dominated by two key players, Aerojet Rocketdyne (bought by L3Harris in 2023) and Northrop Grumman, both of which are central to the nation's strategic and tactical missile capabilities. Figure 3 displays just how critical these manufacturers are to U.S. missile programs. A host of crucial weapons systems, no matter who makes them, must have solid rocket motors from one of these two producers–not a single point of failure, but awfully close.

Current production of solid rocket motors cannot keep up with demand in Ukraine and the Middle East, let alone a conflict with a peer adversary like China.[25] No solid rocket motor, no missile. Restarting production can take 3 to 5 years if some production is ongoing, and up to 8 years if production has completely ceased.[26]

WEAPONS SYSTEM RELIANCE ON SOLID ROCKET MOTOR MANUFACTURERS

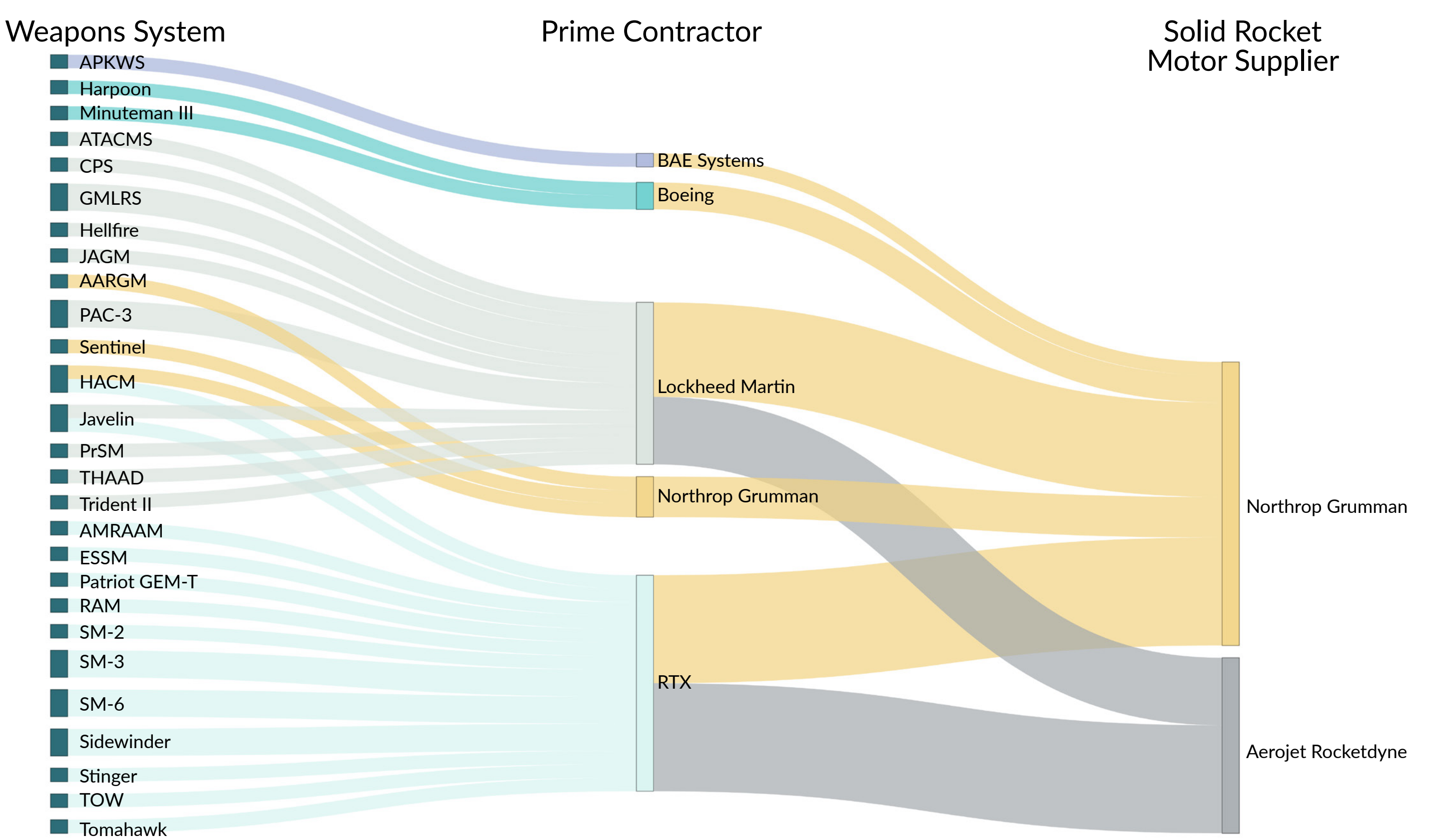


Figure 3. Dozens of key missile systems depend on solid rocket motor production by just two companies. Figure excludes Nammo AS as a supplier of solid rocket motors to the AMRAAM.

Energetic parts and propellants can take a year to source, followed by 6 to 9 months to make a rocket after receiving materials, with throat nozzles alone taking 7 to 10 months lead time.[27] Aerojet Rocketdyne operates on a "make-to-order" basis, not holding inventory for rapid production.[28] These long lead times contribute significantly to the overall difficulty in rapidly scaling up missile production and replenishing depleted stockpiles.

Moreover, the solid rocket motor supply chain is rife with bottlenecks often caused by a reliance on single- and sole-source suppliers for critical components. This not only limits overall missile production capacity, but presents significant risks to disruption, especially in a contested environment. For example, ammonium perchlorate is a critical component of solid rocket motor propellant and, for years, production has relied on a single domestically-approved source of ammonium perchlorate, American Pacific Corporation (AMPAC, owned by NewMarket Corporation).[29]

Using an ammonium perchlorate source other than AMPAC requires requalification of the solid rocket motor, a costly endeavor which takes many months. In response to escalating demand from U.S. military programs, NewMarket Corporation, AMPAC's parent company, recently approved a $100M expansion to boost ammonium perchlorate production by over 50% by 2026.[30] AMPAC's increased ammonium perchlorate production could help improve solid rocket motor production rates, but it does not alleviate the fact that AMPAC is a single point of failure in the solid rocket motor—and the broader missile system—supply chain.

Beyond AMPAC, the DoD lacks a deeper understanding of the shared industrial base critical for solid rocket motor production. Limited visibility into the sub-tier supply chain obscures critical interdependencies, bottlenecks, and single points of failure. A high degree of interconnectedness and shared sub-tier supply base suggests that expanding production of solid rocket motors will be difficult without increasing the number of suppliers for key parts and material.

Figures 4 and 5 map the solid rocket motor propellant and igniter supply chain for Northrop Grumman and Aerojet Rocketdyne, illustrating the extent to which these two ostensible competitors rely on a shared and concentrated base of sub-tier suppliers. A note on supplier tier labeling in the figures below: Labeling tiers of the supply chain depends on your reference point. Using prime weapons system contractors as the reference point (Tier 0), the two dominant solid rocket motor manufacturers, Northrop Grumman and Aeroject Rocketdyne, are labeled Tier 1 suppliers. Direct suppliers to Northrop or Aeroject are labeled Tier 2 suppliers, and direct suppliers to companies at Tier 2 are labeled Tier 3 suppliers. A company may be both a Tier 2 and a Tier 3 supplier if it directly supplies Northrop and/or Aeroject and one or more companies at Tier 2. Exclusive Tier 3 suppliers have only an indirect supply connection to Northrop and/or Aeroject.

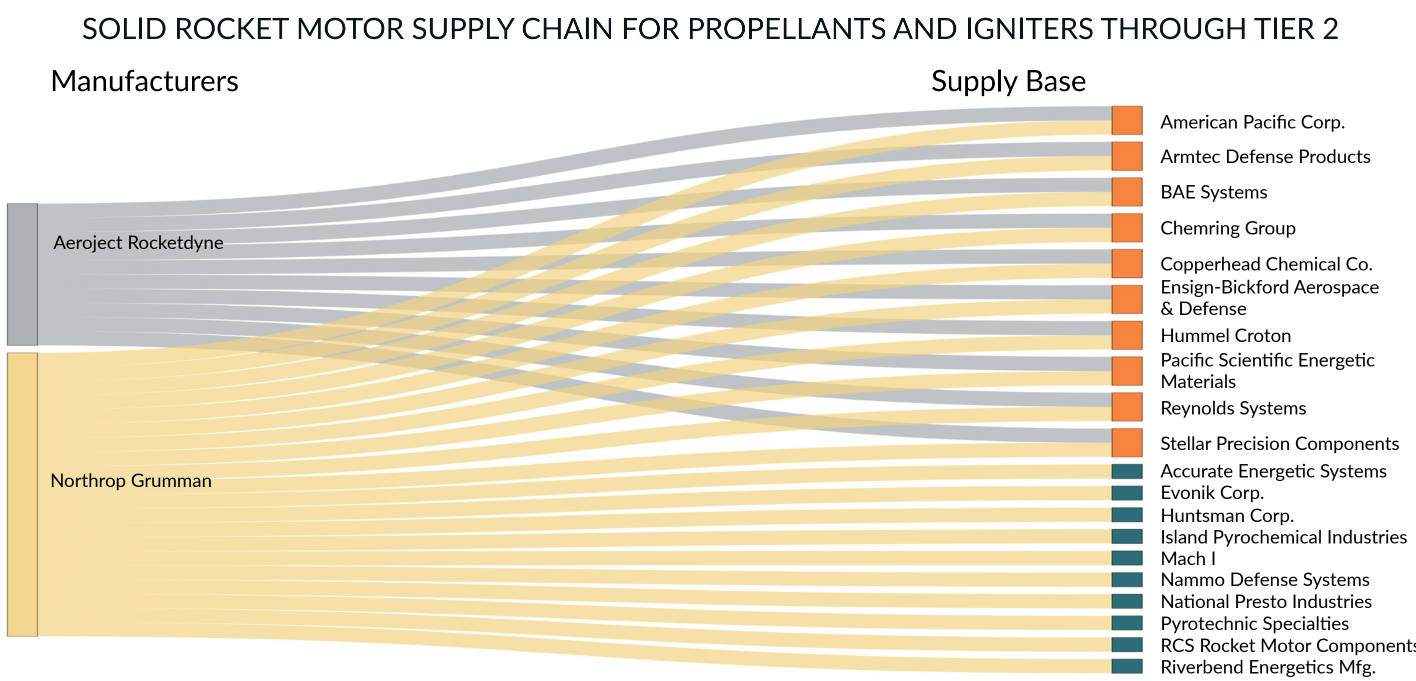


Figure 4. Solid rocket motor manufacturers rely on a shared supply base for propellants and igniters. Note: BAE Systems represents BAE Systems Ordnance Systems, which is a government-owned contractor-operated (GOCO) facility for energetics.

Figure 4 reveals significant overlap between the direct suppliers of propellant and ignitor components for Northrop Grumman and Aerojet Rocketdyne. Critically, all of Aerojet Rocketdyne's suppliers also supply Northrop Grumman. Both companies are tethered to a handful of shared suppliers for essential components. A disruption at any one of these shared suppliers—whether a production delay, a quality control issue, or a catastrophic event like a factory fire—would simultaneously cripple the production capacity of the entire solid rocket motor enterprise.

This view, however, only scratches the surface of the underlying interdependencies.

SOLID ROCKET MOTOR SUPPLY CHAIN FOR PROPELLANTS AND IGNITERS THROUGH TIER 3

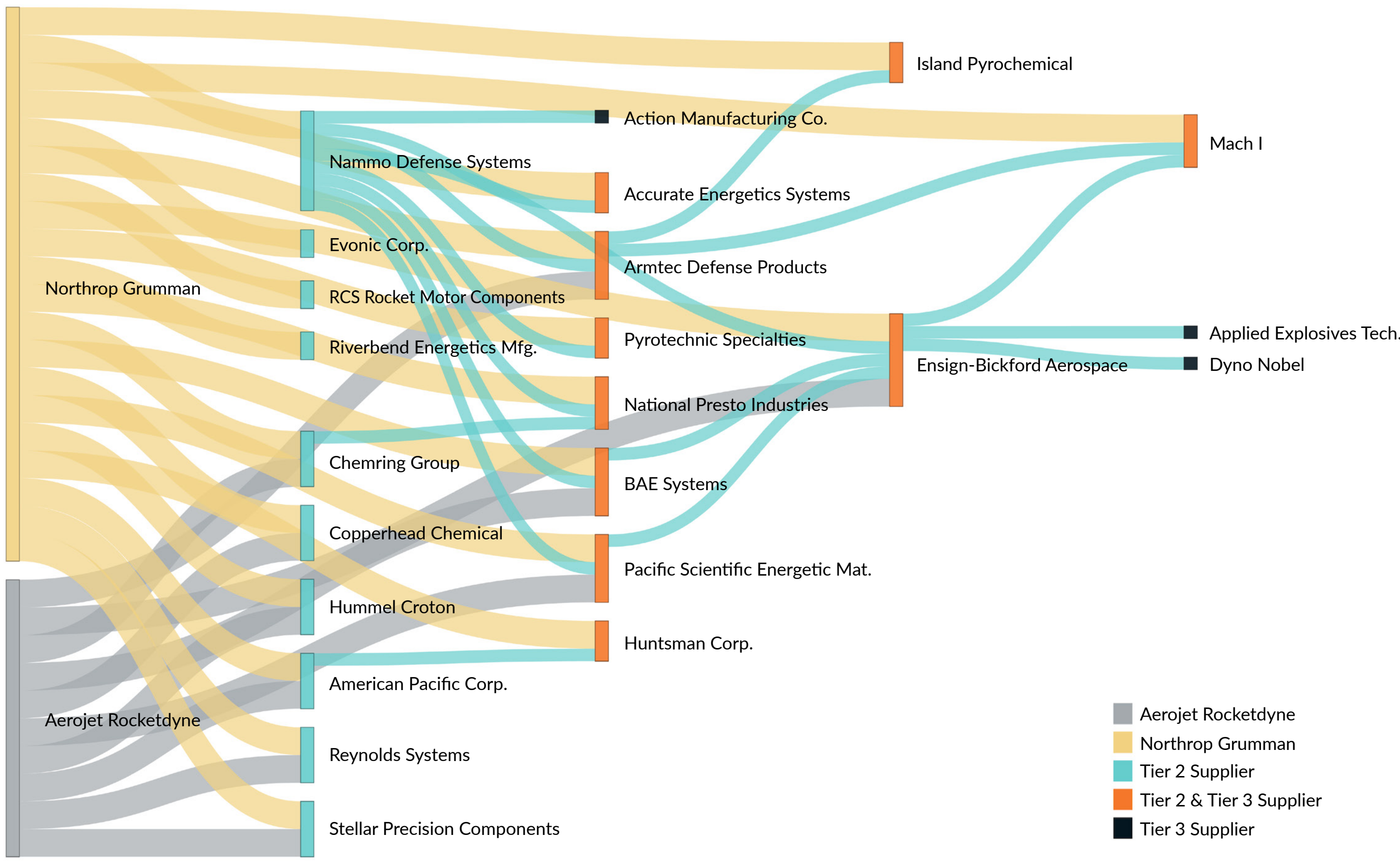


Figure 5. Supply chain convergence for solid rocket motor propellants and igniters is even deeper at the sub-tier level.

Figure 5 exposes the full complexity of the propellant and igniter supply chain by mapping connections down an additional level to Tier 3. Typically, mapping multiple tiers of a supply chain exponentially increases the number of suppliers at the base, resulting in a triangular shape with the greatest number of suppliers at the lowest tier of the supply chain. The base of a supply chain should be wide. This is not true for the solid rocket motor supply chain, however. Here the base is narrow, which is abnormal and dangerous. Companies are not just suppliers but also customers within the same fragile ecosystem. The production of critical energetic components and materials is a deeply interconnected web where risks are compounded and hidden.

Convergence at Tiers 2 and 3 means that seemingly independent supply chains are, in fact, reliant on the same Tier 3 sources. The supply chain teeters on a small number of sub-tier suppliers that tie back to both solid rocket motor manufacturers, whether directly (at Tier 2) or indirectly (at Tier 3). For instance, at Tier 2, Northrop Grumman relies on suppliers like Nammo Defense Systems, BAE Systems, Pyrotechnic Specialties and Pacific Scientific Energetic Materials. Nammo Defense Systems is also supplied by BAE Systems, Pyrotechnic Specialties and Pacific Scientific Energetic Materials, making them multi-tier (Tier 2 and Tier 3) suppliers.

Crucially, these same multi-tier companies are also essential suppliers to Ensign-Bickford Aerospace & Defense, which directly supplies both Northrop and Aerojet. A failure at Pyrotechnic Specialties, for example, would create a cascading bottleneck simultaneously affecting supply chains for both Northrop Grumman and Aerojet Rocketdyne through multiple, indirect pathways.

While Northrop Grumman and Aerojet Rocketdyne operate as competitors, their supply chains are critically intertwined. The lack of visibility beyond the first tier of the supply chain masks a highly concentrated and fragile sub-tier industrial base for production of critical energetic components and materials necessary to manufacture dozens of critical weapons systems. A disruption at a single sub-tier supplier could have systemic consequences, halting production at both of the nation's most essential solid rocket motor manufacturers. This, in turn, would have a cascading effect on the production of some of the most essential weapons systems for U.S. operational success and deterrence.

This case of solid rocket motors illustrates how acquisition decisions based on outdated systems with limited, disconnected data fail to anticipate production vulnerabilities, and therefore, undermine operational resilience, readiness, and deterrence. Regardless of how well logistical support functions have been optimized, without the ability to link acquisition and industrial pipelines with proactive logistics planning, commanders and logistics officers will quickly be confronted with the reality that the materiel they planned to move is delayed or backordered due to one or more unforeseen production chokepoints originating in the DIB. Operational success depends on a more responsive acquisition system that can anticipate and proactively respond to production vulnerabilities before it becomes a liability to U.S. and allied operations.

THE OPERATIONAL COST: REACTIVE SCRAMBLES IN WARTIME

The disconnect between logistical operations and the acquisition systems required to support them becomes a critical liability when crises emerge. Logistics planning that is divorced from the realities of industrial and supply chain capacity results in reactive scrambles that fail to meet wartime demands and risk outright failure. The DIB, optimized for "just-in-time" efficiency and burdened by inconsistent demand signals, is struggling to keep pace with current demands for U.S. military orders, support for conflicts in Ukraine and the Middle East as well as foreign military sales to our allies.[31] Critical supply chain vulnerabilities, long lead times for essential components and systems, and multi-year lags to realize increased production capacity undermine U.S. deterrence and have direct consequences for sustaining the fight in theater.

In the Red Sea, U.S. naval operations against Houthi attacks have led to significant munition expenditure. Operations by the Eisenhower Carrier Strike Group alone expended 155 Standard Missiles, nearly 60 air-to-air missiles, and 125 Tomahawks, with most Tomahawks used in less than a day.[32] In Ukraine, the demand for missiles and artillery has heavily strained existing U.S. stockpiles and production capabilities, forcing Ukrainian soldiers to become "more selective" with their HIMARS attacks.[33] Despite a recent barrage of Russian ballistic missile attacks on Ukraine, U.S. concern about declining stockpiles of key weapon systems, including the Patriot Advanced Capability-3 Missile Segment Enhancement (PAC-3 MSE) resulted in a (brief) pause of weapons shipments to Ukraine.[34]

Depleting stockpiles of key weapons and munitions, including Javelins, Stingers, and 155mm ammunition raise concerns that these inventories would be quickly exhausted in a high-intensity conflict.[35] While depleted stockpiles are certainly cause for concern, narrowly focusing on stockpiles misses the bigger problem—production capacity and long lead times. Between February and August 2022, the U.S. sent enough Javelin missiles to Ukraine to equal seven years' worth of production at FY2022 levels.[36]

As shown in Figure 6, increased demand for Javelins has resulted in a significant increase in the total procurement lead time (the amount of time from contract award until delivery of the first unit) from 32 months (2016-2022) to 57 months in 2023 and 67 months in 2024. This is a major jump in the wrong direction and comes despite reductions in the maximum production capacity for the Javelin—from 6,480 in 2020 to 2,100 in 2024. In recent years, even modern weapons systems like the PAC-3 MSE have experienced increased lead times. Such latency coincides with recent demand surges for the PAC-3 MSE by allies including Ukraine, Israel as well as for defending U.S. bases in the Middle East from retaliatory strikes by Iran.

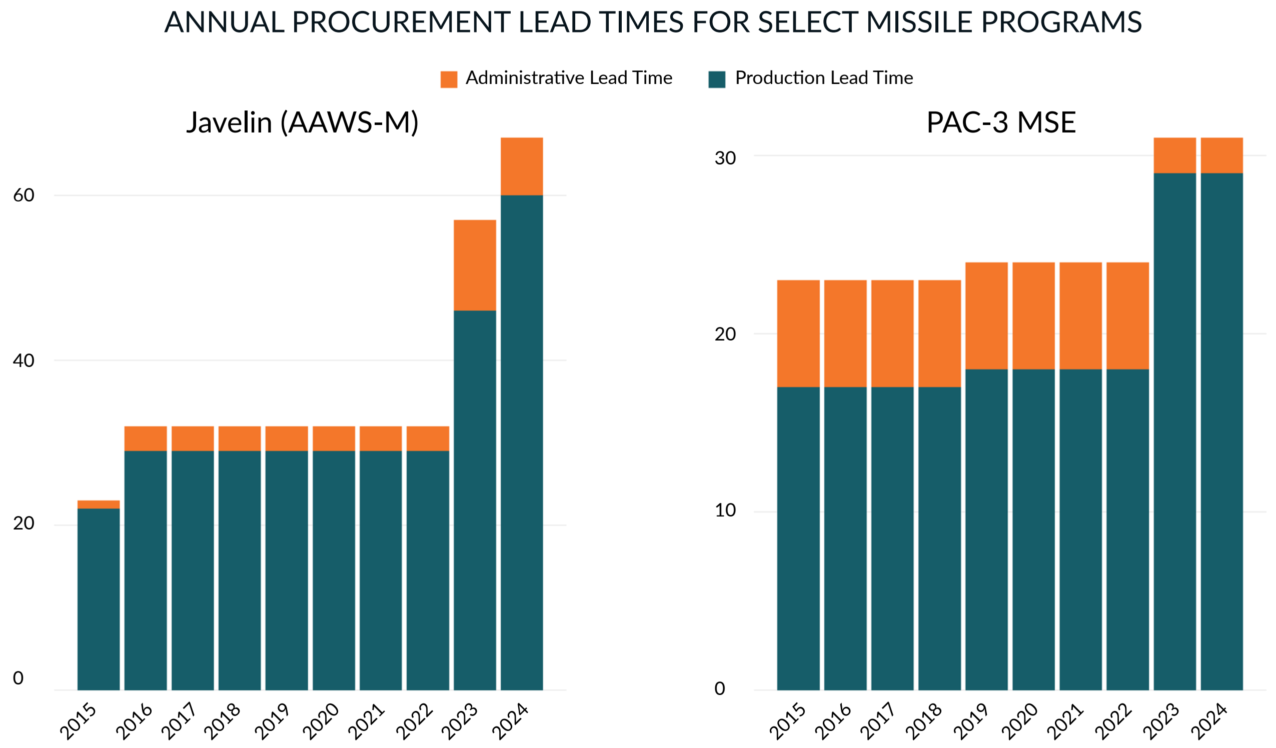


Figure 6. Increased lead times for missile procurement during a period of surging demand puts U.S. and allied readiness, deterrence at risk.

The last few years testified to the shortages of 155mm shells, Stingers, and Javelins; the next few years may be shortages of munitions far more important to the United States in deterring China: SM-3s and -6s, JASSMs, LRASMs, and Tomahawks. Indeed, war games show that missile inventories including the LRASM and JASSM could be depleted in a mere week in the event of a major power conflict.[37]

Despite billions in spending to replenish stockpiles, it will take years to ramp up additional production.[38] Yet even once we've achieved the necessary production rates to replenish stockpiles, the risk is that stockpiles give us a false sense of confidence in our readiness. Once replenished, we risk cutting the demand signals needed to keep the DIB warm, allowing production lines to atrophy once more. Indeed, production capacity—not stockpiles—is a more powerful deterrent. The solution is not just bigger stockpiles, but a more integrated system. A closed-loop of information sharing between military planners and the DIB, ensuring steady and predictable engagement, is the only way to genuinely sustain the capacity required for a protracted conflict.

The ability of the DIB to respond to the kill chain is ultimately constrained by production capacity, lead times, manpower, and material availability. Reactive scrambles are the inevitable result of a system that only discovers its industrial and supply chain weaknesses under operational strain, rather than proactively managing them as a core component of the acquisition process.

REALIZING THE FACTORY TO FIGHT VISION

Logistics doesn't just enable combat power—it is combat power. The DoD can no longer rely on a "just in time" logistics framework optimized for peacetime efficiency. To win in a contested environment, the DoD needs to adopt a more adaptive, data-driven "just in case" framework where anticipatory logistics are rooted in a responsive acquisition system with real-time operational and industrial base awareness. Logistics becomes intelligent, predictive, and strategically aligned when anchored in acquisition and industrial base reality. Viewing logistics through this lens transforms it from a reactive support function into a proactive, strategic enabler of operational advantage. In the words of an enduring military expression, *get there firstest with the mostest.*

This transformation starts by seeing logistics not simply as a movement problem, but as an industrial challenge. In a contested environment, where supply locations are distributed across island chains, the enemy is sinking our supply ships, and bombing our depots, sustaining the fight requires more than efficient routing. What gets moved and when depends on failure rates, part availability and substitutability, lead times, and total supplier capacity. It hinges on the health and responsiveness of the DIB and requires understanding supplier locations, alternative sourcing options, production surge capabilities, and the specific sustainment needs of dispersed forces. Put simply: operational readiness hinges on acquisition and industrial base reality.

The challenges facing the DIB are complex and the DoD alone cannot fix all of them. Reforming the Planning, Programming, Budgeting, and Execution (PPBE) process, defense acquisitions, and the Federal Acquisitions Regulation (FAR) will require working with Congress to implement statutory changes. Still, the DoD has ample authority to transform the current siloed, manual, and labor-intensive systems that exist today. But it demands a fundamental shift in planning and execution—one based on a real-time feedback loop between warfighters, logisticians, acquisition officials, and the broader industrial base that supports them.

An integrated system with connected data from the factory to the fight does more than move supply. It facilitates proactive management of DIB health by identifying single points of failure before a crisis, shrinks the demand signal from months to minutes, and uses predictive analytics to anticipate the warfighter's needs. Under this framework, every expenditure of fuel, munitions, or spare parts is automatically recorded into AI-enabled software. Together with real-time data on inventory, planned operations, and transportation constraints, AI models predict operational needs—what is required, where, and when. It generates an immediate demand signal back to the industrial base and gives acquisition officials and manufacturers the visibility they need to prioritize production and initiate resupply well before the warfighter ever has to ration rounds. This is not just about optimizing inventory levels and resupply routes; it's about embedding the supply chain within the kill chain itself.

Beginning in February 2022, the U.S. provided Ukraine with 1M rounds of 155mm ammunition, but it wasn't until December of that year that the Army awarded contracts to ramp production—several months after Pentagon officials warned that U.S. inventory had reached "uncomfortably low" levels.[39] Imagine a system that logs each transfer or expenditure, instantly triggering what needs to happen to replace them—what components are needed, which suppliers are involved, who has capacity, and how long it will take. Today, that's not possible. Orders are placed, and the system waits. With connected data and predictive software, every shell fired or missile launched can trigger a supply chain response that is as precise and timely as the weapon itself.

The necessary ingredients to build such a system already exist. The U.S. is home to the best software and AI technology in the world, which can—and should—be leveraged to create an asymmetric advantage in the physical world. Unlike adversaries who rely on blunt volume or top-down mobilization, the U.S. competitive advantage in AI-enabled software can transform military logistics into a dynamic, adaptive, and resilient capability—a true strategic enabler of lethality.

Realizing the factory to fight vision addresses critical vulnerabilities that the DoD can mitigate today. First, it promotes proactive DIB resilience by identifying and addressing critical vulnerabilities within the DIB before a conflict begins. This includes risks ranging from sole-source providers, supply chain bottlenecks, programs and systems that compete with each other for the same production lines, shared supplier dependencies, to single points of failure vulnerable to kinetic and/or non-kinetic adversary attacks. Second, it accelerates the demand-to-supply cycle by streamlining and automating data connectivity, dramatically reducing the lag between when a warfighter requests something to when that demand signal reaches the factory. Third, it enables predictive, anticipatory logistics for protracted conflict. Getting ahead of the curve to predict warfighter needs days, weeks, months, or even years in advance, supports a push-centric logistics model and improves the Joint Force's ability to sustain the fight in a protracted war. By activating the broader acquisition and sustainment ecosystems, this framework ensures the right supplies get to the right place at the right time, providing an enduring operational advantage.

To deter adversaries like China, speed and precision matter. We can no longer throw money at problems and hope for throughput. The future of defense logistics demands integration, not isolation. Logistics is the connective tissue that binds the acquisition system and industrial base together, ensuring that strategic goals translate into operational reality. While systemic issues like the lengthy duration of the PPBE process and the unreliability of regular appropriations from Congress present ongoing challenges to DIB readiness, optimizing critical internal DoD processes through a factory to fight approach offers an immediate, tangible path to enhance responsiveness in contested and protracted conflicts. To manage logistics for the future, the DoD needs a fundamentally different approach—one grounded in AI-enabled software and connected data from factory to fight.

ENDNOTES

[1] Timothy A. Walton, Ryan Boone, and Harrison Schramm, *Sustaining the Fight: Resilient Maritime Logistics for a New Era* (Washington, DC: Center for Strategic and Budgetary Assessments, April 2019).

[2] Megan Priebe et al., *Distributed Operations in a Contested Environment: Implications for USAF Force Presentation*, RR-2959 (Santa Monica, CA: RAND Corporation, 2019), https://www.rand.org/pubs/research_reports/RR2959.html.

[3] Mark Simerly and Wes Adams, "The Defense Logistics Agency's Role in Overcoming the Challenges of Contested Logistics," *Defense Acquisition Magazine*, November 2024.

[4] Christopher Lowman, "The Role of Logistics Sustainment in Integrated Deterrence," *National Defense*, January 18, 2024, https://www.nationaldefensemagazine.org/articles/2024/1/18/government-perspective-the-role-of-logistics-sustainment-in-integrated-deterrence; Simerly and Adams, "The Defense Logistics Agency's Role."; Christopher O. Mohan, "Transforming Sustainment to Deliver Combat Ready Formations," *Army Sustainment* (Spring 2025).

[5] Chris Dougherty, *Buying Time: Logistics for a New American Way of War* (Washington, DC: Center for a New American Security, 2023).; Patrick Kelleher, "Readiness and the Logistics Deterrent Effect," *War on the Rocks*, July 23, 2025, https://warontherocks.com/2025/07/readiness-and-the-logistics-deterrent-effect/.

[6] Lauren C. Williams, "Is Bad Data to Blame for Missing Weapons Parts?," *National Security Media*, January 22, 2025, https://nationalsecuritymedia.gwu.edu/2025/01/22/is-bad-data-to-blame-for-missing-weapons-parts/.

[7] Seth G. Jones, *Empty Bins in a Wartime Environment: The Challenge to the U.S. Defense Industrial Base* (Washington, DC: Center for Strategic and International Studies, January 2023).

[8] Walton, Boone, and Schramm, Sustaining the Fight; Heidi K. Hoyle, "Three Years Later: What Have We Learned from Ukraine?," *Army Sustainment* (Spring 2025).

[9] Stacie Pettyjohn, Becca Wasser, and Chris Dougherty, *Dangerous Straits: Wargaming a Future Conflict over Taiwan* (Washington, DC: Center for a New American Security, June 2022).

[10] Becca Wasser and Peter Sheers, *From Production Lines to Front Lines: Revitalizing the U.S. Defense Industrial Base for Future Great Power Conflict* (Washington, DC: Center for a New American Security, April 2025).

[11] Hanna Aries, Bastian Giegerich, and Tom Lawrenson, "The Guns of Europe: Defence-Industrial Challenges in a Time of War," *Survival* 65, no. 3 (2023): 7–24, https://doi.org/10.1080/00396338.2023.2218716; U.S. Government Accountability Office, *Ukraine: Status and Challenges of DOD Weapon Replacement Efforts*, GAO-24-107231 (Washington, DC: GAO, April 2024).

[12] Howard Wang and Bonny Lin Zakheim, *China's Lessons from the Russia-Ukraine War: Perceived New Strategic Opportunities and an Emerging Model of Hybrid Warfare*, RR-A3141-4 (Santa Monica, CA: RAND Corporation, 2025), https://www.rand.org/t/RRA3141-4.

[13] U.S. Department of Defense, *State of Competition within the Defense Industrial Base* (Washington, DC: Office of the Secretary of Defense, February 15, 2022), https://media.defense.gov/2022/feb/15/2002939087/-1/-1/1/state-of-competition-within-the-defense-industrial-base.pdf.

[14] Andrew Gonzalez and Stephen Rodriguez, "Nothing Left in the Tank: The State of the Pentagon's Supply Chain," *Defense News*, June 28, 2021, https://www.defensenews.com/opinion/commentary/2021/06/28/nothing-left-in-the-tank-the-state-of-the-pentagons-supply-chain/.

[15] Gordon Lubold, "The U.S. Military Has an Explosive Problem," *The Wall Street Journal*, April 26, 2023, https://www.wsj.com/us-news/the-u-s-military-has-an-explosive-problem-6e1a1049.

[16] Defense Business Board, Business Transformation Advisory Subcommittee, *Supply Chain Illumination Report* (Washington, DC: Defense Business Board, January 2025).

[17] The Heritage Foundation, "The U.S. Defense Industrial Base: Past Strength, Current Challenges, and Needed Change," The Heritage Foundation, n.d.

[18] Sergio Chávez et al., "How Arming Ukraine Is Stretching the US Defence Industry," *Financial Times*, January 31, 2023.

[19] U.S. Government Accountability Office, *Weapon System Sustainment: Aircraft Mission Capable Goals Were Generally Not Met and Sustainment Costs Varied by Aircraft*, GAO-23-106217 (Washington, DC: GAO, November 2022).

[20] U.S. Government Accountability Office, *Weapon System Sustainment*, GAO-23-106217.

[21] U.S. Government Accountability Office, *Solid Rocket Motors: DOD and Industry Are Addressing Challenges to Minimize Supply Concerns*, GAO-18-45 (Washington, DC: GAO, October 2017); Chávez et al., "How Arming Ukraine"; Wasser and Sheers, *From Production Lines to Front Lines.*

[22] Robert M. Collins, "Enabling Logistics in Contested Environments: Resiliency, Distributed, and Predictive," *Army Sustainment* (Spring 2025).

[23] Wasser and Sheers, *From Production Lines to Front Lines*.

[24] U.S. Government Accountability Office, *Solid Rocket Motors*, GAO-18-45.

[25] Stephen Losey, "Businesses Reposition Amid Growing Demand for Solid Rocket Motors," *Defense News*, October 31, 2023, https://www.defensenews.com/industry/2023/10/31/businesses-reposition-amid-growing-demand-for-solid-rocket-motors/.

[26] U.S. Government Accountability Office, *Solid Rocket Motors*, GAO-18-45.

[27] William R. Gureck, "Analyzing Solid Rocket Motors and the Changes in the Industry That Affect the Defense Industrial Base" (master's thesis, Naval Postgraduate School, December 2023), NPS-AM-24-091.

[28] Gureck, "Analyzing Solid Rocket Motors."

[29] U.S. Department of Defense, Office of Inspector General, *Audit of Purchases of Ammonium Perchlorate Through Subcontracts with a Single Department of Defense-Approved Domestic Supplier* (Arlington, VA: DoD OIG, 2020).

[30] Hanna Rivers, "NewMarket's Rocket Fuel Play: A Bold Bet on Defense and Space Growth," *Ainvest*, April 22, 2025, https://www.ainvest.com/news/newmarket-rocket-fuel-play-bold-bet-defense-space-growth-2504/.

[31] Wasser and Sheers, *From Production Lines to Front Lines.*

[32] Jim Fein, "The U.S. Navy Is Running Dangerously Low on Munitions," The Heritage Foundation, August 15, 2024, https://www.heritage.org/defense/commentary/the-us-navy-running-dangerously-low-munitions.

[33] Sinéad Baker, "Short on Rockets, Ukraine Has Had to Get 'More Selective' with Its HIMARS Attacks, Soldier Says," *Business Insider*, April 2024, https://www.businessinsider.com/ukraine-shortages-mean-be-choosy-with-himars-targets-us-veteran-2024-4.

[34] Tara Copp, "Pentagon Pause on Arms Shipments to Ukraine Part of a Global Review of Pressures on Stockpiles," *AP News*, July 2, 2025, https://apnews.com/article/ukraine-america-stockpiles-army-trump-pentagon-weapons-94ff0c465b58608c653b6f64c113a5b9.

[35] Fein, "U.S. Navy Is Running Dangerously Low on Munitions"; Mark F. Cancian, *Rebuilding U.S. Inventories: Six Critical Systems* (Washington, DC: Center for Strategic and International Studies, 2025).

[36] Jones, *Empty Bins in a Wartime Environment.*

[37] Jones, *Empty Bins in a Wartime Environment.*

[38] U.S. Government Accountability Office, Ukraine: *Status and Challenges of DOD Weapon Replacement Efforts*, GAO-24-107231 (Washington, DC: GAO, April 2024).

[39] Gordon Lubold, "Ukraine War Is Depleting U.S. Ammunition Stockpiles, Sparking Pentagon Concern," *The Wall Street Journal*, August 29, 2022, https://www.wsj.com/politics/national-security/ukraine-war-depleting-u-s-ammunition-stockpiles-sparking-pentagon-concern; Joe Gould, "Army Plans 'Dramatic' Ammo Production Boost as Ukraine Drains Stocks," *Defense News*, December 5, 2022, https://www.defensenews.com/pentagon/2022/12/05/army-plans-dramatic-ammo-production-boost-as-ukraine-drains-stocks/.

Govini builds software to accelerate the Defense Acquisition Process. Ark, Govini's flagship product, combines commercial data and artificial intelligence into applications that solve challenges across the entire spectrum of Defense Acquisition, including Supply Chain, Science and Technology, Production, Sustainment, Logistics, and Modernization. With Ark, the acquisition community eliminates slow, manual processes and gains the ability to rapidly imagine, produce, and field critical warfighting capabilities. Ark transforms Defense Acquisition into a strategic advantage for the United States.

govini