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The Defense Sustainment Agency: Leading the OIB of the Future

Seminar 16: Organic Industrial Base (OIB) Industry Study

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- Ms. Jennifer Matney: Seminar 16 member and Working Capital Fund expert
- Ms. Diana Maurer: Government Accountability Office, Director of Defense Capabilities and Management
- Ms. Elizabeth Oakes: National Security Council, Director for Defense Industrial Base Policy
- Mr. Chris Rose: United Kingdom Ministry of Defence, Attaché for Acquisition, Policy and Trade
- Rear Admiral Andrew Kyte: United Kingdom Royal Navy, Chief of Defence Logistics and Support
- Lieutenant General Tom Miller: United States Air Force, Deputy Chief of Staff for Logistics, Engineering and Force Protection
- Lt Col Josh DePaul: United States Air Force, Joint Munitions Branch Chief in the Logistics Directorate of the Joint Staff
- Lieutenant General (retired) Mitch Stevenson: Logistics Consultant at Leidos
- Honorable Christopher Lowman: Assistant Secretary of Defense for Sustainment
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- Anniston Army Depot, Anniston, AL
- Army Materiel Command Headquarters, Anniston, AL
- Defense Logistics Agency, Fort Belvoir, VA
- Mid-Atlantic Regional Maintenance Center, Norfolk, VA
- Huntington Ingalls Industries, Newport News, VA
- Colonna's Shipyard, Newport News, VA
- United States Coast Guard Aviation Logistics Center, Elizabeth City, NC
- United Kingdom
 - Royal Air Force Coningsby
 - CAT Defense
 - Leidos UK
 - Ministry of Defence, Defence Equipment and Support
 - Rolls Royce
 - Royal Navy Shipyard Portsmouth
 - United States Embassy
- Oklahoma City Air Logistics Complex, Oklahoma City, OK
- American Airlines Heavy Maintenance Center, Tulsa, OK
- Textron Aviation, Wichita, KS
- National Institute for Aviation Research, Wichita, KS
- Cox Machines, Wichita, KS
- Wichita State University Tech, Wichita, KS
- United States Coast Guard Shipyard, Baltimore, MD
- House Armed Services Committee (Subcommittee for Readiness), Washington D.C.
- F-35 Joint Program Office, Arlington, VA

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PREFACE

The Industry Studies Course (ISC) at the Eisenhower School is an integral part of the curriculum, emphasizing the school's commitment to industry engagement. It provides a comprehensive exploration of the national and global resource base using various methods such as lectures, discussions, field studies, analysis, and individual research. The ISC is complemented by the Industry Analysis course, which equips students with tools to evaluate industry health, identify challenges, and consider policy implications for meeting national security requirements.

Aligned with the Eisenhower School's Program Learning Objectives, the industry study aims to educate strategic leaders who can assess the potential contributions of the Innovation and Defense Industrial Base to national security. These leaders compare the industry to competitors, with a particular focus on China, and evaluate its alignment with the objectives outlined in the 2022 National Defense Strategy.

The Industry Studies Course undertaken by the Eisenhower School's class of 2023 Organic Industrial Base (OIB) industry study cohort, Seminar 16, focused on envisioning the future of the OIB (depot-level maintenance, repair, overhaul, and modification services) to sustain readiness of complex weapon systems. Throughout their exploration, Seminar 16 identified flexibility, agility, interoperability, effectiveness, efficiency, forward projection, and distributing to the point of need as crucial requirements for a future OIB that enables the U.S.'s preparedness in peer conflicts by 2030 and beyond.

Executive Summary

The Eisenhower School's class of 2023 OIB industry study cohort, Seminar 16, set its sights on reimagining the OIB of the future with an academic focus on the depot-level maintenance, repair, and overhaul (MRO), and modification services to sustain readiness of complex weapon systems. During the seminar's journey, common themes were noted through several interactions with industry and government senior leaders across the MRO and sustainment enterprise--*flexibility, agility, interoperable, effective, efficient, forward projecting, and distributing to the point of need*--as key requirements for a future OIB. Seminar 16 welcomed the challenge of making this vision a reality in an OIB environment fraught with unfavorable market dynamics, aging and underfunded infrastructure, and a shrinking workforce. Accordingly, the conclusion of this report reflects the seminar's aspiration for the creation of a new defense agency, the Defense Sustainment Agency (DSA), as a solution for mitigating the above issues and placing the U.S. on a stronger footing for prevailing in a peer conflict by 2030 and beyond.

The 2022 National Security Strategy highlights *integrated deterrence* as the US strategy for facing aggression posed by the People's Republic of China (PRC), Russia, or other states and stresses the importance of integration across the government and non-military domains (the defense sustainment industrial base [DSIB]). It is Seminar 16's view that unifying a disaggregated OIB will strengthen integration across the government and DSIB through strategic planning and execution of MRO services as a joint force. The unified approach offered by the DSA can best enable the requirements touted by senior leaders as being necessities for the future OIB.

Analysis of the strategic environment and the OIB industry through the lens of Porter's Five Forces and the Strategic Gameboard sets the stage for proposing the DSA as a viable construct for limiting OIB constraints through 1) Consolidating authorities and budget, 2) Improved acquisition sustainment planning, 3) Advanced technology integration, and 4) Enterprise control and management. Seminar 16 asserts that the creation of the DSA will contribute to enhanced OIB funding processes, strengthened acquisition planning, increased innovation, and refined Common Operating Picture oversight.

Alternatively, it is possible to achieve similar outcomes of the DSA by applying practices of its approach to the existing OIB enterprise (i.e., Office of the Secretary of Defense, sustainment centers, depots, and other entities that span the military Services). However, a closer examination of DSA's advantages and disadvantages presented later in the report will make the argument for why establishing the DSA is the best option for reimagining the OIB of the future and building capacity and capability to overmatch any peer competitor by 2030.

Key Takeaways:

- The OIB operates in a disadvantaged industry and struggles with modernization and adaptation.
- High bargaining power, barriers to entry, and intense competition exist among buyers, suppliers, and competitors.
- Congressional protection of the OIB's position in the MRO services market does not result in significant investments in infrastructure and technology. Additionally, the Department of Defense (DoD) faces challenges in adopting advanced technologies, and sustainment costs have become unaffordable.

Key Recommendations

- Congress should establish temporary and permanent appropriations for the DSA to address funding shortfalls.
- Granting innovative authorities to the DSA, including contracting with the commercial industry and leveraging public-private partnerships, is essential.
- Congress should mandate DSA's total ownership and responsibility for OIB data systems, facilities, and equipment.
- Utilizing existing programs and implementing innovative solutions to expand defense sustainment industrial base surge capacity, strengthen the workforce, and include partners and allies to a defined extent is critical.
- Formation of DSA as a single entity enables the implementation of best practices and addresses

drawbacks of a decentralized approach.

- Early integration of DSA into the acquisition process is critical for program success.
- Access to IP is crucial for competition, resilient supply chains, and reduced program costs.

Section 1 – Strategic Context

The U.S. is confronted with critical strategic challenges posed by the PRC, the convergence of technology and warfare, and the readiness of its military to meet these challenges effectively. This is likely a multi-decade geopolitical competition with consequential long-term implications for the U.S. military. And this competition is emerging at a time when the U.S. is transitioning from 20 years of fighting the Global War on Terror, facing increasing defense responsibilities in Europe, and continuing obligations in the Middle East. The era of strategic competition or put more directly – The PRC Challenge - is prompting the U.S. geopolitical and military pivot to the Indo-Pacific region.

The PRC is the sole competitor with the means and intention to reshape the U.S.-led international rules-based order.¹ The PRC's Military-Civil Fusion strategy has led to the accelerated development of the People's Liberation Army's (PLA) capabilities, which raises important questions about the evolving character of warfare along with the current state and future of the U.S. defense industrial base (DIB) and its role in a potential Indo-Pacific conflict.

Integrating emerging and advanced technologies into military applications will fundamentally change the character of future wars and conflicts. To this end, Defense Advanced Research Projects Agency (DARPA) has introduced the concept of mosaic warfare, which envisions a future state where technology will provide a significant strategic advantage in decision-making, and distributed capabilities will overwhelm military forces and political decision-makers at nearly all levels.² DARPA's mosaic warfare concept describes what is likely the future reality of a conflict with the PRC. Here, advanced technologies will play a key role

across the spectrum of combat outcomes. Therefore, the modernization race is on to apply advanced technologies to current and future weapons, platforms, and systems.

Acknowledging strategic competition is a reality, the U.S. has formulated the strategy of Globally Integrated Deterrence (GID) with allies and partners to maintain the American-led rules-based international order.³ As a first-order effect, the GID strategy translates to an increased demand for deployments and exercises—especially in the INDOPACOM theater—which significantly strains platforms, people, and support systems due to the arduous tyranny of distance that must be continually overcome.

As a second-order effect, GID gives rise to strategic questions regarding the current state of military readiness and how to maintain future force readiness in the face of mounting challenges. Moreover, the implementation of mosaic warfare and its utilization of advanced technology poses strategic problems for the DIB, specifically the DSIB, comprised of the government-owned, government-operated (GOGO) OIB and the commercial industrial base (CIB). As a third-order factor, the DSIB plays a critical, often overlooked, function in the US military by providing MRO services. The OIB, by law, is responsible for maintaining critical technical skills, military production capabilities, and production surge capacity. However, due to structural industry issues, unfavorable market dynamics, aging and underfunded infrastructure, and a shrinking workforce, the OIB is inadequately prepared to meet emerging strategic challenges. This represents a critical vulnerability in the DSIB that must be addressed.

The OIB lacks top-level strategic planning. For example, OIB sites all appear to share significant problems with workforce recruitment with each site pursuing local mitigations. There is no comprehensive OIB workforce strategy or planning and even site-specific working solutions do not appear to be shared across organizations. This is also the case for advanced

technology integration and planning. The key question is, can the OIB meet its responsibilities and the growing demands of the evolving strategic environment?

For decades, the military Services have tried to improve their individual portions of the OIB. Congress is keenly aware of OIB issues and responds with multiple rounds of well-intentioned protectionist legislation with little strategic impact. The existing joint acquisition and procurement processes also fail to adequately address sustainment planning and costs during the technical development of a new system. Instead, sustainment strategies are often developed in the latter stages of system procurement. More transformative measures are almost certainly required.

To meet global strategic challenges by 2030, this cohort of Eisenhower students' principal recommendation is to create a new defense agency-level entity—the DSA. The DSA's mission would be to lead and manage the OIB enterprise, develop force-wide planning for weapons and equipment sustainment, and provide joint MRO services to the entire Department. Consolidation of authorities and budget, leading sustainment planning for acquisitions, advanced technology integration, and enterprise control and management are the keys to the long-term success of the DSA in addressing the challenges faced by the OIB.

Section 2 - Industry Analysis

It is crucial to distinguish between the "defense acquisition industrial base" (DAIB) and the "DSIB" more clearly. Air Force Lieutenant General Tom Miller, who served as a research fellow at the Brookings Institute in 2010, deserves credit for highlighting this difference in his scholarship. Miller pointed out that policymakers and legislators tend to focus more on the acquisition industrial base than the sustainment industrial base.⁴ The DAIB refers to the "original equipment manufacturers (OEM) that produce major defense acquisition program systems."⁵ The DAIB is commercial and dominated by major defense primes competing against each other. These primes also compete for lucrative long-term sustainment contracts.

Miller outlined that the sustainment industry is different from the DAIB. The DSIB comprises commercial companies (CIB) and organic entities—the OIB—that compete as rivals to provide a range of support functions and services. The DoD defines sustainment as the "package of support functions required to maintain the readiness and operational capability of weapon systems, subsystems, software, and support systems."⁶ The central aspect of readiness and operational capability are MRO workloads derived from each Service's needs and schedule. Miller's research focused on the question of the optimal mix of MRO workloads between the CIB and OIB to keep the industry healthy. Interestingly, Miller did not propose an optimal distribution of workloads. Instead, he made an important forecast that as the DoD buys fewer systems over time, defense companies would compete for more MRO workloads to offset lost revenues from acquisition, slowly squeezing out OIB market share.⁷

Characterizing the Defense Sustainment Industry Using Porter's Five Forces

- *Buyer Bargaining Power* - The DoD enjoys high bargaining power due to large-scale procurement contracts. Still, the critical nature of weapons and platforms limits their ability to

exert as much influence over pricing or terms as expected. Each military Service has significant buying power, and the Services actively lobby Congress for program support and long-term funding.

- *Threat of New Entrants* - New entrants face high barriers to entry, including significant initial capital investment and regulatory compliance, while existing defense primes own their intellectual property and enjoy strong relationships with the DoD.
- *Supplier Bargaining Power* - The bargaining power of suppliers is high because of the OIB's heavy reliance on them for raw materials, components, parts, machinery, and specialized services, with burdensome contracting and security requirements limiting the pool of qualified suppliers. Some defense suppliers exert an outsized influence due to their proprietary technologies or intellectual property.
- *Competitive Rivalry* - The commercial defense industry is characterized by a moderate to high level of industry rivalry for sustainment outside of the government-mandated 50% for the OIB. Established defense contractors and suppliers compete fiercely for government contracts on price, quality, delivery timelines, and other key performance metrics. Industry consolidation and strategic alliances contribute to increased competitive intensity as companies seek to leverage economies of scale and secure long-term contracts, often with vendor-lock advantages, where the costs of switching vendors locks in customers.
- *Threat of Substitutes* - The OIB's threat of substitutes is low due to a regulatory environment that protects it and the high-performance standards and specific requirements of defense systems and equipment.

Estimating the Industry Dynamic for Russia and China Through Porter's Five Forces

The NSS refers to China and Russia as the U.S.'s pacing challenge and acute threats. Understanding the U.S. sustainment industry is necessary to realizing how it fits within integrated deterrence. However, it is also an imperative for decision-makers to have a grasp on the industries affecting our adversaries such as China and Russia. Appendices B and C of this report help to highlight the dynamics of Russia and China's defense industries through the lens of Porter's Five Forces Analysis.

The Strategic Game Board

- *Where to compete.* The OIB should compete based on competitive advantage or the core expertise and skills of residents at organic sites, but the reality of their vertical integration with Services paints a different picture. The OIB is beholden to Service MRO schedules and siloed program executive office (PEO) decisions often driven by political and budgetary considerations.
- *When to compete.* The OIB is almost entirely responsive to PEOs and must actively manage the peaks and valleys of PEO and Service demand signals. The Services and subordinate units may not adhere to their projected plans to ship certain weapons platforms and systems for scheduled MRO services, and projected workloads may not arrive at depots. PEOs may also designate a less optimal site as the Center of Industrial Technology and Excellence (CITE) for certain weapons systems based on congressional pressure. This is the case with the Army's Bradley Fighting Vehicle serviced at Red River Depot instead of the Army's tracked CITE at Anniston.
- *How to compete.* It is essential to understand that the OIB and Congress play together on the strategic MRO competition game board. Congress is critical in protecting the OIB as a core

national resource and determines where and how it competes. The OIB likely would not exist on its own without protection. Congressional legislation and DoD rules ensure the OIB is sheltered from market forces -- the 50/50 requirement, CITE, and Designated Sources of Repair (DSOR) all direct MRO workloads to the depots. However, PEOs frequently manipulate 50/50 requirements in practice, and CIB workloads are sometimes completed in OIB facilities, so the OIB receives credit towards its 50% goal. Working Capital Fund (WCF) financial management constraints also govern the financial management for much of the OIB. OIB sites will likely charge higher rates for MRO workloads to comply with Congress' now-8% capital investment rule.

OIB Market Constraints and Impacts

Congressional protection and DoD Service rules force depots to pursue limited same-game strategies. CITE and DSOR designations can inadvertently narrow the scope of OIB business plans to a limited number of specific systems.⁸ Depots pursue defined niches through a CITE or DSOR designation, attempting to gain and protect that competitive advantage over the long term within that niche MRO market segment. This precludes expanding into other potential MRO market areas.

Depots are not mandated or resourced to pursue new-game, new value strategies that require heavy investments in research and development (R&D) and testing, nor can they currently operate independently from PEO and commercial prime vendors due to over-specialization with specific MRO workloads.

The irony is that the same rules that have propped up the OIB over time also impede development and potential growth. Depots are not allowed to make a profit. Minimum capital investment mandates, such as the 8% rule, force depots to charge higher rates to their service

customers, negating some of the value proposition of OIB-based labor for PEOs. As a result, depot capital investment projects are spread over lengthy periods to avoid rate spikes. And the 8% investment rule only applies to major covered depots and not the entire OIB enterprise that includes arsenals and other maintenance and production facilities. The net effect is that the OIB's small competitive advantages in niches have significantly eroded over time. Places such as Anniston Army Depot in Alabama, the Army's tracked vehicle CITE, primarily focus on low-skill touch labor such as paint stripping and washing tank hulls. Anniston then ships most of those hulls to General Dynamics Land Systems in Lima, Ohio for major tank overhaul services.

Despite these protections and investment mandates, OIB sites are underfunded, projected workloads are declining, and capital investments cannot meet modernization requirements or recapitalize facilities and infrastructure. Repeated General Accounting Office (GAO) studies indicate infrastructure throughout the OIB MRO enterprise is in "generally fair to poor" condition.⁹ Miller's original question concerning the optimal mix of MRO workloads across the DSIB now appears to miss the issue. As OIB infrastructure continues to age, funding shrinks. At the same time, technology drives more sophisticated weapons and systems, the more pressing question now is—can the OIB, on its current trajectory, even continue to fulfill its core missions and does it even have a place in the future MRO services market?

The OIB Faces Significant Challenges

The need for sustainment to be a shared policy priority: The OIB is a disaggregated entity that does not strategically plan or execute MRO services as a united force. MRO is seen as a Service-specific function. This makes it difficult to conceptualize OIB issues as shared or joint problems to be addressed with a unified strategy and plan. Congress pays close attention to the OIB and reacts through legislation, but the limitations of attempting to manage change through legislation are well documented.

The need for infrastructure upgrades: The OIB's infrastructure is aging and in need of repair and replacement. This includes facilities, digital systems, and industrial plant equipment.

The need for financial model restructuring: The current financial structure of the OIB disincentivizes collaboration between OIB depots. Legally and financially, the depots are not allowed to assist each other without a distinct customer order. Depots are paid based on the

number of work orders they complete rather than reducing the overall cost of maintaining a weapon system. This incentivizes depots to compete with each other, rather than collaborate.

The need for innovation: The defense industry constantly evolves, and new technologies are being developed and applied to warfare. The OIB needs to be able to create a comprehensive advanced technology integration roadmap to remain competitive.

The need for workforce development: The OIB faces a shortage of skilled workers. This shortage is due to several factors, including the baby boomer generation's retirement, the increasing complexity of defense systems, and the lack of training programs for defense-related skills.

The need for access to IP: The OIB needs access to intellectual property (IP) that is essential for maintaining and repairing weapon systems. This is because IP is often owned by defense contractors, who also compete for MRO workloads and thus are reluctant to share IP broadly.

The need to create supply chain resilience: The OIB's supply chain is vulnerable to disruptions as it relies on a diminishing number of suppliers and single or sole source vendors for critical components and manufacturing processes.

The need to plan for aging systems: The OIB is responsible for maintaining and repairing many aging weapon systems. These systems are becoming increasingly difficult and expensive to maintain. The mandate to maintain old systems conflicts with the ability to adapt and offer services for new systems.

Centralization and Integration: The Key to Improving Defense Sustainment

The Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)) is responsible for DoD-wide sustainment policy direction and oversight. However, the Services retain overall management and budget authorities. They make decisions based on their Service's requirements and manage their depots and MRO services independently.¹⁰ The Services operate 18 separate depots across numerous locations with different organizational structures, financial management systems, and data management systems. The depot enterprise operates under six different WCFs and separate appropriated funds, and each operates under a different chain of command and levels of leadership. This decentralized structure allows Services to interpret policy guidance and prioritize their budgets as they see fit, making it challenging for USD to harmonize MRO services or share resources, information, and best practices. The result is that DoD often fails to achieve desired sustainment policy objectives.

This report proposes that consolidating policy, authorities, and budget under a single agency offers the benefits of management centralization and functional integration. Creating an agency to unite disparate but similar activities across the DoD is not new. The Defense Intelligence Agency (DIA) and the Defense Logistics Agency (DLA) were established on 1 October 1961. The DIA was established to “obtain unity of effort among all DoD components in developing military intelligence, and to strengthen DoD’s overall capacity,” while the DLA aimed to consolidate the services supply managers and the Armed Forces Supply Support Center—an action recommended nearly 30 years earlier by President Hoover.¹¹ More recently, Congress mandated the creation of the Defense Health Agency (DHA) to manage and oversee the DoD’s medical healthcare system, including battlefield care, hospitals, and clinics that serve nearly 10 million Service members and beneficiaries.¹²

To achieve this centralization, Congress should enact the key recommendations to follow in the next section. These recommendations are not mutually exclusive—many can be enacted individually and achieve immediate, positive effects. However, implemented together—under the auspices of the DSA—their effect will be amplified and will quickly reinvigorate the OIB’s ability to deliver MRO services that are of consequence to the readiness and warfighting ability of the DoD, its partners, and allies.

Section 3 – The Defense Sustainment Agency

3A. AUTHORITIES, RESOURCING, AND STRUCTURE

The DSA should be established with appropriate mandates, appropriations, and authorities to provide unified leadership of the OIB and integration of the DSIB, delivering efficient and sufficient MRO services for all DoD components.

The MRO market functions as a monopsony where the DoD is the sole buyer of services. The Department erodes OIB bargaining power within the market by segregating (by military branch, functions, and resources), encouraging competition and separation among the Services. This decentralized structure drives non-harmonized policies and limits sharing best practices; disparate information technology (IT) systems contribute to an inability to share data at all levels. Ultimately, this results in sub-optimized performance. OIB entities largely do not coordinate with each other for resources or collaborate on MRO-related technology. The OIB is a disaggregated collection of different Service-coupled MRO entities.

To address this issue, the OIB should employ a new organizational structure that can direct resource allocation and oversee more efficient and effective military systems' sustainment.¹³ To achieve globally integrated deterrence and deter peer conflict by 2030, the OIB must enhance its capability and capacity to meet peacetime demands and surge during times of crisis and conflict. Congress should consider action to design and pass legislation that creates a DSA, appropriating funds and granting authorities to carry out specific mandates to drive momentum, efficiency, and innovation in support of the National Security Strategy.^{14,15}

Mandates

To consolidate the OIB efforts currently overseen by the Services, the DSA should be created with specific mandates that give it broad latitude to take innovative and aggressive

action. The Agency should be mandated to take ownership and responsibility for all OIB facilities and equipment, centralize management, and execute a dynamic investment program to recapitalize the OIB's flagging infrastructure and industrial plant equipment. Additionally, the DSA should reinvigorate a shrinking OIB workforce by focusing on recruiting and retaining highly skilled blue-collar artisans and critical white-collar workers in the Science, Technology, Engineering, and Math (STEM) fields. The DSA should oversee the establishment of a scalable and flexible workforce, such as a National Defense Manufacturing Reserve (NDMR). The NDMR is a conceptual force modeled on the reserve component that could provide surge capacity as a scalable, mobile civilian workforce capable of meeting MRO requirements. Other mandates include improving PEO integration by enhancing competition among the supply base to lower acquisition and life-cycle sustainment costs and improving technical collaboration to increase the agility and affordability of transitioning advanced technology into the sustainment ecosystem. As part of that effort, DSA should oversee a cohesive material availability strategy, ensuring adequate availability of spares beyond the traditional one-for-one replacement method. Finally, the agency should expand the surge capacity of the DSIB through partnerships and contractual agreements with partners and allies to set the stage for rapidly expanding surge capability during crises and conflicts.

Appropriations

The agency would receive both enduring and temporary appropriations to execute operations and address the shortfalls in facilities investment and human capital. Separate appropriations above the current DoD budget baseline for facilities are necessary to establish the DSA as the sole entity responsible for MILCON, Facilities Sustainment, Restoration, and Modernization (FSRM), and Base Operating Support (BOS) budgeting and execution for the

entire OIB. During the first ten years, the agency would require temporary MILCON appropriations to increase investment in facilities recapitalization and industrial plant equipment and allocate portions of FSRM and BOS funds currently aligned to the Services for the OIB under the DSA. Granting temporary appropriations above the current DoD MILCON top-line is critical to meet the mandate of recapitalizing OIB facilities.

Establishing a stand-alone appropriation for spares and repair parts enables the DSA to increase material availability beyond the one-for-one approach allowable under the Financial Management Regulation (FMR). Currently, each Service determines how much, if any, additional material availability investment to make through direct appropriations or additional WCF surcharges. DSA's standardized approach for requesting direct appropriations for increased material availability will mitigate the impacts of continuing resolutions and ensures the enterprise is positioned to meet the NSS and NDS goals by 2030.¹⁶

By providing direct appropriations to the DSA, the Services can avoid competing for funds and focus on generating readiness and power projection. Centralized management of planning, requesting, and executing funding for facilities and spares would eliminate intra-Service and inter-Service competition for funds. This centralized approach can enhance the capacity and capability of the OIB to deliver mission-ready platforms while enabling the DSA to innovate in the facilities and supply arenas.

Authorities

After receiving the required appropriations, the DSA would require innovative authorities to fulfill its mandates from Congress. A surge of several hundred million dollars of military construction (MILCON) funding would overwhelm the DoD organizations responsible for military construction. As part of the temporary MILCON appropriation, DSA should be

authorized to leverage service contracts for MILCON program execution to the greatest extent possible. Furthermore, Public-Private Partnership authorities like those granted for the MHPI should be granted to magnify the impact of MILCON appropriations.¹⁷

To revitalize the workforce, 5 U.S.C. § 3326, which generally imposes a 180-day waiting period between the retirement of a Service member and appointment to a DoD civilian position, should be amended.¹⁸ The current waiver, established under the 2021 National Defense Authorization Act, applies to competitive Service positions that are: at or below the level of General Schedule 13 (or equivalent); located at a DIB facility that is part of the core logistics capabilities; and have been certified by the Service Secretaries concerned as lacking sufficient numbers of potential candidates.¹⁹ This authority should be made permanent.

Congress should also establish a new law modeled after Appendix 2160€ of Title 50 of the United States Code (National Defense Executive Reserve) to establish the NDMR and include authorities for the President to sustain critical industrial skills and mobilize a civilian workforce to meet surge MRO requirements.

The FMR should be amended to enable the DSA to execute consistent budgeting and funding decisions that prioritize stocking critical spares, ensuring the OIB's ability to meet NSS and NDS goals by 2030.²⁰ Finally, 10 USC 2466—the rule governing the apportionment of funds used to contract for depot-level maintenance and repair—must be amended to grant the DSA flexibility based on capacity and capability across depots, including the use of contracts with the OIB and CIB of partner nations and allies.²¹

Common Sustainment Operating Picture and Execution System

To improve the overall performance of the OIB, the DSA would establish two Financial Improvement and Audit Readiness (FIAR) compliant systems for managing all depot

maintenance activities and Depot Level Repairable (DLR) supply chain activities. By integrating these systems, the DSA would be able to consolidate data currently isolated within the various military Services, allowing for a comprehensive and unified view of the OIB's operations. This would provide the DSA with the information needed to determine where to allocate resources, such as infrastructure, personnel, and supply, to optimize performance. The resulting common sustainment operating picture and consolidated funding would enable greater flexibility and agility in workload distribution oversight, enhance financial efficiency, and improve performance management through consistent, standardized metrics. Overall, this initiative would streamline operations and increase the effectiveness of the OIB.

Capacity Gains Through Infrastructure Improvement at Home and Abroad

Significant capacity shortages exist throughout the DIB, mainly induced by infrastructure shortfalls. Recent GAO reports, including one from 2022, indicate that despite investments, “the condition of infrastructure, facilities, and equipment...has not improved since 2016.”²² As of Fiscal Year 2020, the backlog of restoration and modernization projects across the OIB has reached \$9.7 billion.²³ The delays resulting from the condition of facilities “directly affect the Services’ readiness.”²⁴ A temporary influx of capital and centralized management of facilities funding is required to prevent underinvestment from endangering military readiness.²⁵ Temporary MILCON appropriations above the normal DoD MILCON top-line would allow the DSA to prioritize investment in facilities recapitalization and industrial plant equipment across the OIB while amplifying the impact through unique MILCON execution authorities that will speed the pace of execution. The temporary nature of the MILCON appropriations reflects that once facilities recapitalization is complete, the stand-alone nature of the DSA will enable the OIB to compete for MILCON funds within current constraints.

With stand-alone appropriations and the freedom to prioritize investments that will bring the greatest value to the entire OIB sustainment ecosystem, the DSA can take a holistic approach to recapitalizing facilities. To achieve effective results by 2030, the DSA should leverage private industry throughout the MILCON process. Injecting even a quarter of the estimated facilities backlog into the MILCON execution system would overwhelm it. Establishing a services contract for managing MILCON from planning through execution would enable DSA to reduce the management of its MILCON program to the bare minimum of inherently governmental roles, alleviating what would be years of delay using the existing system.

Innovation Through Public-Private Partnership Authorities

To increase the capacity and capability of the OIB while magnifying the impact of limited funding, DSA should engage with private industry under a Public-Private partnership structure. Many opportunities exist at the operational and former depots and shipyards that could expand facilities to provide surge capacity while bringing value to the commercial sector. Many closed facilities are now home to viable commercial interests that could benefit from expansion, creating Government Owned/Contractor Operated surge capacity.

Under authorities similar to MHPI, DSA would partner with the private sector to improve facilities and offer loan guarantees or direct loans. This would reduce risk and project costs for commercial partners and increase capacity, benefiting DSA and the commercial industry. This increased capacity for surge would be attained at a lower cost than it would if the OIB created this surge capacity on its own and would increase the geographical diversity of that capacity.²⁶

By leveraging new authorities and its mandate to expand the DSIB to partners and allies, the DSA would improve capacity and innovation by establishing contracts and investing in agile facilities and equipment abroad. Working with partners and allies, DSA would construct

common-use facilities, equipped to maintain foreign partners' and allies' equipment while providing surge capacity to sustain U.S. equipment during conflict. The recent establishment of a trilateral union with the U.K. and Australia, AUKUS, provides an excellent opportunity to expand the DSIB for nuclear submarines and contribute to Australia's capability and capacity to maintain its new submarines. This would provide additional capability and capacity for the MRO of the U.S. submarine fleet. Under its mandate, the DSA will identify and establish similar opportunities for other platforms to ensure global MRO services and surge capacity availability.

Reinforcing the Workforce

The DSA would leverage established programs currently siloed within the Services to reverse declines in skilled labor and STEM workforces. Each Service has tackled challenges such as an aging workforce, competition with the private sector, funding reductions, and the lack of training in unique ways. Providing vocational and manufacturing-related learning opportunities is vital to offer a lucrative alternative to traditional university routes. Moreover, DSA's scale can help develop a cohesive plan to attract graduates in STEM fields to opportunities across the entire OIB.

To implement successful programs established by various Services across the OIB, DSA would expand them. The Army's Partnership for Your Success program seeks to align Service members with future employers based on their military experience to assist them in gaining critical skills before they transition out of the Army. The Army's Career Skills Program (CSP) provides transitioning Service members with opportunities to participate in employment skills training, on-the-job training, pre-apprenticeships, and internships with a high probability of employment in technically challenging, highly skilled, and high-demand jobs.¹² Finally, the Army's CSP offers internship and COHORT programs for Service members planning to

transition or retire. DSA would leverage these programs to connect people with opportunities within the OIB and the broader DSIB.

Another concept to address workforce shortages—particularly during surges—would require establishing a new entity. The NDMR concept relies on a part-time civilian workforce of skilled industrial jobs structured to overcome manning shortfalls during surges. The NDMR is a “reserve-component-inspired model for the OIB workforce to provide surge capacity, incorporate the future of work with flexible work options, and retain trained, skilled OIB artisans.”²⁷ By establishing the NDMR as a scalable and mobile civilian workforce focused on preserving critical skills, the capacity will exist to meet surge requirements.

The NDMR can leverage national apprenticeship and vocational training programs to maintain proficiency while providing a part-time opportunity for civilians to work in the industrial sector. The Department of Labor offers subsidized apprenticeship programs to aid civilians in seeking jobs within the manufacturing industry.²⁸ DIB firms can utilize this program to offset the costs of training new employees and establish viable pathways to overcome attrition challenges. Additionally, vocational schools offer skilled workforce training programs tailored to industry requirements. Specifically, Wichita State University (WSU) Tech provides a possible training program that links civilians to valuable trade skills and provides employment assistance after graduation.²⁹ This would also attract prospective artisans from socio-economically challenged demographics because many of these programs are federally and commercially subsidized. DoD can leverage these programs to sustain industrial workforce skills. In times of national mobilization or surge, the DoD can activate these reserve artisans to fill skilled workforce shortages and allocate personnel across the entire DIB as needed.

OIB Organic Manufacturing and Limited Stockpiling

To provide reliable MRO services, the OIB requires a resilient supply chain through organic manufacturing capabilities and stockpiling authorities. Currently, reliance on single-source suppliers and the obsolescence of parts poses significant risks to capacity and surge capability, particularly for aging weapon systems. These issues result in longer lead times for requisition fulfillment, causing delays in critical operations.³⁰

To address these challenges, the DSA would establish a policy that enables the OIB to manufacture necessary materiel and parts to supplement its supply chain. This would involve revising the IP and technical data approach for local manufacturing. For example, the DSA would pursue a structure in which the OEM is paid a fee for their proprietary parts, allowing the OIB to produce those parts using new techniques or manufacturers. The OIB's enhanced capability to manufacture parts locally would increase readiness and provide an immediate response to any supply chain disruption.

Leveraging new authorities regarding the stockpile of critical parts—those with long lead times, sole or unreliable suppliers, or geographical constraints during conflict—combined with department-wide data will allow the DSA to prioritize reducing repair part lead times. To meet new mandates for maintaining sufficient spares and repair parts to meet surge requirements, DSA would leverage lifetime buys and economic order quantities to take advantage of economies of scale and advanced data analytics to predict demand. The number of stockpiled parts would be based on component failure rates and average backorder duration while considering surge demand. This proactive approach to managing the supply chain would help ensure the OIB's readiness and resilience while allowing for quick response times and efficient MRO services for the DoD.

3B. ACQUISITION'S WAR ON SUSTAINMENT COSTS

The GAO's 2022 report on F-35 sustainment provided a staggering reality -- \$1.3 trillion of the jet's estimated lifecycle costs of \$1.7 trillion are sustainment costs, a problem exacerbated by the DoD's failure to acquire IP and technical data rights needed for sustainment.³¹ This exposes the limitations of current joint-level acquisition planning where the focus is on platform production and little attention is paid to sustainment planning. Ballooning F-35 program costs are a significant risk to US national security because it consumes more funding required elsewhere to meet mission requirements.

The creation of the DSA to serve as the executive agent for all DoD major weapon systems sustainment planning and support may correct this imbalance between acquisition and sustainment. The restructuring of the OIB under a single DSA authority would improve the PEO sustainment planning coordination and stakeholder integration by making sustainment an integral part of the acquisition strategy from concept stages to actual procurements. The DSA must also educate acquisition professionals about early planning for lifecycle sustainment, including IP, supply chain risk management, and working with the PEO to ensure sustainment is an integral part of the plan from the program's beginning. This is the primary way the DSA would achieve lower life cycle sustainment costs. Combining the OIB under DSA also provides economy of scale and efficiencies of standardization that will provide additional opportunities for lowering costs. Finally, increased frequency of open communication with industry, greater use of commercial and dual-use technology, and lowering barriers for small businesses will improve competition, provide access to data rights, and support a more robust strategy for lifecycle sustainment.

Life Cycle Sustainment Plan (LCSP)

Given the importance of the LCSP as the primary program management tool, a renewed focus should be placed on preparing the document and ensuring proactive adherence to its guidance. The USD A&S in October 2022 overhauled the LCSP format. Version 3.0 expands DoD's approach to integrated product support elements, facilitates more critical thinking, and introduces emerging topics such as digital product support and supply chain resiliency. Overall, the Department's LCSP update highlights its impact on determining lifecycle costs, sustainment risks, and significant maintenance and overhaul requirements. The DSA would enforce the USD's intent by inserting a "check and balance" measure in early acquisition planning.

The DSA's mission to lower life cycle costs by promoting improved integration with stakeholders and incentivizing supply chain competition aligns with LCSP targets of effective and affordable readiness. The DoD should retain LCSP approval authority, but it should only come after coordination with the DSA. Defense acquisition programs categorized by dollar value are known as Acquisition Categories (ACAT). For ACAT 1D programs (programs with research and development or procurement budgets greater than \$525 million or \$3.065 billion, respectively), the Defense Acquisition Executive (DAE) grants LCSP after coordination by Service Program Executive Officers and other Pentagon staff offices. The DSA's LCSP coordination must be inserted before DAE approval to ensure the bulk of program costs – sustainment – are properly accounted for.

The DSA would increase opportunities for small businesses by incentivizing more competition within the supply chain, which is imperative for DoD success. Since small businesses comprise 73 percent of the companies in the DIB and 99.9 percent of U.S. businesses, DSA would prioritize their vitality. The Department's 2022 report on "State of Competition

within the Defense Industrial Base" states, "The DoD should increase small business participation in defense procurement with an emphasis on increasing competition in priority industrial base sectors of castings and forgings, missiles and munitions, energy storage and batteries, strategic and critical materials, and microelectronics."³² DSA would play an instrumental role in growing its base of suppliers in these priority sectors and other sustainment-impacted areas through partnerships with large primes for IP, the Small Business Administration, and small business industry partners.

DSA would also fill a critical role in assisting programs with LCSP in the early design phases by pushing best practices proven to increase competition in the acquisition and sustainment phases. An excellent example is modular open system architecture (MOSA), which designs lower barriers to entry for competition throughout system life cycles, avoids vendor lock, and reduces costs for sustainment and upgradability. MOSA also alleviates some IP and technical data rights challenges as a vendor-agnostic, plug-and-play system, which strengthens the DoD's position without putting the vendor's IP at risk. DSA would offer unique abilities as a center of acquisition and sustainment excellence to ensure programs integrate best practices supporting the OIB while encouraging private sector competition and innovation.

In addition to DSA's valuable contribution to acquisition planning via LCSP coordination, it should participate in the source selection team process. When competition exists for selecting a contractor to fulfill a high-dollar or complex requirement, formal source selection teams select the contractor proposal that represents the best value to the government. Source selection is a multi-disciplined team effort resulting in rigorous analysis to select a contractor and includes representatives from appropriate functional areas such as contracting, small business, technical, logistics, cost/price, legal, and program management. The DSA calls for improved

integration amongst acquisition stakeholders, and their inclusion in source selections will enable increased focus on sustainment costs and risks.

Supply Chain Risk Reduction with Data Rights to Improve Competition

In 2017, President Donald Trump signed Executive Order (EO) 13806 on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States. The EO directed DoD to conduct a whole-of-government effort to assess risk, identify impacts, and propose recommendations supporting a healthy manufacturing and DIB.³³ In response to the EO, the report identified five trending macro forces shaping the root cause of deterioration in US capabilities, each contributing to risk in DoD's supply chain. Single and sole source providers presented the most significant risks. Officials recommended expanding direct investment in the lower tier of the industrial base through the Defense Production Act Title III along with conducting analysis to address critical bottlenecks, support fragile suppliers, and mitigate single points of failure.³⁴ The report also identified reduced competition and single points of failure as significant risk areas.³⁵ OEM retaining exclusive rights to IP and technical data drove most of these single-point-of-failure events. DSA oversight could mitigate this problem by limiting OEM power through contracts and business practices giving the government access to IP. OEMs wield the most bargaining power as they retain substantial influence by controlling IP rights for repair parts and components and often serve as the single source for those components. This results in increased sustainment costs and limits the ability of the depots to seek other sources of supply or organically produce locally manufactured parts through alternative manufacturing processes. Additionally, the threat of new entrants to the market is low because of high barriers to entry in the form of U.S. government regulations and the OEM's owning IP and technical data. When an OEM closes its doors or shuts down specific production

lines, parts obsolescence becomes another major obstacle. The DSA can holistically influence acquisition to ensure the DoD gains access to technical data that can be shared with additional supply chain vendors, resulting in greater competition and reduced costs. Additionally, increased access would allow DSA depots to manufacture parts locally through alternative manufacturing methods, another means to reduce supply chain burdens. The establishment of the DSA can mitigate the supply chain risk posed by the influence of OEMs through involvement in the weapons system acquisition process as it pertains to life cycle sustainment, and by providing oversight and a unity of effort amongst all of the DoD depots.

The problems arising from parts obsolescence and single or sole source suppliers are exacerbated by a lack of accounting for long-term supply chain considerations at a program's outset. While the DOD once conducted its own supply chain risk evaluations, that capability has atrophied over time as Congress has shifted the burden to contractors to verify their work. As a result, DoD is now grappling with evaluating layered supply chain risk.³⁶ When fielding new weapon systems, some program offices in some cases primarily focus on forecasting life cycle parts requirements for organizational or intermediate-level maintenance and fail to consider requirements at the depot level. This lack of foresight creates competing interests for parts supply between operating forces and the depots. This issue presents an opportunity for the DSA to ensure program offices include depot parts requirements to facilitate long-term sustainment at reduced costs.

For the OIB and the CIB, IP subscriptions can also be an optimal approach to manufacturing parts for weapons systems, either additively or traditionally. For the DSA, this license type provides the ability to pay out a smaller portion of scarce resources at a time of need. For industry, having a single agency develop an IP policy and negotiation processes would

substantially lower compensation risks and provide relief from managing a multitude of different sustainment approaches and stakeholders. For the CIB, it provides a guaranteed revenue stream while protecting its titled technical data. Jointly, it promotes opportunities for shared production when the OIB can provide it at a lower cost or when the CIB does not have the throughput capacity, such as a significant surge. The redundant capability also protects the OIB if a sole source supplier exits the market. This formula has benefits for the global industrial base with partners and allies. IP as a subscription enables distributed manufacturing at the point of need, mitigating contested logistics concerns the U.S. would otherwise experience in the Indo-Pacific.

Final Thoughts for Acquisition's War on Sustainment Costs

The DSA, as the executive agent for all major weapon system sustainment, can take a unified approach to what has been disaggregated by the Services for decades. DSA liaison officers integrating with the PEOs will improve MRO capability and lower sustainment costs. This will also ensure early focus on the lifecycle plan, supply chain risks, and access to data rights to reduce barriers to entry and increase competition. The DSA would open communication with the industry to build trust and transparency that will improve proposals that address the risk to cost, schedule, and performance over the weapons system lifecycle. Evaluation criteria can incentivize the transition of sustainment from the OEM to DSA or small businesses tailored to a balanced value proposition for all stakeholders. With increased education for the acquisition workforce, a robust LCSP can encourage lower costs and risk for sustainment for the long term when negotiated before award. The inability to lower sustainment costs is a grave threat to U.S. national security. Creating the DSA as the executive agent for all DoD major weapons systems sustainment support can address this problem.

Increasing Competition Within the Supply Chain

Another way to lower sustainment costs and improve competition within the supply chain is by bolstering the DSA's interface with small businesses. This focus on small businesses can be achieved by following the Air Force's innovation model, "AFWERX." This program accelerates agile and affordable capability transitions by teaming innovative technology developers with Airmen and Guardian talent.³⁷ Since 2020, AFWERX has overseen the DIB expansion of 253 new companies and invested \$235 million in contracts and private capital in sustainment and advanced manufacturing pursuits.³⁸ Through the stand-up of a "SustainWERX," the DSA can benefit from the same ingenuity. Establishing relationships with entities such as the Defense Innovation Unit, AFWERX, and the OSD's Office of Strategic Capital will enable better integration with acquisition stakeholders and leverage unique aspects of the current innovation ecosystem to generate more competitive and cost-effective sustainment capabilities. As an office embedded in DSA's acquisition and sustainment directorate, SustainWERX can better identify viable small businesses, understand the small business landscape related to sustainment and advanced manufacturing, and facilitate appropriate investment strategies, ultimately increasing competition within the supply chain and lowering lifecycle costs.

3C. TECHNICAL COLLABORATION AND ADVANCED TECHNOLOGY

The DoD faces challenges in adopting and leveraging advanced technologies, resulting in missed opportunities for enhanced capabilities. To address this issue, the DSA can play a crucial role in facilitating agile and affordable transitions of technological solutions to the OIB and MRO services. The DSA's approach would involve OIB-wide collaboration, OIB-wide engineering authority, and expansion of MRO R&D relationships. These are new-game MRO market strategies that address the need to adapt the OIB for mosaic warfare contingencies.

The DSA would bridge the gap between advanced technologies and the maintainer by expediting the transition process and bypassing cultural inertia and bureaucratic hurdles. Its mission is to guide proven technologies through the "valley of death" and promptly deliver them to the OIB. Embracing advanced technologies, collaborative strategies, and partnerships can enhance sustainment capabilities, improve readiness, and position the DOD as an advanced technology enterprise.

OIB-Wide Collaboration

The future of the OIB and MRO services should capitalize on developing and sharing advanced technologies across the enterprise to facilitate agile and cost-effective capability transitions. This entails harnessing the potential of various cutting-edge tools, including full connectivity, digital thread, advanced analytics, applied artificial intelligence, human-machine interaction, and advanced engineering applications such as additive manufacturing.³⁹ In an era marked by rapid technological advancements, the DSA would foster collaboration and develop new institutional capabilities to drive data-informed structural changes that enhance speed and resilience.

It is crucial for the Services that have already invested in advanced capabilities to avoid operating in isolation as separate pockets of innovation, both within their respective Service branches and individual depots. The DSA would ensure that existing modernization strategies incorporate technology transformations that effectively integrate with the broader organic MRO enterprise. By doing so, the DSA aims to prevent the emergence of overly complex and inefficient systems while maintaining the required capabilities, personnel, and processes.

Although the transition towards a more integrated and technologically advanced sustainment framework presents significant challenges, it also offers substantial opportunities for streamlining support functions for the Armed Forces. Rather than striving for a minimal range of capabilities in each depot, the DSA's strategy would encourage the establishment of centers of excellence specializing in applied advanced skills, such as additive metallurgy or reverse engineering. For instance, if Tinker Air Force Base concentrates on manufacturing metal and composite parts to supply all Services, it can optimize its shop floor design, nurture skilled workers, and invest in process-improvement technology to achieve state-of-the-art capabilities.

This would enable them to enhance speed, efficiency, and flexibility, ultimately contributing to improved readiness levels.

Re-engineering existing technologies to simplify sustainment processes could have a disruptive impact on the DoD's current expenditure on platform sustainment. A notable example of the transformative potential of such an approach is GE Aviation's successful project in redesigning a turboprop engine, reducing its component part count from 855 to just 12 through additive manufacturing.⁴⁰ This engine now powers Textron's Beechcraft Denali aircraft, offering advantages such as reduced weight, 20% improved fuel efficiency, 10% increased power, and extended operational hours between overhauls.⁴¹ Another illustration of this process is General Atomics' recent collaboration with commercial automotive 3D printing firm Divergent. Together, they employed additive manufacturing to significantly reduce the part count of a small unmanned aerial system (UAS) from 140 to four components.⁴² This partnership allowed for a considerably faster and more cost-effective design and production process, revolutionizing the traditional timelines associated with UAS development.⁴³ The DSA can accomplish this mission by building a reverse engineering center of excellence, as well as facilitating engagement with industry partners like Divergent.

In conclusion, embracing advanced technologies and pursuing collaborative strategies within the OIB and MRO services holds great promise for enhancing sustainment capabilities for all the Services. By leveraging the power of these technologies, the DSA could achieve accelerated and cost-effective transitions while fostering integration and resilience. The establishment of centers of excellence and the pursuit of innovative approaches to streamline sustainment processes have the potential to revolutionize the support infrastructure and optimize readiness for the benefit of the military as a whole.

Bridging the “Valley of Death”

Visits to various Army, Navy, and Air Force depots had a recurring theme. Advanced manufacturing capabilities existed everywhere but were largely underused and used only to produce non-critical, easily replaced component parts such as cover plates and other items a combat platform could operate without. Obtaining engineering approval through the respective Service chains sits firmly as the biggest obstacle preventing more substantive use of millions of dollars worth of high-end equipment that could begin alleviating supply chain woes and delivering capability to the warfighter effective immediately. The two most substantial limiting factors are cultural inertia at the institutional level and the lack of a universal, standardized qualification process across the Services.

Cultural inertia combined with Service parochialism is impeding the DoD’s ability to embrace the benefits of advanced manufacturing. Though the Services each appear to embrace new technological opportunities, very little progress has been made. Former top acquisition policy expert on the Senate Armed Services Committee and deputy defense undersecretary for industrial policy, Bill Greenwalt, described the current situation as follows, “DoD, through its neglect, is turning its back on the disruptive opportunities from the commercial and non-traditional innovation sector. Rather than go where the innovation is, DoD is doubling down on a bureaucratic, risk-averse, and time-intensive system that puts us at greater risk.”⁴⁴ Linking the DoD to the big-ticket, cutting-edge technologies continuously emerging from the commercial sector has proven difficult.

The Defense Innovation Unit (DIU) was originally established as a means to break bureaucratic barriers and bridge the gap between the Pentagon and the commercial industry. The unit has faced an uphill battle. For example, in DIU’s FY2021 annual report, 26 solicitations

generated over 1,100 proposals but ultimately have only produced 8 successful transitions to DoD end-users.⁴⁵ Greenwalt blames funding and flexibility limitations combined with “an acquisition bureaucracy stuck in a 1970s mindset, and monopolistic entrenched defense companies supported by government advocates who continue to put up roadblocks.”⁴⁶

With progress at the highest levels of the department stagnated, the Services have fared no better. While the OIB has the equipment, the people, and the capacity to do much more, getting engineering approval to produce critical parts has proven a herculean task, if not outright impossible. According to Dr. Samantha McBirney, an engineer at RAND with a background in biomedical applications, emerging technologies, and laser physics, “It can take a full year for a non-mission-critical part to be qualified for use due to unnecessarily rigid, yet entirely subjective, requirements.”⁴⁷ Risk aversion from the top down has created an environment claiming to embrace innovation while preventing it from happening. The DSA could serve as the catalyst to bypass the DoD’s cultural inertia issues and provide the missing “top cover” to transform the Services’ engineering communities into embracers of risk rather than innovation-killing obstacles.

Expansion of MRO R&D relationships

The DoD hardly needs to come up with all the great ideas itself. There are myriad opportunities readily available. To become an advanced technology enterprise, the OIB must function jointly and pool a portion of hybrid revenues to cement R&D partnerships with academia while also building new relationships with different commercial partners.

Pooled OIB investments could initiate co-development projects for manufacturing-related applied MRO R&D with the DoD’s University-affiliated Research Centers (UARC) and the Department of Energy’s National Labs enterprise. R&D work programs should be created with

UARC schools focused on finding technical solutions for enduring MRO problems in metallurgy and applying advanced materials to current and legacy systems and weapons. As projects mature, OIB sites could be the hosts for prototype fabrication, testing, and evaluation. The OIB could also sponsor tailored academic research studies looking into where the enterprise needs to make technical investments. Other UARC research topics could include modeling and simulations for how to provide joint MRO services in a contested logistics environment in the INDOPACOM area of responsibility.

A new investment avenue for the OIB is the commercial start-up community. Strategic partnerships with start-ups would almost immediately push the enterprise to the bleeding edge of technology and the new value technology market space. The OIB could partner with In-Q-Tel and apply pooled resources towards specific In-Q-Tel work programs involved with advanced manufacturing, especially in the areas of advanced metals, new materials, optics, software, and electronics. In-Q-Tel and partner start-up companies could lease secure OIB infrastructure for their testing and evaluation across all start-up activities. Hosting these companies while they test their next-generation capabilities would dramatically increase the OIB's understanding of how to position and provide MRO services for this new generation of systems.

Start-up companies have long struggled to crack the code to enter the DoD's vast market. Most are forced to go elsewhere due to unnecessary bureaucratic hurdles. This is a problem the DSA would be designed to solve by serving as the conduit to bring the capabilities to where they are needed in an expedited fashion. In essence, the DSA would guide already existing and proven advanced technologies through the "valley of death" to put them in the hands of the OIB enterprise.

Section 4 – Issues and Risk

Is More Bureaucracy the Answer?

Some readers of this report may argue that the DSA proposal will increase bureaucracy, hindering efforts already pursued by Congress or other agencies. The creation of the DSA does represent more legislation and another large defense organization. But this legislation would be an attempt at a transformative change of the OIB and the MRO enterprise. This legislation would create the central entity responsible for OIB coordination and MRO services. DSA would make it easier for OSD and Congress to provide oversight because DSA would be the voice of the OIB. This single Agency would also centralize processes, have a common sustainment operating picture, be able to more efficiently manage resources, and be responsible for the changes necessary to meet the requirements of a rapidly changing strategic environment.

In the past, the federal government has responded to national emergencies, such as the terrorist attacks on September 11, 2001, with national-level organizational changes. Often independent commissions and Congressional studies recommend the creation of new agencies or entities that are given the authority and responsibility to act as the federal coordinating body across the government. As highlighted earlier, numerous precedents exist for establishing DoD-level agencies to consolidate, coordinate, and improve mission execution and performance. The DIA, DLA, and DHA were all established to solve systemic issues that the OIB similarly faces. USD A&S should continue to produce top-level policy guidance and provide DoD sustainment oversight. But DSA will have the responsibility, authority, and budget across DoD to effectively execute a comprehensive OIB strategy that integrates all departmental actions. A lead Agency should be an execution executive entity for joint and standardized MRO policies, requirements, and technical engineering standards across the force.

Furthermore, the United Kingdom's Ministry of Defence (MOD), facing similar issues with each of their armed services looking after their own needs and grappling with the increasing costs of sustainment, recently undertook the consolidation of previously separate procurement and logistics agencies and placed them under Defense Equipment and Support (DE&S), an executive agency directly under the MOD.⁴⁸

Shouldn't Incremental Changes Be Enough?

Readers of this report may believe that a proposed new agency will not be as effective as targeted reforms and that the federal government and DoD should instead employ the institutions and mechanisms already in place more effectively. If the DoD's primary goal were to make the current system of MRO services operate more efficiently, the authors of this report would agree that targeted reforms and minor changes to the OIB would likely be effective. But the strategic context of this report's discussion is much broader and the new challenges of the Indo-Pacific pivot, mosaic warfare, and the integration of advanced technologies probably requires a dedicated Agency to lead and manage change.

A single defense coordinating entity also enables deeper discussions about MRO partnerships with foreign partners and allies. The F-35 fighter program provides a model for international MRO cooperation. Australia, Norway, South Korea, and Japan will perform MRO services for the F-35 engines. This type of international coordination would not be possible without leadership from the F-35 Joint Program Office (JPO). OSD or one Service acting alone likely could not negotiate and coordinate all these international arrangements for the F-35. At a DoD-wide scale and across multiple Service weapons and systems, a DSA-like leadership and coordinating entity would probably be required to strategically manage the growth of partner capacity to complement U.S.-based MRO capabilities.

How Long Will This Take, and Can the U.S. Wait?

The Defense Logistics Agency was formed in 1961 and took 15 years to integrate fully. DSA represents a long-term and enduring solution to several OIB problems that will also take time to fully integrate. These problems can be prioritized and addressed in serial, such as acquisition reform and data consolidation, while the organization is built, and Services adapt. Indeed, Service culture, rivalry, and resource competition may initially negatively impact DSA operations. As is the case with the establishment of any new organization, any issues that arise can be addressed and resolved over time as the Agency matures.

Section 5 - Conclusion

In the authors' assessment, DSA's benefits outweigh its drawbacks, which warrants a conclusion supporting its creation. DSA is a solution for satisfying OIB needs — jointness in sustainment policy priorities, innovation, workforce development, infrastructure upgrades, financial model restructuring, IP access, supply chain resilience, and planning for aging systems—and will place it on a stronger footing over other alternatives for prevailing in future peer conflicts.

The DOD's top Acquisition and Sustainment official, Dr. William LaPlante, recently stated, "Sustainment thinking is needed now more than ever."⁴⁹ This resonates with Seminar 16's goal of reaching an end state where Services and other sustainment stakeholders are unified to advance the OIB enterprise. The DSA would make this vision possible through a host of measures including addressing historical funding shortfalls, exercising innovative authorities to improve infrastructure and readiness, early integration into the acquisition process, increasing competition and supply chain resiliency via IP access, leveraging advanced technology, and expanding DSIB surge capacity through and to PPPs and allies/partners.

Naysayers may write off the DSA's existence by characterizing it as an added layer of bureaucracy. However, they will miss the opportunity to realize the value of executing a comprehensive OIB strategy that improves mission execution and performance in an MRO function that is vital to national security. Sustainment thinking is needed now more than ever, and the DSA offers the best opportunity for a more unified approach to it. Absent the DSA, the Department should incorporate the practices advocated for in this report into the existing OIB enterprise to achieve optimal flexibility, agility, interoperability, effectiveness, efficiency, forward projection, and distribution to the point of need. The OIB of the future depends on it.

APPENDIX A – END-OF-YEAR CAPSTONE

China - Taiwan

The current tensions between China and Taiwan stem from China's claims to sovereignty over Taiwan and Taiwan's rejection of these claims. The People's Republic of China (PRC) considered Taiwan a renegade province when the Nationalist government fled to the island after losing in the civil war and established the Republic of China in 1949. In a white paper released by the State Council Information Office in 2019, the PRC believes that “to solve the Taiwan question and achieve complete reunification of the country is in the fundamental interests of the Chinese nation and essential to realizing national rejuvenation.”⁵⁰

The U.S policy based on the “Six Assurances to Taiwan” has been the core of the “Strategic Ambiguity” of U.S.-China-Taiwan relations. The U.S. has historically been a strong supporter of Taiwan's independence and has provided military and diplomatic support to the island. However, the U.S. has also sought a delicate balancing act to maintain good relations with China by recognizing the “One China” policy.

Other U.S. allies and regional partners have also expressed support for Taiwan's independence but have been cautious in their approach due to their relationships with China.

The Taiwan presidential election in 2024 is crucial for the region. A win by the ruling Democratic Progressive Party (DPP) would mean the continuous pursuit of Taiwan's independence hence, a higher probability that the conflict may escalate to a broader regional conflict, disruptions in trade and economic relations, and a refugee crisis.

On the other hand, using the November 2022 midterm election results as the basis, a win by the pro-mainland Koumintang (KMT) Party may lead to a peaceful resolution of the China-

Taiwan tensions, promoting greater stability in the region and improved diplomatic relations between China and Taiwan.

In preparation for the worst-case scenario, the U.S. DIB (the Defense Sustainment Agency in particular) can play a significant role both in the short and long term.

In the short term, the DSA can:

- Provide mobile MRO teams to help train Taiwanese forces on weapons and military equipment sustainment to maintain its readiness to deter any potential Chinese aggression.
- Explore the possibility of establishing MRO locations outside Taiwan, preferably with treaty partner nations in the region, to achieve resilience and responsiveness in providing the required services in times of need for the INDOPACOM and the Taiwan defense requirements. This may include government-to-government or government-to-private firm arrangements depending on the bilateral/multilateral agreements.

In the long term, the DSA can:

- Establish a DSA “forward” presence in the Indo-Pacific and European theaters. DSA forward sites would be given the responsibility to extend the Common Sustainment Operating Picture to include allied and partner capabilities.
- DSA would lead and publicly demonstrate next generation MRO services for new technologies within theaters. This could include combined and joint MRO services for advanced weapons systems, such as hypersonic and counter-hypersonic missile systems, drones, and artificial intelligence-based systems to demonstrate that the U.S. and its allies maintain an MRO technological edge over China.

- Lead the industrial base, academia, and regional allies and partners to develop MRO planning scenarios for high-consumption, high-attrition contingencies with stressors on MRO, logistics, and transportation.

APPENDIX B: PORTER'S FIVE FORCES ANALYSIS OF RUSSIA

The Russian defense industry and military exports are key elements of its economy and foreign policy. Russia is the second largest military arms exporter to global customers, second only to the United States, accounting for \$19 to \$25 billion annually. Russian weapons sales account for 20% of global arms sales to over 45 countries with most sales going to Algeria, China, Egypt, India, and Vietnam.⁵¹ From 2016 forward to present day, India is the largest global buyer of Russian arms.

Moscow has significant resources to continue weapons manufacturing, but the overall trends in sales volume may decline over the long-term as the poor quality of Russian equipment in the Ukraine war shifts demand to other suppliers. Due to the structure of the Russian defense industry, it is also unlikely to see significant increases in weapons and equipment quality over the long-term.

Porter's Five Force Analysis of the Russian Defense Industry

Competitive Rivalry - The rivalry between existing competitors is Low. The Russian government has implemented consolidated state monopolies across the various manufacturing domains. For example, there is only one main fighter aircraft producer, one main shipbuilder, one tank producer, and so on, across the defense manufacturing industry. Very little competition dynamics exist between companies, and over time, this has led to technological stagnation and poor quality.

Buyer Bargaining Power - The power of the government buyer is High. The Russian government drives centrally-planned military production and manufacturing production rates. The Russian government establishes 5-year production goals and companies produce goods to

meet quotas with varying degrees of success. There are few incentives for Russian companies to innovate or produce higher quality products.

Bargaining Power of Foreign Arms Buyers - The power of foreign arms sales buyers is also low. Russian companies are not client-oriented, but the military manufacturing industry is also highly dependent on income generated from sales because it does not receive direct funding from the central government.⁵² The quality of Russian equipment is a continuing maintenance and repair burden to buyer countries, but the comparative low-cost of Russian weapons continues to drive a value-proposition for customers. Russian defense manufacturers do not have a civilian or commercial-facing market component.

Threat of Substitutes - The threat of substitution is medium and likely growing higher. The ongoing war in Ukraine has, over time, openly showcased some of the endemic quality issues with Russian military equipment.⁵³ Open-source reporting reveals that Russian arms sales clients are reevaluating future arms sales purchases given the poor performance of Russian equipment in Ukraine and may be looking for potential substitutes for future equipment procurements.⁵⁴ Threats from foreign defense manufacturing competitors that can provide effective substitutes will likely grow and effect future sales.

Threat of New Entrants - The threat of new domestic entrants is Low. Russian military manufacturing and production is state-controlled. New entrants would be effectively barred from entering the industry unless officially sanctioned by the Kremlin to enter the military production and sales market. Given the ongoing income and supply-chain constraints from international sanctions, the likelihood of a new entrant into the domestic military industry is low.

APPENDIX C: PORTER'S FIVE FORCES ANALYSIS OF CHINA

The U.S.'s ability to keep China within arm's reach during the Great Power race has proven to be no small feat. In a July 2022 address to government acquisition professionals, Maj Gen Cameron Holt, the Department of the Air Force's previous top contracting official, presented a sobering reality for the U.S. by drawing a comparison of its acquisition speed with that of China. "China is getting its hands on new military equipment five to six times faster than the U.S. In purchasing power parity, they spend about one dollar to our 20 dollars to get to the same capability. We are going to lose if we can't figure out how to drop the cost and increase the speed in our defense supply chains."⁵⁵ Holt's words should be cause for alarm in a U.S. defense acquisition industrial base (DAIB) dominated by an oligopoly (Lockheed, Boeing, Northrop Grumman, Raytheon, and General Electric) and consisting of slow, cumbersome acquisition and budgeting processes.

While a former section in this report highlights the dynamics of the defense sustainment industrial base via Porter's Five Forces analysis, the same analysis can be done for the DAIB where much improvement should be made by the U.S. to increase its speed of acquisition. By applying Porter's Five Forces Model to China's process for acquiring weapon systems, the next section surmises the seminar's assessment of China's DAIB.

Porter's Five Forces Analysis of China's DAIB

Buyer Bargaining Power – China's Buyer Bargaining Power can be assessed as High. Because it leverages an *absorptive strategy* with two main features, adoption and integration, China acquires technology from other countries through measures such as reverse engineering, purchasing systems from other countries, and IP theft.⁵⁶ Integration refers to blending defense and commercial interests, as with China's Military-Civil Fusion.⁵⁷ Because of its command

economy and its Military-Civil Fusion structure, China enjoys the benefits of directing its industrial base to focus on technology areas important to the People's Liberation Army (PLA), and in turn has a lot of leverage in determining the prices of systems.

Supplier Bargaining Power – For the same reasons buyer bargaining power is Low, supplier bargaining power for the PLA is also Low. The PRC's command economy coupled with Military-Civil Fusion also plays a role in determining the leverage that suppliers have. In several instances, China is hand-selecting who its suppliers are. As a 2022 Rand report suggests, "President Xi Jinping and the Chinese Communist Party (CCP) have been working to increase their influence and even direct decision-making within defense firms."⁵⁸

Competitive Rivalry – Also for the same reasons mentioned above, Seminar 16 assesses competitive rivalry within China's DIB to be Low. Unlike the U.S. DIB where Moderate competitive rivalry occurs from large primes seeking to outbid their competitors for lucrative government contracts, it is Low for China. In many cases, the CCP/PLA makes the decision on who receives contract awards and is not subject to the procurement practices (such as competition) that can slow down U.S. acquisitions.

Threat of New Entrants – This aspect of Porter's Five Forces can be assessed as Low to Moderate, mainly driven by corruption. Another Rand published report states, "China's defense industry still faces many major obstacles, such as widespread corruption, lack of competition and entrenched monopolies."⁵⁹ Complex acquisition practices and security requirements erect high barriers of entry for prospective U.S. new entrants, creating an environment where the threat of new entrants is Low. However, in China, it is fair to assume companies that want to do business with the PLA can improve their chances of access into the defense industry through their willingness to bribe government officials.

Threat of Substitutes – Threat of substitutes for the PLA can also be assessed as Low to Moderate. China’s absorptive approach towards technology and its embrace of acquiring technology from other countries through measures such as reverse engineering, purchasing systems from other countries, and IP theft are the main drivers in this area. As a result, it has several innovative technology options at its disposal for integrating into its military.

APPENDIX D: ABSTRACTS

CDR Christopher Burt
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U.S. Navy

Title: The Fast Follower Conundrum – Encouraging Innovation and Protecting Data Rights While Ensuring DoD Access to Vital Data for the Organic Industrial Base (OIB)

Thesis: Intellectual property (IP) and data rights are key to enabling the OIB. To meet this need, the DoD has only three choices: buy IP outright, choose a middle path of creative contracting at the beginning of the acquisition cycle, or not buy the data and remain beholden to the contractor. The middle path of creative contracting is the only affordable path that enables the OIB while protecting an innovative private sector.

Plan of Action: The paper used academic frameworks to build the structure that supports the thesis. The use of Market Structure and Porter’s Five Forces frameworks eventually led to the big takeaways in response to the possible courses of action in reimagining the OIB of the future.

Academic Frameworks: The defense industrial base (DIB) market structure is characterized by a single buyer, the DoD, and an oligopolistic market dominated by a few large firms. High barriers to entry, such as significant capital investment, technological expertise, and complex government regulations, restrict competition. This market highly values IP and technical data, which significantly influences both the OIB and the CIB aspects of maintenance, repair, and overhaul (MRO) activities.

This market structure drives the conduct of companies as they strive to protect their IP and establish themselves as sole-source suppliers to secure long-term business. As a result, the industry’s overall performance may suffer, with companies generally avoiding innovation or changes that might jeopardize their established business lines.

Porter's Five Forces model applied to the CIB highlights the challenges faced by the DoD. The threat of new entrants is low due to high barriers. The bargaining power of suppliers is high due to specialized products and services. The bargaining power of buyers is moderate to high due to a single buyer that is readily influenced by politicians coupled with the need to protect a dwindling industrial base. The threat of substitutes is low due to the specialized nature of products and services. Finally, the intensity of competitive rivalry is initially high but disappears after the contract award.

The Five Forces Model emphasizes the importance of IP and technical data to the industry. The challenge for the DoD lies in balancing the protection of private sector investments while ensuring access to IP and technical data needed for MRO activities in the OIB and avoiding vendor lock.

Big Takeaways: Acquiring sufficient IP and data rights in the defense industry faces challenges from the DoD acquisition system, regulations, and communication disconnects. Companies seek

to protect their IP due to commercial market concerns and fear of sharing proprietary information with competitors. Data rights rules, divided into unlimited, government purpose, and limited rights, further complicate matters for both the DoD and the industry. Both must be balanced to meet MRO needs while encouraging private-sector investment and innovation.

The U.S. Government relies on the private sector defense industry for innovation, weapon systems, and as a national resource against competitors, but also maintains an OIB with MRO capabilities for surge capacity during wartime. To support the OIB, the DoD must make informed choices concerning contracts and MRO activities. Recommendations for improvement include:

- effectively implementing and funding the IP Cadre for training contracting officers,
- amending regulations to require access to sufficient technical data to enable OIB core MRO functions as award criteria,
- allowing contracts beyond five years for data rights,
- exploring government-wide consolidated IP and technical data rights acquisition options,
- standardizing Modular Open Systems Approaches (MOSA) to increase innovation, competition, and cost savings while avoiding vendor lock.

Lt Col Clarence “Geno” Burton
Acquisition
U.S. Air Force

Title: Employing the Digital Century Series (DCS) to Align with the Pace of Technology and Reduce the Sustainment Burden

Thesis: Adopting the DCS model would place the Department on a stronger footing for meeting challenges posed by China and others by reorienting its investment strategy to one that delivers advanced capabilities at the pace of technology innovation.

Plan of Action: The DCS concept was introduced in 2020 by Dr. Will Roper, the Department of the Air Force’s (DAF) former Acquisition Executive, as a disruptive shift in DAF acquisitions that suggested quick-turn design and production of new combat aircraft every few years—produced in lots of 50-100 units before being superseded by the next design—would keep the fleet fresh, better align with technology, and prevent ballooning sustainment costs. Following the introduction on DCS’s background, the author summarizes the research sources used to support the paper’s thesis. Major contributors were Dr. Will Roper (via interview), McKinsey and Company’s September 2020 Business Case Analysis on DCS, and reports from the Government Accountability Office and the Hudson Institute. The remaining sections focus on addressing feasibility of the DCS strategy, applying academic frameworks (Porter’s Five Forces and the Supply and Demand model), and evaluating the DCS pros and cons through an analysis of value creation. The closing section argues for employing DCS as a viable investment solution that contributes to flexible, technology-focused, cost-effective, lethal, resilient, and ever-ready weapon systems.

Academic Frameworks: The author leverages Porter’s Five Forces Five and the basic economic model of Supply and Demand to determine the utility of the DCS approach. Porter’s Five Forces illustrates the impact DCS has on the defense weapon system market in the areas of *Threat of New Entrants, Buyer Bargaining Power, and Competitive Rivalry Readiness*. Further, it highlights the benefits produced in these three areas stemming from a more competitive defense industrial base (DIB) and an increased frequency of opportunities to receive contracts for fighter aircraft development and production. From a cost efficiency perspective, Supply and Demand was used to present the prospect of lowering acquisition and lifecycle sustainment prices by evaluating the potential for increased supply and demand.

Big Takeaways: Modernization and sustainment represent 60% of a fighter aircraft’s life-cycle costs. Employing the DCS could potentially reduce the annual costs of an aircraft by 11%. Shifting to a DCS construct would require the DAF’s modernization and sustainment budget to be reallocated to Research and Development. However, this will result in a more pediatric, less geriatric force in addition to the benefit of achieving a larger, more active DIB. Through the focus placed on constant development and a more frequent cadence of contract awards for aircraft, contractors are incentivized to innovate. Overall, DCS enables a competitive advantage 25% greater than the traditional approach and delivers the latest technologies at the speed of relevance.

Title: OIB 4.0 – Meeting the Military at the Future of War

Thesis: This analysis explores how the U.S. Organic Industrial Base (OIB) can adapt to support emerging defense strategies and operational concepts, specifically the concept of Mosaic Warfare, to enhance the United States' deterrence capabilities in the Indo-Pacific region.

Plan of action:

1. **Establish an Industry 4.0 lighthouse:** The U.S. military needs to invest in advanced manufacturing capabilities to create a center of excellence that serves as a proving ground for the rapid adoption of next-generation manufacturing technology. This lighthouse would have the agility, speed, and customization capabilities to produce parts on-demand for maintenance, repair, and overhaul efforts. It would also focus on improving existing designs to make them easier and less costly to sustain. Additionally, the lighthouse should have the capacity to quickly transition to manufacturing munitions or small attritable platforms necessary for Mosaic Warfare. This initiative aims to enhance production efficiency, simplify the supply chain, lower costs, and enable innovation.
2. **Invest in communications components and software:** The OIB should take the lead in developing communications components and software that enable seamless integration across systems. Currently, connectivity is often an afterthought, and there is a lack of unified communications capabilities across different services. By building communications components for all weapons systems and prioritizing connectivity, the OIB can support the objectives of Joint All-Domain Command and Control (JADC2) and enable Mosaic Warfare through fully integrated systems.
3. **Secure funding and maintain technological edge:** To realize the above objectives, a Congressional appropriation is likely necessary to fund the establishment and maintenance of the Industry 4.0 center of excellence. The center have the capacity to manufacture components for all weapons systems. It should also stay at the forefront of technology adoption to keep pace with innovations in speed and materials. Securing funding and staying technologically advanced are crucial to maintaining a highly capable force and outcompeting adversaries.

Supply and Demand Model

The model proposed in this analysis shifts the supply curve to the right to provide for additional demand at the same price, maintain demand but potentially lower cost, or provide additional supply if necessary for surge.

Big Takeaways on how your results tie into the “OIB of the Future”

Overall, the plan of action focuses on leveraging advanced manufacturing technologies, enhancing connectivity and integration, and securing the necessary resources to strengthen the U.S. Organic Industrial Base (OIB) and support emerging defense strategies and operational concepts for credible deterrence in the Indo-Pacific region.

Title: Preserving Industrial Human Capital Through the National Defense Manufacturing Reserve

Thesis: By consolidating the Army reserve components, the DOD can achieve long-term cost savings and apply these savings to establish a scalable reserve workforce focused on preserving critical skills and capable of meeting large-scale maintenance, repair, and overhaul requirements.

Plan of action: The Academic Year 2022 Organic Industrial Base seminar developed the National Defense Manufacturing Reserve (NDRM) concept to overcome these shortfalls. This paper proposes implementing this concept through a resource and politically-informed perspective. Porter's Five Forces, the Supply and Demand, and the Key Readiness Enabler models provide useful frameworks to understand industry challenges, the NDRM's economic value, and how it increases overall readiness for the MRO industry. A risk analysis of the proposal will lay out arguments and gaps in the NDRM and propose future areas of research necessary for successful implementation.

Academic Frameworks: Porter's Five Forces will aid in understanding the risks and challenges of the MRO industry. Competitive rivalry is the most significant force in the model as many commercial and industrial base firms compete for a limited skilled labor pool. Trade schools (suppliers) maintain a largely symbiotic relationship with DIB firms, but unreliable MRO demand signals force suppliers to scale down capabilities to contain costs. Skilled workers (buyers) present high bargaining power due to their limited availability. The Supply and Demand Model presents an economic value proposition supporting the NDRM. Specifically, the NDRM shifts this supply curve through increased productivity and as an additional skilled labor provider. The Key Readiness Enabler model is an important tool to assess the NDRM as this tool analyzes how any initiatives increase readiness. This paper will analyze increased readiness and develop policy options through the Governance, Finance, Human Capital, and Infrastructure enablers.

Big Takeaways: Ultimately, successful implementation of the NDRM will preserve critical industrial skills, establish a ready and scalable civilian workforce, and establish a unified and agile Army reserve component capable of supporting national and state missions.

Title: Strength in numbers: U.S. must leverage allies and partners to create defense industrial base capacity required in future

Thesis: Due to the nature of the war we may have to fight and the capacity shortages throughout the defense industrial base, the U.S. cannot fix this problem alone. Attempting to do so would drain the U.S. economy, lose public support quickly if no existential threat is nearly unanimously perceived, and fail to address the tyranny of distance issues a conflict in the Indo-Pacific region will present. U.S. leaders must look abroad to forge strong partnerships and alliances embracing infrastructure, human capital, material, finance, and governance opportunities in other nations that will be critical to forming the organic industrial base of the future required to preserve the liberal international order.

Plan of Action: This paper will examine and identify the best practices for leveraging foreign allies and partners to create the global defense industrial base capacity required to contain, deter, or defeat China if necessary. The current capacity problem will be examined through the five readiness enablers (infrastructure, human capital, material, finance, and governance) including both commercial and organic industrial bases on a global scale. This conglomerate defense industrial base will be further reviewed through Porter's Five Forces and Diamond models as best practices are identified to create a more mobile, agile, and distributed-to-the-point-of-need system that has the capacity and flexibility required to successfully wage and sustain conflict in the vast Indo-Pacific region. Finally, recommendations for the way ahead will be provided.

Academic Frameworks: Five Readiness Enablers – No single nation possesses the level of infrastructure, human capital, material, finance, and governance capabilities that will be required to defeat China in a conflict contained to the Indo-Pacific region. U.S. leaders need to build upon existing alliances and partnerships while forging new ones to create capacity through tapping into the resources 36 nations in the region offer. Overly restrictive U.S. policy must be amended while also protecting our intellectual property as required. Balance must be struck and greater levels of risk accepted. While Porter's Diamond model is designed to examine how and why some nations innovate and compete on global stages better than others, the elements of governmental influence and related industries are most applicable to this paper. Porter's Five Forces model also ties in as supply chain constraints diminish bargaining power of buyers.

Big Takeaways: Defense industrial base capacity is expanded throughout the Indo-Pacific region as a deterrent if Chinese aggression is contained or as forward sustainable output should conflict become necessary. Capacity to produce assets throughout the region will outpace attrition rates and the long slow logistical chain back to the U.S. mainland is only to contribute to resupply vs sustain the operation wholly. Additionally, Governments will have forged alliances and partnerships throughout the region to enable warfighters to operate together seamlessly, share resources to include MRO activities, and continue outproducing China until conflict resolution. The mutual defense industrial base of the future is a global enterprise – mobile, agile,

and distributed to the point of need with capacity and flexibility no nation on the planet can hope to defeat.

COL Stephen M. Kinyanjui
Signal
Kenya Army

Title: Leveraging Foreign Allies and Partners to Meet the MRO Services of the Future.

Thesis: Improving OCONUS MRO services will depend on leveraging the U.S. Allies and Partners CIB to mitigate existing challenges and result in a more distributed and agile capability support, and based on the geography of the Indo-Pacific region, Australia offers the best regional ally for the U.S. partnership in MRO services that increases the operational efficiency of the U.S. military into the future.

Plan of Action: To achieve the MRO capability in Australia; first, an infrastructure analysis should be carried out; second, the U.S. to engage in long-term FMS and co-development of capabilities and lean on treaty partner nations in the region to standardize interoperability of systems to raise demand; third, the CIB to invest globally to meet the demand thereby supplying the needed capability in MRO services to meet operational requirements.

Academic Frameworks: a. Demand & Supply. The paper argues that the attractive long-term FMS and co-development activities will attract private-sector investment in Australia, e.g., AUKUS Submarines or F-35 programs. b. Structure, conduct & performance. The paper argues that the global CIB firms will be an offshore investment of the existing U.S. OEM firms in Australia. The firms will compete across the board, focused on Ship and Aircraft MRO services and in technical data packages monopoly pricing for these services. The performance of the firms' output will be measured by the level of operational readiness required to deter PRC and achieve surge capacity in case of war. c. Five Readiness Enablers. The paper argues for a major private sector investment in the Australian infrastructure, human capital, supply chains (materiel), and governance, especially the IP regulatory environment.

Key Takeaways: By the U.S. entering into long-term FMS contracts with Australia and other treaty partners such as Japan, South Korea, Philippines, and Thailand and entering into co-development of capabilities with Australia, such as AUKUS, will create the necessary demand to attract the U.S. Primes to invest in the region. These firms will become part of the Global CIB investment in MRO services in Australia and will reduce the tyranny of distance between the U.S. West Coast and PRC, thereby increasing the operational availability of military capabilities across the region, thereby deterring PRC aggression. The research identified that Australia has positioned itself for these investments and is empowering the development of cutting-edge military innovations with A\$1.2 billion through the Next Generation Technologies Fund (NGTF) and another A\$1 billion in funding to 2030 through their Defense Innovation Hub. However, IP theft, political risks due to offshoring of jobs, and loss of competitive advantage were identified as potential risks. Creating the MRO work around sensitive technologies and having OEMs operate Siemens distributed manufacturing exchange advocated as a mitigating mechanism. Despite the risks, the partnership with Australia to Maintain, Repair, and Overhaul military capabilities reduces the tyranny of distance, strengthens the long-term relationship of allies and partners, and creates a higher level of military readiness in the region.

COL Alfonso DS Matias Jr
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Philippines Army

Title: Offshoring Select MRO Capabilities to the Philippines: A Strategy to Strengthen OIB's Responsiveness and Resilience

Thesis: Offshoring select maintenance, repair, and overhaul (MRO) capabilities of the U.S. organic industrial base (OIB) to the Philippines is an important initiative that could help enhance the US OIB's responsiveness and resilience to sustain operations in the Indo-Pacific Command (INDOPACOM) region.

Plan of Action: To support the thesis, the paper explored the concept of offshored MRO services, the need for the U.S. OIB to expand its offshored MRO agreements, and the potential of the Philippines as an ideal location to offshore some U.S. OIB MRO capabilities. It concluded with a brief discussion of the acknowledged challenge in implementing the initiative and how best to further the overall objective of reimagining the future of the US OIB.

Academic Frameworks: Available literature explained the concept of offshored MRO services as applied in the paper, citing the experiences in the U.S. Passenger Airline industry and the U.S. Navy's offshore MRO agreement with RUAG Australia for selected components of the F/A 18 Hornet Fleet through collaboration between the U.S. Department of Defense and the Australian Ministry of Defence. The Eisenhower School's OIB key readiness enablers framework was used to appreciate the current state of the U.S. OIB. Its components, current challenges, and implications on the proposed offshoring of OIB MRO capability were articulated to justify the need to expand the offshored MRO agreement of the U.S. Industrial Base. The Porter's Diamond model was the framework used for analyzing a prospective country's competitiveness in providing MRO services. Through this framework, the Philippines was identified as a possible location for providing select MRO services for ship repair in the INDOPACOM region for the U.S. Navy.

Big Takeaways: The paper presented a compelling option for U.S. OIB to offshore select MRO services in shipbuilding and repair to become more responsive in the INDOPACOM while seeking lower costs, increasing resilience and efficiency, and tapping into a talented and growing workforce in Southeast Asia. However, the U.S. and the Philippines need to review and expand the existing Enhanced Defense Cooperation Agreement (EDCA) coverage to include offshore MRO services in the agreement.

Ms Jennifer Loyall Matney
Financial Management and Logistics
U.S. Air Force Civilian

Title: The OIB of the Future Requires a New Defense Sustainment Agency

Thesis Statement: The Service-owned sustainment structure within the aviation and land-based OIB hinders efficiency, agility, and future success against near-peer or peer competitors by 2030. A new Defense Sustainment Agency (DSA) focused solely on providing depot maintenance and depot-level reparable (DLR) supply management allows for greater oversight, negotiating power, and workload allocation.

Plan of Action: A new Defense Sustainment Agency (DSA) could provide centralized management of depot maintenance and supply chain management, eliminating redundancies and improving consistency. The DSA would be led by a four-star general and organized into three functional divisions for aviation, land, and DLR supply.

Academic Frameworks: The Production Function calculates output based on input resources like labor and capital. But having multiple small facilities can increase overhead costs without increasing output, reducing the effectiveness of the production function. Depot-level reparable supply chains work differently from traditional supply concepts like the Law of Supply. Demand and funding are controlled, so price increases may not lead to more supply. Porter's Five Forces describe the threat of new entrants to the OIB as low, with its high barriers to entry and exit limiting potential consolidations or closures. Relocating capital equipment is costly, leading to excess capacity and draining funding from fully utilized facilities.

Big Takeaways: To achieve global defense goals by 2030, the OIB needs a more efficient structure. Collaboration and knowledge sharing are vital to regaining U.S. dominance. DSA can improve the OIB's production function by eliminating overhead costs while strengthening negotiation power as a unified supplier and purchaser. The new DSA will provide greater flexibility and agility, increasing material availability for warfighters.

Title: Shoring up the semiconductor supply chain to Bolster the U.S. organic industrial base (OIB)

Thesis: The U.S. government and industry have taken steps to onshore critical semiconductor production and secure the supply chain. However, more actions are needed to ensure long-term resilience and competitiveness.

Plan of action: to support the thesis, the paper discussed the impact of global semiconductor supply chain challenges on the OIB and national security. Also, it described the steps taken by the U.S. government and industry to address these challenges. Additionally, I made a proposal for expanding the OIB to include a new capability for manufacturing semiconductors. This proposal will include an explicit recognition of the benefits and costs of such a new capability.

Academic Frameworks: *Porter's Five Forces* will aid in understanding the risks and challenges of shoring up the semiconductor supply chain to enhance the OIB. Characterized by high barriers to entry such as high capital requirements, technological complexity, economies of scale, and intellectual property protection. Shoring up the semiconductor supply chain would help decrease the *threat of new entrants* by encouraging new domestic suppliers to enter the market and increase domestic production capabilities and R&D investments of existing U.S. semiconductor companies. This would also help maintain their competitive advantage and market share in the global semiconductor industry and create a more diversified and resilient domestic ecosystem to support the OIB and national security.

Suppliers in the semiconductor industry have a high degree of concentration, differentiation, and switching costs. Shoring up the semiconductor supply chain would help reduce the *bargaining power of suppliers* by increasing domestic production capabilities and R&D investments. This would also help diversify the sources of supply and reduce dependence on foreign suppliers.

Applying the *Readiness enablers* model to shore up the U.S. semiconductor supply chain includes three factors that contribute to the ability of the OIB to meet the demand and needs of the DoD and other customers. These factors are workforce, infrastructure, and technology. Shoring up the semiconductor supply chain would require investing in education, training, and immigration policies that can attract and retain talent in the growing U.S. semiconductor industry that would result from onshoring. It would also require upgrading and expanding the existing facilities and equipment and building new ones to increase domestic production capacity and reduce dependence on foreign sources. Finally, increasing R&D investments and collaborations among industry, academia, and government to develop and adopt new technologies such as AI, quantum computing, and nanotechnology would be necessary.

Big Takeaways: To expand the U.S. OIB to include a new capability of manufacturing semiconductors would entail investing in modernizing and diversifying the existing OIB facilities that provide sustainment resources for the military, such as depots and arsenals. This would involve upgrading the equipment, processes, technologies, and workforce skills to enable the production of advanced microelectronics and other critical components. semiconductor design and fabrication capacity. This would also involve creating incentives, partnerships, and

information-sharing mechanisms to foster a more resilient and competitive domestic semiconductor industry.

Title: Shipyard PPV - Applying Military Housing Privatization Authorities to Shipyards

Thesis: Congress must grant new authorities that empower the Navy to establish a Shipyard Public-Private Venture (SPPV) that leverages limited funds to spur the Commercial Industrial Base (CIB) to increase the number of drydocks capable of supporting nuclear-powered aircraft carriers and submarines, removing a critical constraint to increase the supply of Maintenance, Repair, and Overhaul (MRO) and Battle Damage Repair (BDR) services for the Navy's nuclear fleet.

Plan of Action: The paper provides analysis and recommendations that support the thesis in an organized, logical manner. First, the paper will review existing studies regarding the condition of Naval shipyards, their capacity to conduct peace-time MRO, and the capacity and need for BDR capacity for the Navy's nuclear fleet, and the authorities under which the Military Housing Privatization Initiative (MHPI) was executed. Next, the paper will summarize the demand and analyze the ability of the OIB and Commercial Industrial Base (CIB) to supply MRO and BDR services. It will then leverage Porter's Five Forces to understand the commercial market. Based on this analysis, the paper will offer recommendations to leverage MHPI authorities for use with shipyards.

Academic Frameworks: Analytical frameworks used in the paper include an analysis of supply and demand, market analysis using Porter's five forces, and Elihu Goldratt's *Theory of Constraints* to understand constraints causing a lack of supply in the OIB and CIB. This analysis identified that Navy demand for MRO services exceeds supply during peacetime conditions and that the availability of surge capacity to meet BDR demands during conflict is almost non-existent. Porter's five forces analysis reveals that the low threat of new competitors and low, competitive rivalry between firms prevent supply the CIB from increasing supply in response to demand. Leveraging the *Theory of Constraints*, it is ascertained that the lack of dry-dock capacity is the key constraint for both the OIB and the CIB.

Big Takeaways: This paper recommends a whole-of-government approach that leverages the commercial sector through new authorities modeled on the MHPI. The approach aims to leverage federal, state, and municipal government combined with private industry to increase MRO supply while providing capacity to support surge requirements in a timely and cost-effective manner. It proposes that Congress grant DoD appropriate authorities to create a Shipyard Public Private Venture to address the forces preventing supply expansion. Despite significant investment in the OIB, the Navy is out of money and time. The CIB—despite the clear demand for peacetime MRO services—has not responded by increasing supply and has no incentive to respond to theoretical demand for BDR capacity that may never be needed. By granting authorities similar to the MHPI, Congress can lay the groundwork for the Navy to establish a Shipyard Public Private Venture that multiplies the impact of available funds—increasing the number of dry docks—subsequently lowering barriers to entry and increasing competition in the MRO services industry. These authorities would catalyze CIB expansion and

spur a more efficient whole-of-government approach that would encourage the alignment of resources across the federal government.

Title: Addressing Critical Skilled Labor Shortages in the Organic Industrial Base: A Case Study on Army Opportunities

Thesis: This research paper will address the impacts on the OIB without critical skill vacancies being filled and provide solutions to filling these vacancies by reviewing existing Army programs aimed at filling critical skilled labor vacancies. More importantly, this research will answer, “How can the OIB recruit and hire the critically skilled workforce needed to support the OIB of the future?”

Plan of action: This paper provides analysis and recommendations that support the thesis in an organized, logical manner. First, the paper will apply academic frameworks to include the readiness model and the operational readiness model, the supply and demand framework, and concluding with an analysis of Porter’s Five Forces. The paper uses a case-study method to analyze and recommend two existing Army recruitment and retention programs that offer solutions for the OIB's skilled workforce demands. While these are Army programs, they can benefit each of the services with skilled labor, often drawing from those prior service members possessing the needed critical skills the OIB requires.

Academic Frameworks: The paper begins by analyzing different frameworks to understand the significance of the shortage of skilled labor in the OIB. The OIB Readiness Model and the Operational Readiness Model illustrate how the shortage of skilled labor directly affects the readiness and operational capabilities of the OIB. The supply and demand framework highlights the impact of skilled labor shortages on the labor market, including wage inflation and talent competition. Porter's Five Forces framework is applied to analyze the competitive forces that shape the labor supply and demand, identifying strategies for addressing the issue

Big Takeaways:

The paper presents a case study on Army programs as solutions to fill critical skilled labor vacancies in the OIB. The Partnership for Your Success (PaYS) Program, which establishes partnerships between the Army and corporations, offers opportunities for service members to align their military skills with future employment. The PaYS program can help the OIB recruit skilled laborers, such as welders and mechanics, and address critical skill shortages. Additionally, the Army Career Skills Program (CSP) provides transitioning service members with employment skills training and internships in high-demand industries, facilitating their transition into civilian careers.

By leveraging these Army programs and initiatives, the OIB can overcome critical skilled labor shortages. This research paper emphasizes the need for a collective effort across the OIB to address critical skilled labor shortages. By implementing the PaYS program and leveraging the Army Career Skills Program, the OIB can recruit and hire the skilled workforce needed to support its mission and ensure readiness for future defense industrial activity and depot maintenance requirements.

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Infantry
U.S. Marine Corps

Title: A National Shortfall: Resourcing an Enduring OIB Strategy to Meet the Requirements of the NSS and NDS

Thesis: The United States (U.S.) must establish a long-term Organic Industrial Base (OIB) strategy that supports Globally Integrated Deterrence (GID) strategic requirements, imperatives, and mobilization demands, and must execute and resource the strategy through a novel whole-of-government interagency approach.

Plan of Action: This work first defines the OIB and reviews a decade's worth of analysis of the OIB to frame its current condition and fundamental weaknesses. Second, the paper contextualizes the current strategic environment with a focus on the critical requirements of the National Security Strategy (NSS), National Defense Strategy (NDS), and GID to define the strategic requirements, imperatives, and demands of a novel OIB strategic approach. Further analysis focusing on the requirements to gain a national advantage through a robust OIB strategy and the pitfalls of capability-bridging strategy refines the needs of a long-range OIB strategy. Finally, this work discusses a potential new approach to a long-term OIB strategy that can exploit interagency action across the national power instruments to meet the demands of U.S. strategy.

Academic Frameworks: This work analyzes the strategic environment through the author-developed Strategic Network Deterrence Complex Adaptive System framework, and the requirements of GID through the Sisson-Siebens-Blechman (SSB) framework for coercive strategy, to illuminate the strategic requirements of the future OIB. The novel employment of Michael Porter's Model for National Advantage and an author-developed bridging solutions framework refines the needs of a long-range OIB strategy and analyzes the risks inherent in bridging solutions to extend legacy capabilities to meet GID mobilization requirements. The result is recommendations for establishing an effective strategy to guide the development of the future OIB.

Big Takeaways: The U.S. does not have a comprehensive OIB strategy that drives a long-term whole-of-government interagency effort that can endure changes in administration and associated priorities. The U.S. needs a long-term OIB strategy over 15 to 50 years that can meet the mobilization requirements of the U.S. national strategy. Given the current coercive approach of GID, an effective long-term OIB strategy must: apply to any geographic area of competition no matter its priority, account for the complex adaptive system of actors and statecraft, operate with the same national power instrument employment as GID, enable the negative engagement approach of coercion, and account for the imperatives of a coercive strategy. Developing a long-term OIB strategy must pay particular attention to the GID-driven mobilization demand conditions placed on the OIB, and whether policies and funding positively influence the factors employed to meet the demands. Further, a continued focus on minimizing short-term risk by extending legacy OIB capabilities will fail to meet the mobilization requirements of GID.

Finally, the management of the OIB needs a new approach, with the authorities to direct interagency action and a resourcing capability that prevents new systems funding at the expense of the OIB.

Mr. Anthony Thomas
Acquisition
U.S. Defense Logistics Agency

Title: DoD's IP Strategy Overhaul for a Modernized Organic Industrial Base

Thesis Statement: Overhauling DoD's IP strategy, when adequately resourced, will directly support taxpayer stewardship in reduced sustainment costs, the warfighter with increased maintenance, repair, and overhaul (MRO) capabilities, and a distributed manufacturing capability at the point of need.

Plan of Action: DoD commented that the temporary nature of the IP cadre billets made it a disincentive for employment. They stated that it would present an obstacle in future attempts to staff. Not only did the temporary billets weaken the caliber of the cadre, but having only four temporary billets to support DoD looks to be woefully under-resourced. It's recommended the strategy be fully funded. This may have also contributed to the disaggregation of the IP strategy taking away from its success. In addition, the 813 advisory panel with all of its recommendations did not mention the IP subscription model that addresses many of the tensions between industry and government. It's recommended this be pursued along with the initiative to develop more modular open systems approaches (MOSA). As well as continuing best practices such as fully incorporating the sustainment lifecycle into the acquisition strategy, open communications with industry, and requiring proposals to specify their interpretation on required data rights. Where the distinction is made between operation, maintenance, installation, or training (OMIT), and the exclusion of detailed manufacturing or process data (DMPD) and specifics on fit, form and function (FFF) data rights required by existing laws are key areas to request in proposals.

Academic Frameworks: Applying the Porter's five forces model to the U.S. defense industry, the CIB structure is an oligopoly with a monopsony. In other words, there are a few sellers with a single buyer. The DoD initiated the few sellers' structure when they encouraged consolidation of the CIB. The Department of Justice took a more relaxed stance on the concern for mergers and acquisitions during the 1990s. What resulted was limited competition and an increase in vendor lock for some of DoD's most exquisite weapon system programs.

Using the concept of value creation, a potential solution is for the CIB to provide data rights as a service or subscription. This value creation is seen in the emerging additive manufacturing industry, where an entity can pay for the IP royalty by part for each build. Moreover, the entertainment industry using streaming media pioneered this licensing approach decades ago, making it less novel and assuring a viable licensing model.

Big Takeaways: A robust intellectual property (IP) strategy can be obtained even in peacetime when the DoD acquisition community is integrated and focused on opening communication with the industry, negotiating intellectual property prior to award for the complete lifecycle of the system, and tailored licensing. A potential solution is incentivizing the industry to set up an IP subscription broadly accepted in the commercial market for streaming entertainment. This may be accomplished through public private partnerships. For DoD acquisition, the contractor can offer a right-to-use license per part or over a specified time. For the OIB, this type of right-to-use license provides the ability to pay out a smaller portion of scarce resources at the time of need. For the CIB, it provides a guaranteed revenue stream while protecting its titled technical data. Jointly, it promotes more opportunities for shared production either because the OIB can provide

it at a lower cost, or the OIB can supplement the manufacturing when the CIB does not have the throughput alone during times of surge, or they decide to exit the market. An additional benefit for the DoD is an international industrial base with disbursed manufacturing capability at the point of need.

LtCol Patrick Williams
Logistics
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Title: Building Resiliency in the Organic Industrial Base Supply Chain

Thesis: The organic industrial base (OIB) relies on a consistent, effective supply chain to conduct its primary mission of providing maintenance, repair, and overhaul (MRO) services for the Department of Defense (DOD). It is important for the depots that constitute the OIB that the supply chain that supports them is resilient, and comprehensive means are in place to mitigate supply chain risk. The challenge for the OIB is to maintain readiness despite significant constraints within the OIB supply chain. Greater resiliency can be built into the OIB supply chain through the implementation of improved DOD governing policy and practices, along with the granting of additional authorities to key OIB supply chain elements, thereby enabling the OIB depots to manage supply chain risk more effectively.

Plan of Action: The paper provides analysis and recommendations that support the thesis as follows. First, the paper reviews existing reports that pertain to supply chain risk management and resiliency in the defense industrial base (DIB), applicable to the OIB. Next, the paper frames and analyzes the OIB supply chain resiliency problem. This is accomplished using analytical frameworks applied to the OIB market. This analysis is based upon independent research, interviews, and visits conducted with supply chain professionals at commercial industry sites, OIB depots, and the Defense Logistics Agency (DLA). Based on the analysis, the paper offers recommendations and next steps to address the problem and concludes by describing its applicability towards building the OIB of the future.

Academic Frameworks: Analytical frameworks used in the paper include Porter's Five Forces and basic economic market structure. The strongest of Porter's Five Forces with respect to the vendors that constitute the OIB supply chain is the bargaining power of suppliers. Within the OIB supply chain, the original equipment manufacturer (OEM), as the supplier with the most bargaining power, influences a large portion of the supply chain by controlling the intellectual property (IP) rights for repair parts and components, or serving as the sole or single source of supply for those components. The threat of new entrants to the market is low because of the high barriers to entry in the form of U.S. government regulations, and the IP and technical data ownership by OEMs. The MRO services market that the OIB operates in is structured as an oligopoly, where aside from the state-owned maintenance depots, there are only a few prime defense contractors that produce most of the weapon systems for and supply many of the repair parts to this market. Yet some smaller, lower-tier suppliers to this market also operate in other non-DOD markets. The structure of those other markets is representative of monopolistic competition, where the product produced is differentiated and the barriers to entry are lower.

Big Takeaways: Some takeaways from the models used to describe how to build resiliency in the OIB supply chain are to move from an exclusive oligopoly market structure to one of monopolistic competition by increasing the number of market suppliers to the OIB. Policy should attempt to reduce the bargaining power of prime contractor suppliers by allowing for access to IP and technical data during the acquisition process. This will allow for more suppliers

to enter the market, as well as allow OIB depots to locally manufacture parts and become more value added to their own supply chains, build resiliency, and increase readiness.

Mr. Jin S. Yoo
Directorate of Science and Technology
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Title: Different Rules, Different Thinking, New Money: The OIB Reimagined as an Advanced Technology Enterprise

Thesis: To meet the global challenges presented by peer competition, the OIB needs a new management and investment strategy that reimagines the OIB as a leading advanced technology joint enterprise, capable of leading the DIB in metals and material applications, advanced manufacturing, and innovative MRO techniques that are faster, agile, and rapidly scalable.

Plan of Action: To achieve this vision for new value creation, the OIB should convert its unused capacity into consistent revenue, reinvest that revenue into coordinated capital improvements across the OIB, and develop a joint OIB advanced technology collaboration roadmap with the goal of reshaping the character of the MRO market from the current construct that is wholly service dominated, to a joint MRO paradigm that offers the scaled supply-side increases in MRO services that can readily meet the evolving challenges of today and tomorrow.

Academic Frameworks: This paper uses Porter's Five Forces to decompose the sustainment industrial base into the commercial industrial base (CIB) and organic industrial base (OIB). The paper argues that the legislative protections surrounding the OIB actually make it less competitive with the CIB in the MRO market over time. The paper makes the argument that the OIB and Congress act together on the strategic game board. Again, restrictive legislation keeps the OIB competing in niche services in the same game repeatedly. To evolve into a new-game strategy, the approach to OIB needs different thinking and a new strategy. More importantly this new strategy needs consistent resourcing somewhat separated from the current OIB funding model.

Big Takeaways: It is critical for the OIB to begin to act as an advanced manufacturing enterprise that turns coordinated technology investments into sustained value for the DOD in the MRO services market. This strategy would increase capacity and supply of services, but also dramatically increase the quality of that capacity and provide modernized services in preparation for peer competition threats. Moving strategically into advanced technologies would change the OIB strategic game board by potentially expanding into different MRO markets such the space domain, next-generation communications, and the government information and intelligence domains. Critics would argue that a government-owned enterprise could not be a technology leader. But this is a spurious argument that does not recognize the federal government's historical role in innovation. The National Aeronautics and Space Administration's role with driving science and technology R&D and Defense Advanced Research Projects Agency's with the DOD are ongoing testimonies to the government's role in innovation. With a new hybrid framework and shared investments that underwrite a new advanced technology identity, the OIB could also be a part of innovation leadership legacy.

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