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**Reforming the U.S. Organic Industrial Base and  
Safeguarding the Indo-Pacific Through Regional  
Sustainment**

**INDUSTRY STUDIES**

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## Executive Summary

For the Academic Year 2023/2024, the Organic Industrial Base (OIB) Industry Study Seminar at the Eisenhower School for National Security and Resource Strategy considered if U.S. maintenance, repair, and overhaul (MRO) capacities can sustain military forces to deter war and, if necessary, to win in the Indo-Pacific. As the U.S. shifts its strategic focus to the Indo-Pacific in response to increasing great power competition with the PRC, and as the years 2027 through 2030 appear critical, this seminar recognized that the current OIB may lack the capability and capacity to meet the challenge. This seminar proposes that the U.S. OIB reform its structure, conduct, performance, and policy to build a “Responsive OIB,” one that can leverage MRO services abroad and strengthen OIB enterprises at home.

This thesis requires an analytic picture of the current OIB. To accomplish this, the seminar applied the structure, conduct, performance, and policy (SCP-P) framework. This research then applied the Five Readiness Enablers framework, which highlights OIB governance, infrastructure, materiel, finance, and human capital to identify vulnerabilities and risks that may harm readiness to accomplish core competencies. As will be presented, the seminar’s main findings are that the OIB workforce is aging and decreasing, its infrastructure is deteriorating and obsolete, global supply chains remain a strategic and fragile challenge, and current policies do not include adequate use of foreign MRO facilities. Even if the seminar assesses the OIB as effective in peacetime, overall, there is a growing shortfall in possible efficiencies considering potential conflict in the Indo-Pacific in the timeframe 2027-2030.

Through site visits, subject matter expert engagements, research, and analysis, this seminar determined that the U.S.’s strong network of allies and partners (A&P) can be pivotal in deterring and defeating adversaries. A&P also provide opportunities to offset identified readiness

weaknesses in the current OIB. In this context, the seminar examined the Regional Sustainment Framework (RSF), championed by the Office of the Secretary of Defense (OSD) and led by the Honorable Christopher Lowman, Assistant Secretary of Defense for Sustainment (ASD(S)). The RSF offers opportunities for the U.S. to work with A&P to forward project MRO services closer to contested theaters, alleviating supply chain risks, bolstering allied interoperability, supplementing U.S. industrial human capital shortfalls, reducing transportation time and costs, and enhancing the U.S. overall sustainment strategies.

To ensure the OIB is ready for future challenges of the Indo-Pacific, this seminar recommends that the Department of Defense (DoD) issue guidance to the military services with an eye toward reforms to OIB locations. These reforms may specify requirements to support the RSF and implement a plan for each service integrating A&P MRO services in the relevant regions, starting with the Indo-Pacific. A&P MRO services are meant to be used in addition to current OIB resources; they do not necessarily replace the use of existing facilities in CONUS. Furthermore, complementing the inherent benefits of RSF, the OIB should address human capital concerns by developing a civilian maintenance reserve force and an OIB artisan fellowship program. Moreover, the RSF can identify areas for infrastructure improvement by pairing MRO stress tests with already-scheduled combatant command and major command (MAJCOM) exercises, by better distributing capital fund investment governance, and by institutionalizing cyber resiliency as a critical OIB function. Finally, this seminar recommends policies and governance reform to integrate multi-national MRO considerations into future weapon systems acquisitions and incentivize regional alignment as a part of future weapon system MRO life cycle sustainment plans.

## **Strategic Context**

The OIB must be ready to sustain U.S. military platforms for the challenges anticipated in U.S. national strategy, particularly those necessary to counter PRC aggression in the Indo-Pacific. Readiness provides the military with the ability to be both combat capable and combat credible. As stated in 2023 by Undersecretary of Defense for Acquisition and Sustainment William LaPlante, “Production itself is deterrence... to expand global capacity of production and sustainment and foster opportunities for even co-development, co-production and co-sustainment.”<sup>1</sup> To address the OIB’s readiness requirements, this paper will first define readiness and deterrence in the context of OIB MRO services.

### **Readiness**

DODI 3000.18 defines operational readiness as all factors impacting the joint force’s ability to accomplish assigned missions and tasks that support the National Security Strategy (NSS) and National Defense Strategy (NDS).<sup>2</sup> From a sustainment mindset, this means readiness includes all factors which impact production and maintenance (e.g., including supply chains), required to support the joint force in accomplishing missions.<sup>3</sup> This research applies this sustainment mindset and the Five Readiness Enablers to consider all factors which impact the OIB’s provision of MRO. To generate MRO, the OIB must combine trained personnel with the facilities required to sustain warfighting equipment, which is then provided to the warfighter for operational and training needs. The Indo-Pacific introduces additional challenges to the broader sense of readiness, as the “tyranny of distance” from the continental U.S. (CONUS) increases timelines to and from operating areas.



## **Deterrence**

The NSS states that “the PRC presents America’s most consequential geopolitical challenge” and that “the Indo-Pacific is where its outcomes will be most acutely shaped.”<sup>4</sup> The NSS and NDS pursue “integrated deterrence,” a whole-of-government approach to “combine our strengths to achieve maximum effect in deterring acts of aggression.”<sup>5</sup> To materially address this challenge, the NDS seeks to “modernize the systems that design and build the Joint Force... make supporting systems more resilient and agile in the face of threats... and cultivate... a workforce” to achieve these ends.<sup>6</sup>

The thesis of this paper supports these efforts and argues that such recapitalization must occur for both readiness and deterrence. The OIB must prepare to provide the military with required warfighting materials in a responsive manner and time so that the adversary understands they has only two choices; capitulate or face unacceptable costs.

## **Analysis**

This research will explore the nature of the OIB in three sections, each devoted to its own separate analytic framework. The first section investigates the OIB’s structure, conduct, performance, and policies (SCP-P) to define the current OIB. As an analytic framework, SCP-P explains the current state of the OIB in terms of its foundations, decisions, actions, and applicable shaping forces. The second section applies the Five Readiness Enablers, a framework developed by the Eisenhower School that identifies the main factors contributing to military readiness of the OIB as if it were an economic production function. The Five Readiness Enablers will be used to help assess what OIB factors apply to concerns in the Indo-Pacific for the time frame 2027-2030, and in turn what the “OIB of the future” may require. The third section

introduces the novel conception of a “Responsive OIB,” elaborating which competing OIB requirements must be balanced in the long-term.

### **SCP-P Model: Current OIB Structure**

The OIB’s current structure is subject to broader national and DoD issues concerning the workforce, supply chains, and infrastructure. The workforce of the OIB is governed by sometimes outmoded hiring practices and shortages in skilled labor. Its infrastructure is impacted by aging facilities, a lengthy military construction (MILCON) process, and a fiscally constrained environment. These examples, in addition to increasing supply chain vulnerabilities, mean that the DoD must seek ways to evolve to meet the current environment.

Figure 1 illustrates the current structure of the U.S. defense industrial base (DIB) and the OIB’s place in it. It also depicts allied and partner nations’ interest in expanding their contributions to a cooperative industrial base. The U.S. has an opportunity to capitalize on this interest by shifting certain OIB and CIB activities to those partner nations.

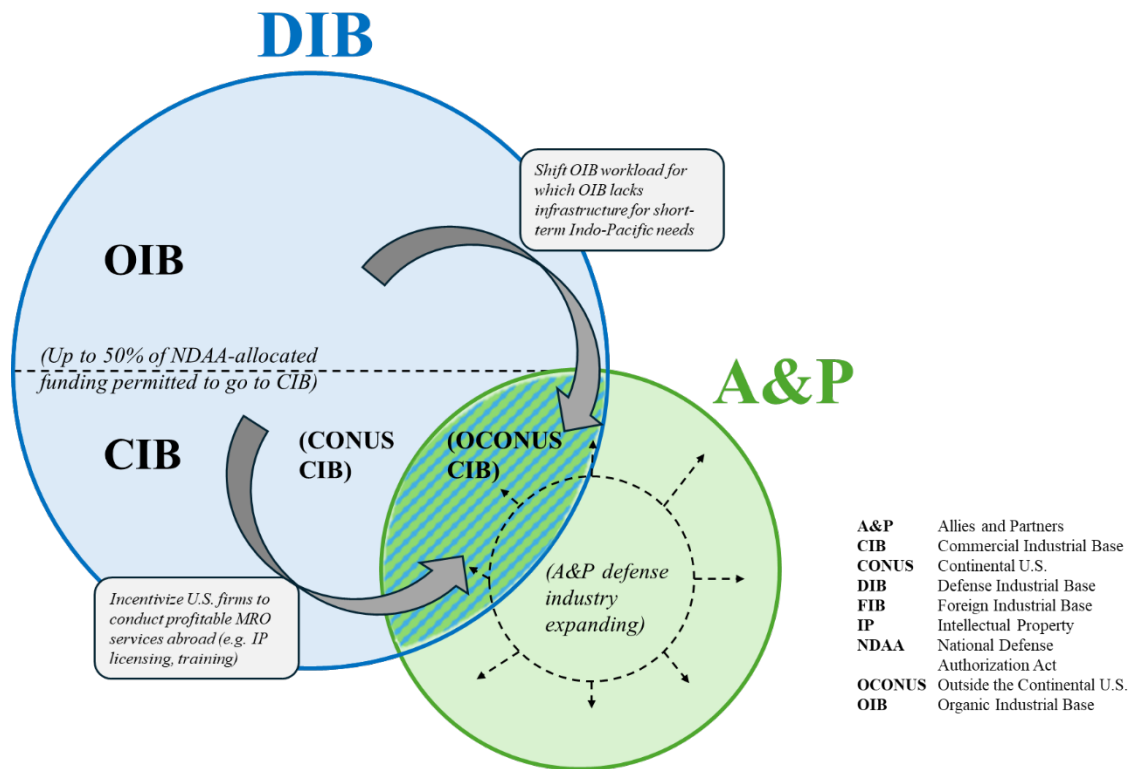


Figure 1: The evolving structure of the defense industrial base regarding sustainment and MRO

The current structure of the OIB is driven by statutes in Title 10, U.S. Code. According to 10 USC 2464, the United States must maintain “core” depot-level maintenance and repair capabilities to support combatant commanders’ operational requirements and to enable the joint force to execute strategic, contingency, and emergency plans.<sup>7</sup> Furthermore, government owned-government operated (GOGO) facilities are required to maintain enough workload to maintain what is known as core depot-level capability. To accomplish this, 10 USC 2466 stipulates that no more than 50 percent of annual funds allocated to a military service or defense agency for depot-level maintenance may be used for non-government personnel to accomplish this workload.<sup>8</sup> This is typically referred to as the “50-50” rule. While critical to maintaining capability in the event of a national crisis, these elements of the U.S. Code may restrict how the OIB takes advantage of new industrial base sources, such as those available internationally.

OIB facilities are concentrated in CONUS, the result of historical requirements placed on the OIB and political interests in keeping facilities in certain electoral districts. While this creates some efficiencies by centralizing the OIB workforce and associated resources in one landmass, this puts OIB logistics capabilities at risk of being isolated from the theaters these capabilities are meant to support. Operating large distances from CONUS complicates logistics and increases the risk associated with transportation and supply chain disruptions. Such disruptions could be partially alleviated by dispersing MRO services globally and integrating them into a more resilient network.

Additional examination of the OIB's structure through the lens of political, economic, social, and technological factors is included in Appendix B. This analysis highlights external influences that affect OIB operations and are pertinent to the reform of the OIB.

### **SCP-P Model: Conduct**

Today's OIB heavily emphasizes conducting its mission self-sufficiently. As capacity limitations and surge requirements inherent in a protracted Indo-Pacific fight come into focus, the OIB has begun to explore how partnering with foreign nations might provide opportunities to change how it conducts its mission to provide greater combat capability.

Roberto Buaron's Strategic Gameboard is a framework for assessing the conduct of an industry; applying it to the OIB reveals why the OIB may be exploring changes in its business practices. This model focuses on where, how, and when the OIB competes within the broader DIB.<sup>9</sup> While the OIB is CONUS-centric, "where" a firm chooses to compete goes beyond chosen physical locations and includes considerations such as which markets in which to compete. During industry study visits to OIB sites, leaders at OIB locations generally said that they do not seek to compete with industry but rather to fill gaps in the market. This is an element of "where"

the OIB chooses to compete—areas where the commercial market is not producing enough to meet the DOD’s demand signal. The OIB chooses to compete in low density, legacy systems where profit margins are not as attractive to private firms as profit margins for other systems.

When analyzing “when” to compete, OIB leaders plan when they intend to conduct MRO work, but ultimately they do not know how much workload will be demanded. The OIB was created to guarantee that the U.S. had some industrial capacity on hand in the event of a crisis. Under routine circumstances, the OIB organizations forecast the demand for MRO services based on scheduled maintenance and operations forecasts and then posture themselves for anticipated workload. However, all visited OIB organizations reported to the seminar that they preserve some unpublished measure of capacity for surge requirements, subject to resource availability.

In the Strategic Gameboard, “how” to compete conveys whether a firm is operating the same way as other firms or has undertaken a fundamentally new way to operate, potentially disrupting competition. The organic and commercial elements of the MRO ecosystem generally use similar equipment and processes as one another, but the OIB has the additional consideration that it may need to operate in a combat environment. This has led OIB organizations to explore methods that might not be economical for commercial firms, but are advantageous in potential combat scenarios. These include functions like deployable repair capabilities (equipment, supplies, or workforce) or additive manufacturing for parts on demand and on site.

### **SCP-P Model: Performance**

While the CIB is primarily concerned with prioritizing efficiency in search of profit margins, the OIB also must be concerned with effectiveness deriving from the aims of

government leaders. This tends to place the OIB at a disadvantage to seek the most efficient capital allocations to maximize long-term performance.

Further, measuring the effectiveness of core capabilities and surge can be inherently difficult. According to DODI 4151.20, dated 4 May 2018, services are required use what is known as the DoD “core” computation methodology to determine the essential maintenance competencies each service must sustain, and the required workloads needed to maintain those capabilities.<sup>10</sup> This metric ensures the services sustain a maintenance force technically competent to accomplish a broad range of tasks supporting peacetime operations.<sup>11</sup>

The OIB is grappling with performance challenges partly due to its backlog of facility restoration and modernization projects, which has increased by nearly 50 percent since 2017. This expanding backlog contributes to substantial cost increases and delays in depot operations. Much of the OIB’s capital equipment is past its expected service life, diminishing the OIB’s ability to perform high-quality repairs and keep pace with the demands of military operations. This inefficiency not only leads to increased operational costs but also prolongs the downtime for essential equipment repairs, affecting overall military readiness.<sup>12</sup> The impact to military readiness has been substantial, as seen in sub-standard mission capable rates for aircraft<sup>13</sup> and on-time maintenance rates for ships, the latter of which in 2021 were as low as 20% for carrier strike groups.<sup>14</sup>

In response to increasing operating costs and to identify performance shortfalls, vulnerabilities in supply chains, and reports of its declining infrastructure, Congress has been increasing its oversight of the OIB. Specifically, Congressional investigations have increased reporting on OIB health and the impacts of commercial mergers and acquisitions on overall OIB operations.<sup>15</sup> Congress has also required U.S. military services to spend minimum thresholds on

modernizing facilities and requires them to create annual OIB modernization plans. These requirements are intended to correct OIB readiness shortfalls.

### **SCP-P Model: Policy**

A collection of relevant laws and policies shape the structure, conduct, and performance of the OIB. Most of these policies predate recent changes to the strategic environment and will require updates to implement objectives driven by the NSS, NDS, National Defense Industrial Strategy (NDIS), and OSD initiatives.

The most visible policies governing the OIB are those central to its structure, the “50-50” and “core” requirements covered earlier in this paper. Together, these preserve organic capability in the event of a short-notice contingency or a major war. An additional legal provision mandates that military services reinvest 8% of OIB revenue into OIB facilities and capital infrastructure while a subset of OIB facilities submit special reporting to Congress.<sup>16</sup> Subject to the broad frameworks provided in the legislation, the DoD provides policy while individual services have the latitude to implement their portions of the OIB in ways that best support their unique sustainment needs.

Existing policies have not fully addressed expeditionary sustainment, readiness to meet the pacing challenge, or the integration of allied and partner capabilities. The Regional Sustainment Framework (RSF), a new OSD initiative, now seeks to bridge this gap and aims to improve military readiness and effectiveness by fostering a globally connected, agile, resilient, forward projected, and well-distributed MRO network. This strategy mainly focuses on the challenges of maintaining military operations within distant contested logistical environments, especially in the Indo-Pacific region. The RSF endeavors to position MRO services closer to operational areas and integrate them into a holistic regional sustainment strategy.<sup>17</sup>

Current policies, particularly DoDI 5000.91 (Product Support Management for the Adaptive Acquisition Framework), significantly influences the behavior within the acquisition and sustainment community. These policies permit future acquisition programs to balance organic, commercial, and regional support. Regional sustainment decisions could be made impartially, considering a wider perspective beyond the discretion of the Program Manager and Product Support Manager. Without additional evaluation of the benefits of regional sustainment, these managers might be overly swayed by immediate cost-saving incentives.

To effectively address the identified shortfalls within the OIB, particularly concerning MRO operations, implementing a regional approach such as the RSF is likely not just beneficial but essential. The RSF's strategic focus on decentralizing MRO capabilities, enhancing infrastructure, developing regional workforce skills, diversifying supply chains, and strengthening partnerships directly addresses the most central deficiencies within the OIB. These topics are examined further in the governance sub-section below and in this paper's recommendations.

### **Five Readiness Enablers**

While the SCP-P framework has been used to explain the current OIB, the Five Readiness Enablers will be used to understand what factors contribute to the readiness of the potential OIB of the future. Each readiness enabler contributes to readiness and interacts with the other enablers. For the original Five Readiness Enablers model, see Figure 2. In this seminar's view, some enablers have a direct impact on readiness, while others have an indirect impact. The seminar introduced an adjusted model, adding two elements: strategy and innovation, as seen in Figure 3. The element of strategy refers to the overarching plan for continued success of the enterprise and all internal components. The element of innovation refers to the OIB-equivalent of



“entrepreneurship.” Entrepreneurship is a crucial element of the economic production function, upon which the Five Readiness Enablers model is based, describing how individuals pursue economic incentives that ultimately increase the efficient allocation of capital and distribution of goods and services. In the OIB, individuals pursue similar efficiencies without free-market profit motives.

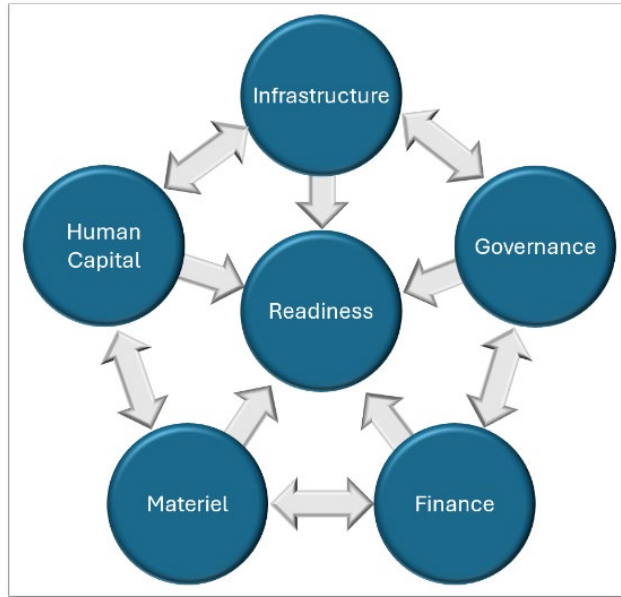


Figure 2: The Five Readiness Enablers (Original)

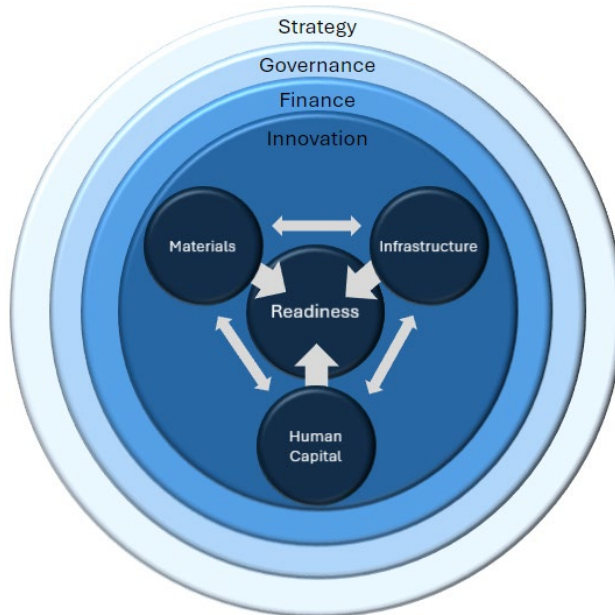


Figure 3: The Readiness Enablers (Updated)

## **Five Readiness Enablers: Governance**

Governance of the OIB requires close review to determine how to adapt to a changing global environment, specifically regarding 50-50 and reporting of surge capacity. While the seminar's strategies recognize and address the changing environment, policy governance itself requires equal attention.

Governance encompasses all legal permissions required for the OIB to operate as an MRO enterprise. Accordingly, governance aims to meet industrial base demands in peacetime and war. It includes the processes, structures, and mechanisms through which the OIB is directed, controlled, and regulated. Military leadership, civilian service secretaries, and congressional oversight govern the OIB, primarily through legal frameworks like Title 10 U.S. Code, Title 50 U.S. Code, and the Code of Federal Regulations (CFR). In this way, governance indirectly affects readiness through the application of direct enablers.

One drawback of governance is that it can hinder flexibility if it is too restrictive. For instance, the 50-50 rule could limit the DIB's ability to expand capacity through the competitive advantage of the CIB or otherwise restrict the ability to expand during a rapidly evolving conflict scenario. Yet, such an expansion may be required if OIB facilities lack the capacity for increased workload due to surging operational requirements or combat losses. Further, a desire to maintain 50-50 runs contrary to significantly growing the industrial base through international contracts. As a result, legislators will need to determine if foreign industrial base (FIB) activities—projected to be predominantly contracts—will count toward the commercial component of 50-50 reporting. If they do, organic “offsets” may be required in the OIB.

Another governance issue the seminar identified is that the OIB lacks a metric for surge capacity that is standardized across the DoD. The computation method for determining surge

capacity in MRO facilities employs direct labor hours (DLH). This metric is inadequate because it overlooks critical factors like labor, plant capacity, and other production elements essential for a thorough assessment. Further, DLH itself does not describe the level to which reserve capacity can be levied to increase throughput. Many MRO facilities lack standardized surge plans and rely on rough estimates of their production capabilities, making it unclear what exactly can be produced during a surge.<sup>18</sup> More sophisticated methods and simulations are necessary to evaluate OIB's readiness for high-demand scenarios, such as potential conflicts in the Indo-Pacific with peer adversaries.

### **Five Readiness Enablers: Human Capital**

Human capital refers to the availability, quantity, training, skills, and experience of the workforce, and serves as a foundation for readiness. The workforce ensures the continuity and development of talented individuals. The OIB has encountered human capital challenges, most notably workforce shortfalls for certain occupations. Initiatives to bolster the workforce would ordinarily take years, beyond 2027-2030, to produce impacts for sustainment for conflict in the Indo-Pacific. This research assesses that innovative uses of reserve forces, changes to Office of Personnel Management (OPM) pay structures, and collaborative MRO initiatives with A&P would significantly improve near-term workforce shortages and address long-term issues.

Human capital issues in the OIB are part of a long-term U.S. trend; since 1979, there has been a decline in the number of individuals entering U.S. manufacturing and tradecraft occupations. Workforce “shortages extend from skilled laborers to engineers and other STEM fields needed to drive innovation and capacity development.”<sup>19</sup> Since 2001, the GAO has identified skills gaps as a high-risk issue, issuing a stark warning that the government lacks the necessary skills in critical occupations such as human resources, science, technology,

engineering, mathematics, cybersecurity, and acquisitions.<sup>20</sup> During the seminar's visits to various MRO installations, mid- and top-level leadership explicitly stated that labor shortages were one of their main concerns.

There is a clear supply and demand issue in recruiting, training, and retaining new STEM talent into the OIB. Due to the long-term shifts required for skilled laborers to enter the economy, the skilled labor supply within the OIB is relatively inelastic. This means that sudden increases in wages and incentives would not rapidly decrease worker shortages to meet demand (see Appendix C for more analysis). In addition to the nation-wide shortage of a skilled labor and STEM workers, OPM wage ceilings amplify shortages in the OIB. This results in a demand issue within the OIB as wages cannot increase to reach equilibrium with the labor supply.

The strategic placement of the right individuals in appropriate roles is important to the viability and resilience of the OIB. Workforce age is an issue throughout the DIB, and even more pronounced in the OIB, as many core labor force members approach or pass retirement age. Several depot senior leaders stated that the average age of wage-grade employees (i.e., artisans) is around 53 years. This population represents a repository of significant experience that is at risk of being lost when the population retires. Recruiting new artisans is a particular challenge for the OIB. OIB hiring tends to lag behind trends in private labor markets and struggles to be competitive with the CIB, as private industry tends to offer higher wages and faster rates of onboarding employees. DoD bureaucratic processes serve as impediments to swiftly recruiting and onboarding talent. As of 2020, the federal hiring process takes an average of 98 days, about double the time it takes the private sector.<sup>21</sup>

A foundational problem underlying the above issues is the government employee compensation structure, where the compensation of skilled artisans is both too low, and the

qualification requirements are too high. Despite current human capital initiatives, the government is often at a competitive disadvantage. This is mainly because current compensation does not sufficiently incentivize prospective talent, leading to a loss of competitiveness. OPM must align its pay structures, qualification criteria, and hiring standards to effectively compete with the private sector. For the OIB to successfully attract these skilled artisans, it is imperative that the compensation packages offered are competitive enough. Furthermore, the qualification standards set by OPM must be realistic so the applicant can compete for the position. For example, if a recently graduated engineering student desired a job at an Army depot in one of the areas the seminar visited, to be qualified they would require a 3.0 grade point average (GPA). Without this GPA, the applicant would have to start as a lower tier of the government payscale, a substantial reduction below competitive private sector rates. It is essential for the OIB of the future that these standards align with the realities of the job market, thereby facilitating the recruitment of a diverse and skilled workforce for the OIB. This would enhance the OIB's competitiveness and ensure its readiness to meet the nation's defense needs.

Lastly, to sustain and win in the Indo-Pacific, the workforce will require flexible and multifunctional leaders and artisans who can be surged at the point of need, whether that is at an A&P location or at a traditional CONUS OIB location. To effectively recruit and retain top-tier talent, the enterprise must reimagine strategies and processes to enable a resilient and flexible OIB with the capacity and capability to be ready when the nation calls.

### **Five Readiness Enablers: Infrastructure**

Infrastructure refers to the physical structures (property, plant, and equipment) supporting the OIB and is critical to accomplishing the sustainment mission. OIB infrastructure challenges are summarized by three factors: aging facilities and equipment, geographical centralization in

CONUS, and cyber vulnerabilities. Regardless of the nature of the threat, poor facilities and equipment will serve as constraints to the level of productivity in the OIB. CONUS centralization becomes an issue considering the threat posed by the PRC with contested logistics. The RSF can mitigate the risks faced in the Indo-Pacific by pursuing A&P opportunities when they present a comparative advantage to domestic MRO. Finally, the cyber threat must be countered, especially as the OIB seeks ways to expand industrial infrastructure.

In recent decades, aging infrastructure has increasingly challenged the OIB, decreasing workforce output and limiting surge capacity. Recently, Congress has attempted to reverse the deterioration of the 21 covered depots by establishing minimum capital investments based on a three-year average of workload revenue.<sup>22</sup> Covered depots are identified by statute and distinguished from other depots by their comprehensive repair and overhaul capabilities. This minimum capital investment requirement is helpful for establishing a baseline level of investment available to consider additional infrastructure requirements.

Facility struggles in the OIB are compounded by a slow MILCON process that is focused on modern platforms. The GAO found that facility strategies have been “incomplete” as recently as 2022, with no appreciable change in facility readiness since 2016.<sup>23</sup> From a depot perspective, MILCON projects are tied to workload activations, which occur for new weapon systems no later than four years after initial operating capability.<sup>24</sup> This new construction constitutes an urgent matter for the depots while upgrading legacy facilities is achieved through the relatively limited Facilities, Sustainment, Restoration, and Modernization (FSRM) funding. Legacy systems in turn suffer due to poor facilities, creating a risk to effective sustainment in a significant portion of the force. This approach unintentionally favors new systems when surge capacity depends on facilities for all platforms, new and old.

In addition to facility readiness, it is important to examine the geographic laydown of OIB facilities, where as noted above there is a need to rely on more distant locations rather than solely on CONUS-based centers of excellence. Based on the OIB model the U.S. has employed since WWII, all 21 covered depots are in CONUS. Yet, this format makes depots less relevant in a contested logistics environment, where there is appreciable risk to distribution channels or MRO hubs. As the OIB struggles to modernize infrastructure, capacity is immediately available at A&P locations. RSF enables select systems to be maintained by foreign industrial base activities. The seminar judges that access to more facilities and MRO services would lead to increased overall industrial capacity in the DIB and enhance the ability of the OIB to focus on surge capacity by using core infrastructure. Based on the scarcity of U.S. industrial resources, expecting a strictly CONUS infrastructure to yield necessary capacity is unrealistic; further, it incurs unnecessary risk to then deliver capabilities across greater distances and contested lines.

The threat of cyber-attacks is an evolving and critical consideration for the OIB. Attacking through cyberspace has the advantage of being stealthy, deniable, and usually non-escalatory, meaning that it will likely be the first means adversaries will use to disrupt logistics and MRO. The RSF provides a way to address contested logistics challenges, but it comes at the cost of employing new infrastructure and opening additional cyber-attack vulnerabilities. As OSD considers the RSF, assessing partners' infrastructure is crucial. Adequate facilities, equipment, proximity to operational areas, and available resources determine the viability of supporting MRO activities. The ability and willingness of partner nations to invest in infrastructure to support RSF are essential, especially in its later stages when capacity is expanded.

## **Five Readiness Enablers: Materiel/Materials**

The term materiel refers to military supplies and physical materials used by the OIB. The seminar chose to expand this concept to include all materials required for adequate OIB performance. Supply chains are crucial in providing materials and supporting ongoing MRO services at the depots. Given its significant reliance on suppliers and its role as a force provider, the OIB must play a prominent role in DoD strategy to strengthen supply chains. The OIB faces a complex challenge, including efforts to enhance supply chain visibility, reduce reliance on sole suppliers and competitors, and improve inventory management. Additionally, the OIB must develop an MRO system that is adaptable enough to navigate in a contested logistics environment such as vulnerable Indo-Pacific distribution pathways.

Due to the serious impact of potential disruptions, the NDIS emphasizes the condition of military platform supply chains. After the Cold War, U.S. industrial capacity broadly contracted, coinciding with the PRC rising as a leading industrial power and surpassing the U.S. and many allies in key sectors.<sup>25</sup> Consequently, the DoD has highlighted the strategic importance of leveraging the OIB to help the DIB so that is not reliant on “adversarial foreign sources for capital, technology, raw materials, and critical inputs.”<sup>26</sup>

While the role of the OIB may expand, the NDIS also aims to enlist the assistance of A&P in addressing supply chain challenges. Globalization has rendered the industrial base dependent on vulnerable supply chains, especially in the lower tiers.<sup>27</sup> Consequently, the DoD has emphasized establishing a collaborative networked framework that extends beyond production to encompass “co-sustainment, maintenance, repair, and overhaul.”<sup>28</sup> The goal is to bolster domestic supply chains and initiate broader discussions with allies and partners regarding an FIB that integrates MRO services, further enhancing readiness. The rise of globalization and



contested logistics challenges in the Indo-Pacific has led DoD supply chain managers to confront worldwide supply chain issues. Moreover, their efforts are further complicated by the necessity of distributing materials to and from contested environments. As the OSD proposed, the RSF concept is likely a necessary first step to alleviating these vulnerabilities by integrating allies and partners into the MRO enterprise. The risk is that operational readiness will suffer in a conflict if no action is taken.

### **Five Readiness Enablers: Finance**

The finance enabler describes how MRO activities are funded in the OIB, along with the mechanisms to manage those funds. Current OIB finance methods are optimized for peacetime sustainment and for contingencies that typically have not been deemed imminent. As a result, these finance methods have produced short- and long-term readiness hurdles: funding is not suited for major surges in workload, while capital investments to improve OIB performance take years to make progress.

At present, funding is a combination of direct Congressional appropriations, including the MILCON process, and Defense Working Capital Funds (DWCF). Unlike a private-sector firm, the OIB has no alternatives to seek funding, such as venture capital or bond issuance. Through DWCF, military organizations transfer funds to OIB organizations to pay for MRO services, plus a surcharge for operating expenses. OIB organizations maintain these funds in a special account and are bound by policy to set rates based on recent years' performance and workload with a goal to break even. Because this funding model sets prices for future services based on previous workloads, working capital surplus or deficit, and predictable military service plans, it is well-suited to steady-state sustainment programs. However, it is not suited to rapidly respond to significant changes in MRO demand (i.e., surge requirements) because funds are decided a full

year in advance. Other aspects of the funding model, such as annual Congressional appropriations and the multi-year MILCON appropriation process, are even less responsive to short-term needs due to their longer timeline to implement. This dynamic creates a serious limitation in the OIB's ability to scale in the near-term and to modernize its capacity in the long-term.

As an indirect enabler, finance differs from the other enablers in important ways. Finance can be augmented rapidly in response to contingencies. In a matter of days, given an emergent need, Congress could allocate or appropriate substantial new funding and initiate changes to OIB governance. However, the ability to rapidly scale finance should not be misinterpreted as readiness for crises or mobilization. Once allocated, it would take much longer for the funding to impact readiness through the direct enablers (human capital, infrastructure, materiel/materials). This compounding of risk is amplified by the sheer scale of forces the OIB supports.

The above condition of the finance enabler requires OIB organizations to allocate resources wisely and swiftly. For example, the Army Materiel Command's (AMC's) Project Vulcan found innovative ways to approach this challenge. The project forced depot commanders to prioritize their desired capital investments and to assign costs in terms of other projects for every one of those investments. Data was required from each depot to show the consequences to facility construction if each priority investment were not to occur. This permitted AMC to calculate the time delay for future MRO activities or the associated cost in terms of other project delays. Data was computed in a central location, allowing change in funding could be weighed against other depot priorities. Aside from the immediate benefits to decision-making, Project Vulcan further allowed for the selection and comparison of investment courses of action as groups of investments. This process is a revolutionary improvement compared to the previous

process: intuitive judgments by individual depot commanders for how best to balance a profit-neutral incentive structure with the expected workload.

### **Analysis Conclusion: Building a Responsive Organic Industrial Base**

The SCP-P and Five Readiness Enablers indicate a significant need for a dynamic “OIB of the future,” one that the seminar labels a “Responsive OIB.” Previous OIB industry seminars have articulated the attributes needed from the OIB of the future in the context of the Five Readiness Enablers. This seminar emphasizes that the future is not fixed, and the OIB needs to adopt a coalition strategy involving allies and partners as the strategic landscape evolves to address national security threats.

A Responsive OIB meets immediate MRO needs while at peace and maintains surge capacity during wartime to fulfill unexpected requirements. It takes time to buy or build infrastructure, recruit and train a workforce, and pursue capabilities in new locations with allies and partners. Nevertheless, these efforts send a powerful message to our adversaries that the U.S. is committed to establishing a robust MRO capability, and it has a broad network of allies who share in that commitment. The coalition approach suggested by the RSF cannot help but affect the calculus of any nation seeking to challenge the established order. This does not mean that CONUS depots will have less work; if properly resourced and executed, this approach will grow the global MRO capacity, which is needed today and vital for the future OIB to respond to current and future threats.

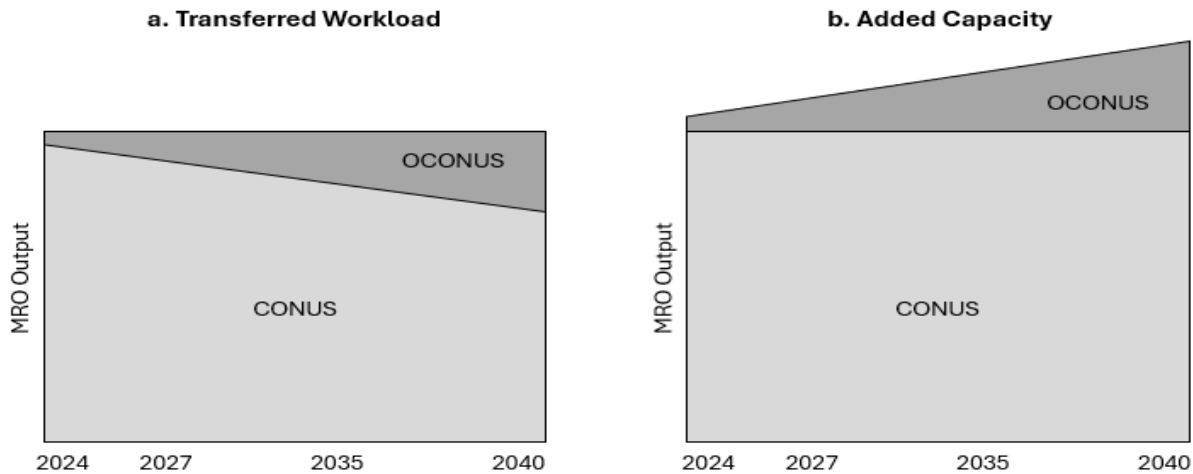


Figure 4. Illustration of impact to MRO capacity caused by (a) transfer of workload overseas, vs. (b) adding capacity overseas without impacting CONUS workload or employment.

### **Recommendations**

This paper makes recommendations that span the breadth of the OIB Readiness Enablers, but do not encompass all the requirements essential to shape the OIB of the future or create a Responsive OIB. The recommendations are framed from the perspective of their ability to implement and/or support the RSF and a Responsive OIB. For instance, the paper proposes innovative ways to attract a new generation of workers, and to keep a standby force in case of surge requirements. It recommends facility investments to shore up its foundational infrastructure, as well as validation exercises to test surge capacity and the expanded use of AI to inform future investment. Also, it proposes contracting strategies to improve long-term sustainability and urges the services to view cyber resiliency as a critical function of the OIB and allocate resources accordingly. Collectively, these recommendations advocate for the DoD to take bold actions to make the RSF concept a reality. Although the RSF is not part of the current OIB, it may play an integral role shaping it.

## **RSF**

In broad terms, the seminar advocates for the OIB to actively engage in supporting the implementation of the RSF. In supporting the RSF, the OIB not only advances its core mission of readying U.S. military platforms for conflict, but also would contribute to U.S. national security initiatives. The RSF holds the potential to drive essential transformations within the OIB, ensuring the sustained competitiveness of the broader DIB in the long run.

### **Certain OIB locations must develop a detailed resource-informed RSF implementation**

**plan:** To facilitate the development of a detailed implementation plan, the DoD should gather additional information from OIB locations. The seminar identified two ways the DoD can begin to gather the required information to build a detailed implementation plan. First, each service should employ expertise within the OIB, program offices, sustainment commands and combatant commanders to create a list of programs, maintenance and repair activities that would be acceptable to conduct at foreign locations, prioritizing readiness needs, sensitivity to IP, physical security, cybersecurity, and other operational concerns. This list would inform decision-making to choose what occurs at foreign and domestic MRO locations. Second, the above-mentioned group should collectively nominate workloads suitable for transfer to foreign partners. The evaluation criteria should consider the combatant commanders' input, and target areas to alleviate the maintenance backlog within the OIB or those that, in preparation for conflict, would strain domestic facilities operating at maximum capacity.

In addressing the pacing challenge, the RSF offers a solution to the pressing needs of the OIB, allowing the OIB to adapt to rapid geopolitical shifts and technological advancements. The primary impediment the seminar identified to implementing the RSF is the likely resistance from organizations concerned about losing MRO workload that they perceive might be transferred

overseas. This resistance may be addressed by robust communication across the DoD enterprise highlighting that A&P MRO would be primarily for workload that the OIB cannot accommodate (see Figure 4 above). A senior leader responsible for DoD sustainment recently emphasized four key efforts aimed at implementing the RSF. These include soliciting input from combatant commanders, organizing A&P industry days focused on MRO services, spreading awareness of RSF concepts across the DoD, and capitalizing on work areas to provide quick and meaningful impact to overcome political hurdles. A detailed implementation plan would advance these efforts and, as they see the immediate benefits of the plan, would generate support from the warfighting, sustainment, and procurement communities. This unified support is both necessary to overcome political hurdles and ultimately would strengthen the RSF's potential to benefit the future operations of the OIB.

In terms of costs to implement this recommendation, the DoD possesses the necessary expertise and skills to develop this implementation plan. The DoD should direct the appropriate personnel to develop a range of options to leverage regionally aligned sustainment capability. This recommendation acknowledges that allocating personnel to this task further strains an organization already experiencing staffing shortages. The actual cost to implement RSF will ultimately be tied to speed (timeline to implement), breadth (number of foreign locations and services), and depth (level or complexity of MRO services). Socializing a detailed implementation plan allows Congress and the DoD to better consider capability gains relative to costs.

## **Human Capital**

To address critical workforce issues in the OIB, the seminar recommends three reforms to mitigate the OIB's workforce issues, to meet the demands of our nation's defense requirements, and ultimately to deter or fight to win our nation's wars.

**Leverage A&P, particularly where they have comparative advantages:** Some allies and partners already have a well-trained, highly specialized workforce. In the Indo-Pacific, for example, Japan, Australia, Singapore, and South Korea have a well-trained workforce the U.S. might leverage while it waits to realize the impacts of its current recruiting and education STEM and tradecraft programs.

**Build and maintain a civilian reserve force:** Cultivating a trained civilian reserve maintenance force presents a viable solution for building a ready pool of skilled artisans. The OIB may benefit from using existing but unfilled Select Reserve Billets to fill human capital gaps to enhance the depot's operational effectiveness. A unique aspect of this model is that the reservists would be in a civilian status, government schedule (GS) employees or wage grade (WG), and would not be held to the same military restrictions such as physical fitness or age.

**Establish an enterprise OIB artisan fellowship program:** The OIB requires versatile artisans who can be deployed to meet requirements. At an enterprise level, the seminar recommends the DoD implement an OIB artisan fellowship program. This program would cultivate a pipeline of mobile artisans, targeting recent graduates and military veterans, ensuring a surplus of multifunctional skilled personnel. For consideration, participants in this fellowship might be required to sign a mobility agreement, with the intent of rotating artisans to different depot or

shipyard locations. These rotations will provide invaluable on-the-job training on various pieces of equipment (i.e., ships, tanks, aircraft, etc.).

These recommendations necessitate a significant dedication of time and financial resources to adequately staff positions and empower the OIB to make long-term commitments to hire and train additional employees. In some cases, time and financial costs would be reduced by using A&P MRO services, where MRO customers would benefit from well-capitalized infrastructure and lower labor costs. This potential is particularly evident in some countries in the Indo-Pacific, including South Korea, Thailand, and the Philippines. Domestically, Congress and the DoD would need to increase the budget specifically allocated for workforce development programs within the OIB. The DoD could implement an interim process to address short-term human capital needs in the OIB while primary strategies are underway to address long-term issues. For instance, the OIB could leverage the military reserve force to support MRO during drill days and annual training sessions, easing workload pressures on OIB locations. This also may attract skilled personnel and enhance operational readiness.

### **Infrastructure**

To enhance its capacity to surge, the OIB enterprise needs consistent and equitable infrastructure investment across the 21 covered depots. Additionally, it should conduct formal exercises to assess its capability to ramp up production during national mobilization. To complement the military operational readiness and support critical surge demands, we recommend.

**Modify Title 10 U.S.C. §2460 mandatory reinvestment requirements:** Of the 8% annual revenue that must be reinvested in each revenue-earning facility, permit up to 4% to be shifted from each facility to OIB locations in greater need at the discretion of its military service. This



policy change encourages investments to be distributed equitably and systematically, reaching all depots in need and establishing a sustainable routine for maintenance and modernization.

Implementing this policy would expand the 8% statute to all OIB facilities, not just covered facilities currently identified in the statute. There are two groups who may resist this change: well-capitalized facilities that would lose up to 4% of their funding, and components of military services that would prefer to devote funding to priorities outside OIB facilities. Allowing the remaining 4% to be used at the discretion of the services may incentivize their buy-in, and ensure resources are allocated to priority projects more seamlessly across each service. This is particularly important in the Indo-Pacific, where strategic requirements require rapid shifts in resource allocation to specific areas aligned to regional threats. Balancing structured and discretionary investments helps maintain a robust, agile, and responsive OIB capable of supporting both old and new weapon systems.

Implementing this recommendation extends the mandatory investment requirement to all OIB facilities. If adopted, this recommendation is likely to raise costs in the short-term for those facilities that would be contributing a portion of their 8% to other locations. In the long-term it likely would save costs for the OIB enterprise, as the most underserved locations would receive additional funding to meet mission requirements and sufficiently capitalize their operations.

**Perform exercises that test the OIB’s surge capacity, and leverage AI for complex resourcing decisions across the DoD:** When services conduct or participate in combatant command and major command level exercises, a portion of the exercise budget should be allocated to test the OIB’s ability to operate at a wartime pace and duration. Given the current environment of strategic competition, a formal approach to testing surge capacity is necessary.

To implement this recommendation, the first step would be to incorporate OIB surge capacity testing into ongoing training exercises that already have funding allocated, thus achieving both objectives without additional costs associated with a separate dedicated surge test. Additionally, the department must build on existing data science tools, such as artificial intelligence (AI), to model surge scenarios. Data analysis can provide critical insights into some aspects of the problem without the high costs of fully live exercises. The DoD should expand on successful AI initiatives like the Army's Vulcan tool to prioritize OIB investments, develop data informed surge requirements, and ultimately identify and rectify chokepoints within the OIB. This would have the added benefit of socializing a use-case for Vulcan; the seminar strongly urges the DoD to consider adopting a Vulcan-like tool to prioritize additional investments across the entire DIB, eventually for all facilities within the enterprise.

**Institutionalize cyber resiliency as a critical OIB function by investing 1% of annual revenue in cyber resiliency and a dedicated OIB Red Team:** Addressing the possibility of a direct attack on U.S. domestic MRO facilities during wartime, and preserving those facilities' functionality, will require culture change and additional resourcing. Diversifying the number and geographical locations of MRO facilities complicate adversary decisions on where to physically attack. However, the expansion of cyber terrain accompanying such diversification makes attacks via cyberspace easier. The seminar recommends increasing resources to address this problem and establishing a dedicated OIB Red Team to continuously test the OIB's cyber defenses. This Red Team will simulate adversarial tactics to identify vulnerabilities, recommend remediation strategies, and improve overall cyber posture. Such active measures will strengthen the OIB's ability to maintain functionality despite targeted attacks.

To implement this recommendation, the OIB and Congress should broaden their view of what constitutes “capital investment” for depots to include additional cyber readiness components and then adjust spending authority accordingly. Resourcing and enhancing cyber resiliency should not be limited to cybersecurity hardware and software but should also include competitively paid subject-matter experts and cybersecurity service contracts. The seminar recommends investing 1% of annual OIB revenue in cyber resiliency, which would be in line with commercial industry standards. Funding for a dedicated OIB Red Team could come from existing resources by aligning their role with ongoing evaluations of services’ OIB posture. By continuously assessing the supply chains and communication links, the joint team could identify vulnerabilities and integrate their findings into existing depot improvement plans and capital investment strategies. Additionally, incorporating the Red Team’s authority into agreements establishing overseas OIB capability would allow them to monitor and evaluate critical foreign networks. This integration would provide significant strategic value and ensure comprehensive evaluations. Furthermore, by requiring the team to assess major IT architecture changes and modernization efforts before final decisions are made, their role would become essential and integral to existing strategic initiatives, reducing the need for separate budget allocation. Further analysis may determine whether 1% is sufficient, but it is a percentage comparable to some major commercial industries.

### **Policy and Governance**

The policy and governance recommendations provided here aim to strengthen acquisition and sustainment policy to synchronize the sustainment and acquisition community’s efforts. This alignment will ultimately foster the development of a resilient regional sustainment capability.

**Incentivize resilient MRO services in future weapon system contracts:** The OIB of the future must balance between providing sustainment services close to the point of need and managing domestic workload, ensuring a healthy mix of domestic and regionally aligned capabilities. The DoD should require new future weapon system contracts to incentivize the early establishment of OIB MRO services both domestically and with foreign partners. For weapons systems intended to support the multinational coalition, such as the F-35, officials responsible for the sustainment strategy of those systems should consider regionally aligned sustainment capability and/or early establishment of OIB MRO. Legacy systems only operated by the U.S. might not require a regional sustainment component; however, some older systems, which partners operate, such as the F-16, might be suitable for MRO services within the RSF model. Regional alignment of MRO services for legacy systems might also serve as the first step for countries to be later considered service partners for future weapon systems. In addition, to strengthen supply chain resiliency, all future weapon system contracts should include terms and conditions allowing the OIB to manufacture parts in a national emergency.

**Consider regional alignment as a part of future weapon system MRO life cycle sustainment plans:** This recommendation suggests amending the Product Support Management for the Adaptive Acquisition Framework manual (DoDI 5000.91) to direct future weapon system Life Cycle Sustainment Plans (LCSP) to include evaluation of regionally aligned MRO capabilities. In addition, for all major and special interest programs, the mandatory product support business case analysis (BCA) should assess the feasibility of establishing regionally aligned sustainment capability. It is necessary that decisions regarding the allocation of MRO services among organic, commercial, and regionally aligned capabilities undergo thorough and impartial evaluation when developing the LCSP.

Within the LCSP, cost should be seen as one variable among many in the decision to implement a regional sustainment strategy or transition MRO to the OIB. Updating policy will incur minimal costs; however, it is important to consider regional alignment at A&P facilities and/or MRO within the OIB might increase costs associated with future weapon system contracts. Ultimately, this decision should be made at more strategic levels within the DoD, considering factors such as efficiency, effectiveness, and long-term sustainability.

### **Limits of Position / Counterarguments**

The seminar examined the current and projected capabilities of the OIB within the context of the Indo-Pacific theater, validating the RSF as a strategic response to identified vulnerabilities. However, the seminar's findings face limitations and counterarguments based on their underlying assumptions about international cooperation, infrastructure capacity, financing, domestic political challenges, and the detailed implementation of such a broad strategy. First, relying on foreign MRO services under the RSF might face geopolitical resistance as most Pacific countries have deep economic relationships with the PRC that could cause a potential conflict of interest. Therefore, conflicting strategic priorities could limit the practical applicability of this recommendation. The focus on shifting part of the OIB's capacity overseas may also overlook an alternative approach that would seek to enhance domestic capabilities with innovative technologies and processes that could mitigate some of the identified limitations. While the RSF seeks to use the industrial bases of allied nations, there remains a significant risk that these nations may not be willing or able to meet or sustain the surge demands of a protracted high-intensity conflict in the Indo-Pacific.

The seminar's primary analysis notes the OIB's surge capacity issues and offers

recommendations for enhancement through international partnerships and the RSF to address Indo-Pacific operational and strategic challenges. The recommendation to use foreign infrastructure for MRO activities to mitigate stateside bottlenecks presumes that partner countries have the requisite infrastructure capable and scalable enough to meet U.S. military demands, particularly in surge scenarios when they are in a potentially more threatened environment. Infrastructure disparities, differing technological standards, and the enormous logistical undertaking involved in coordinating such efforts across diverse geographical and regulatory environments—in crisis—could significantly restrict the operationalization of this framework.

Additionally, RSF introduces potential vulnerabilities related to dependence on international partners for MRO services. This dependence could expose the U.S. to geopolitical risks if partner nations face political instability, shift in strategic priorities, or become unwilling to cooperate in critical times. Additionally, integrating systems across multiple countries could complicate logistics and increase exposure to cyber threats, potentially compromising the operational security and effectiveness of U.S. military assets in the Indo-Pacific region. These vulnerabilities necessitate robust contingency planning and enhanced cybersecurity measures to safeguard against such risks.

Lastly, domestic political dynamics and bureaucratic processes could challenge the RSF's feasibility. Legislative approval and stakeholder buy-in—including defense policymakers and service branches—are critical for RSF implementation. Additionally, political volatility, such as changes in administration or policy shifts, can disrupt ongoing and future commitments to the RSF, jeopardizing long-term strategic planning and investment.

While recognizing these counterpoints, the study offers recommendations for incremental

improvements. These recommendations aim to refine rather than overhaul existing practices. They provide a pathway for the evolution of the OIB to incorporate the RSF to address sustainment challenges the U.S. military could face in a conflict scenario with the PRC in the Pacific.

### **Areas for Further Study**

Implementing RSF will require decisions about where to prioritize developing capabilities. To evaluate the suitability of locations in the Indo-Pacific for implementing RSF MRO hubs, the seminar developed a scorecard (Appendix D) presenting proposed criteria across seven categories at the strategic level. In a further research project, the countries in the Indo-Pacific should be examined in detail based on this scorecard to determine which countries are most suitable for MRO services in the region.

The analysis section of this paper explains how 10 USC 2466, known as the 50-50 rule, limits the government's ability to outsource depot-level maintenance to industry. A&P or an industry partner contracted by them will operate the MRO facilities. Against this background, it is necessary to analyze in a follow-up study what kind of reform this regulation may need to be able to make effective use of MRO services from A&P. Because the rule has not yet been subject to this greater scrutiny, the study should attempt to derive from additional analysis which allocation is to be recommended from an economical, flexible, and regional perspective.

The analysis section of this paper also shows that the measures of OIB effectiveness are lacking and inadequate to implement either a strategic approach such as RSF or other strategic objectives. The metrics used rely on capturing direct labor hours to determine peak capacity. This metric is problematic because it needs to capture all factors necessary to thoroughly evaluate MRO facility performance, including labor, throughput, equipment capacity, and other critical production elements. To make well-informed decisions about the future design of the OIB, there

should be a comprehensive set of metrics that accurately measure its effectiveness. The seminar, therefore, suggests developing such a set of metrics in a follow-up study, perhaps modeled directly from private industry best practices.

### **Appendices**

Throughout the semester, our seminar delved into various subjects relevant to our research topic. We included a comprehensive set of nine appendices aimed at advancing the readers' understanding across key areas. However, it's important to note that while these appendices cover a broad range of subjects, they only offer a glimpse into the extensive research and analysis undertaken to formulate and substantiate the paper's recommendations.



## **Appendix A: Literature Review**

Similar to previous Organic Industrial Base seminars, this seminar chose to scope its research around the national strategies and priorities explained in the National Security Strategy, National Defense Strategy, and National Military Strategy. This year's study also benefitted from the additional Administration guidance through the recent release of the first National Defense Industrial Strategy and a 2024 National Defense Industrial Association article, "Vital Signs." Significant effort was taken to understand and utilize the existing research, documentation, and guidance covering "great power competition," deterrence, readiness, supply chain vulnerabilities, and interoperability with allies and partners. Additionally, this seminar wanted to build upon research and ideas from previous Eisenhower School Organic Industrial Base Industry Studies, specifically, the 2019, 2022, and 2023 academic years' classes.

Starting with deterrence, deterrence by resilience means hardening the ability of the United States and allies and partners to withstand multi-domain attacks, fight through, and recover from any disruption.<sup>29</sup> This deterrence relies on bolstering critical infrastructure both within the homeland and with A&P in increasing reconstitution options, and reducing the incentives for adversaries to attack because the United States is fielding a diverse, dispersed, resilient, and redundant defense eco-system.

The NDS calls for a strategy focused on defense, deterrence of strategic attacks and aggression. Secretary of Defense Lloyd Austin, in the National Defense Strategy, explains the Department of Defense's (DoD) priorities are: 1) Defend the Homeland, paced to the multi-domain threats posed by the PRC, 2) deter strategic attacks against the United States and its allies and partners, 3) deterring aggression, while being prepared to win in conflict, first

prioritizing the PRC in the Indo-Pacific then Russia in Europe.<sup>30</sup> This research focuses on the role of peacetime and wartime sustainment to deter and win a conflict in the Indo-Pacific.

Furthermore, the NDIS highlights resilient supply chains as a substantial challenge while also describing various measures to stimulate demand to ensure resilient supply chains. These measures include improving foreign military sales, investing in excess reserve capacity, increasing critical material stockpiles, expanding domestic production, and fostering partnerships with allies to expand global defense production.<sup>31</sup> This holds particular significance considering steady-state or long-term competition with the PRC. The PRC has made notable advancements in the capacity to independently produce sophisticated military hardware. From 2019-2023, the PRC's global defense imports fell by 44%, signaling it has made progress in the ability to design and produce defense weapons and equipment.<sup>32</sup> In addition, 32 of 37 critical minerals required for defense production are concentrated in China or countries closely tied to its economy.<sup>33</sup>

In the NDIS, four primary factors should be highlighted for this study, coinciding with the four priorities that the document lays out. First, the OIB is identified as a primary factor supporting the priority: “resilient supply chains” due to its unique ability to provide core capability in the event of a national mobilization,<sup>34</sup> is considered an essential component of supply chain resilience. Second, “workforce readiness” is a clear priority that seeks to evolve a “skilled and sufficiently staffed workforce that is diverse and representative of America.”<sup>35</sup> Such a workforce requires ongoing efforts to destigmatize industrial careers, continue growing defense-focused STEM and manufacturing trades, and reach new communities to obtain talent—to name a few.<sup>36</sup> The NDIS further focuses on “flexible acquisition” to balance competing demands in defense acquisition, including efficiency, maintainability, interoperability, sustainment, and cost.<sup>37</sup> Finally, the NDIS discusses a fourth priority of “economic deterrence,”

which builds on the idea that our competitors’ access to “U.S. markets, technologies, and innovations” is a crucial component of integrated deterrence.<sup>38</sup>

With NSS and NDIS grounding in mind, the National Defense Industrial Association (NDIA) “Vital Signs” report for 2024 provides valuable insight into the defense sector’s view of significant shortfalls. Providing collaboration between government, industry, and academia leaders, the NDIA publishes an annual report highlighting major areas of emphasis for the defense industrial base—from a combined government and private perspective. The 2024 report states, “Currently, U.S. policies and financial investments are not oriented to support a defense ecosystem built for peer conflict.”<sup>39</sup> Specifically, the report details five “pillars” for increased emphasis: prioritizing stable budgets, digital modernization, modernizing foreign military sales and integration with allies/partners, restoring industrial readiness and capacity, and resilient supply chains.<sup>40</sup> Each of these themes pertains to the current study’s emphasis and summarizes a message pertinent to both government and private industry.

Similarly, Assistant Secretary of Defense for Sustainment, The Honorable Christopher Lowman identifies that the United States’ adversaries are increasingly trying to hold its defense eco-system at risk.<sup>41</sup> To mitigate this, Honorable Lowman calls for resilient sustainment strategies that are flexible and responsive to the ever-changing geo-political environment. In his article, “The Role of Logistics, Sustainment in Integrated Deterrence, Honorable Lowman lynchpins integrated deterrence to the United States’ ability to prevail despite contested logistics, and to modernize its defense industrial base, to include not only the Organic Industrial Base, but also the network of commercial partners and allies.<sup>42</sup>

Honorable Lowman champions a Regional Sustainment Framework (RSF), which pushes sustainment to allies and partners, keeps combat assets closer to the fight, mitigates threats to

logistics and supply chains. The RSF mitigates several vulnerabilities in the manufacturing and defense industrial bases and promotes supply chain resiliency for the United States.

The Five Readiness Enabler framework, pioneered by the AY '19 OIB seminar, proved instrumental to the research and analysis provided in this work. The Key Readiness Enablers framework was developed by the Eisenhower School to capture the most important inputs for MRO services, with readiness being the outcome. The Key Enablers include Infrastructure, Governance, Finance, Materiel, and Human Capital, and together comprise the OIB's contribution to "national security and military readiness as the integration and interplay" across the five factors.<sup>43</sup> The enablers help provide a holistic view of how the sustainment enterprise, specifically depot-level MRO, requires multifaceted inputs. These inputs are complex and interconnected and ultimately generate readiness—in the form of ready and available platforms—to the warfighter.

The OIB seminar of AY '22 sought to reverse engineer the current OIB to help design the OIB of the future. They identified that current and future conflicts against near-peer adversaries will include conflict in all domains and require the United States to push innovation and acquisition to maintain asymmetric advantages.<sup>44</sup> In their model, the OIB of the future adds acquisitions and innovation as enablers in the production function of readiness. This seminar went on to identify that strategic leaders are not provided an accurate picture of the OIB's capacity, effectiveness, and readiness due to the lack of standardized readiness metrics.<sup>45</sup>

The OIB seminar of AY '23 also addressed the standardization of readiness metrics across the OIB's depots. In order to author the OIB of the future that is flexible, agile, interoperable, effective, efficient, forward-projecting, and distributing to the point sustainment provides integrated deterrence, the seminar decided to design a Defense Sustainment Agency, which

oversaw all facets of OIB management.<sup>46</sup> Beyond adding a new level of oversight to ensure readiness, this seminar foresaw plans of a forward-projecting and distributed OIB. Additionally, this seminar recommended a National Defense Maintenance Reserve (NDRM) to supplement OIB manning during surge requirements. This forward projecting OIB and NDRM are key influences on a successful plan for the new RSF.

The research, documentation, and guidance found throughout the administration's strategy documents and the previous seminars' frameworks were foundational in designing this year's seminar's vision for the OIB of the future, that is forward projecting and ready to sustain combat forces to deter and win in the Indo-Pacific for the emerging challenges in 2027 through 2030.

## Appendix B: PEST Analysis of OIB Structure



PEST analysis is a strategic tool to assess and understand the macro-environmental factors that impact an organization. It stands for Political, Economic, Social, and Technological factors. This framework helps businesses to evaluate external influences that could affect their operations and strategic decisions. By examining these factors, organizations can identify potential threats and opportunities in the environment, allowing them to strategize more effectively and prepare for possible changes that could influence their market dynamics and operational context.<sup>47</sup> Applying the PEST analysis framework to the current OIB structure involves examining how political, economic, social, and technological factors influence its structure and function.

**Political:** Turning first to the political dimensions, the OIB operates within a complex regulatory framework dictated by national security needs and governmental policies. Changes in defense spending, legislation, and priorities, which can shift with different administrations, significantly affect OIB operations. It operates under legislative and executive oversight, with policies often reflecting domestic political priorities such as job preservation within the defense sector and ensuring national security autonomy that influences the extent to which the U.S. can share sensitive technology and collaborate on defense projects. Prioritizing national security and

sovereignty creates a less adaptable structure to international cooperation, limiting the flexibility to leverage allies' and partners' capabilities to align with the NSS.<sup>48</sup>

**Economic:** Shifting the focus to the economic aspects, the OIB largely depends on federal budget allocations, which are influenced by broader economic conditions. Economic downturns or fiscal policies that reduce defense spending can restrict OIB operations and its ability to innovate and maintain readiness. The emphasis on supporting domestic industries often results in a preference for local over international suppliers in MRO activities, even when allies might offer cost-effective solutions. This preference for U.S.-based manufacturers and suppliers is backed by laws like the Buy America Act, which restricts the procurement of foreign products and services.<sup>49</sup>

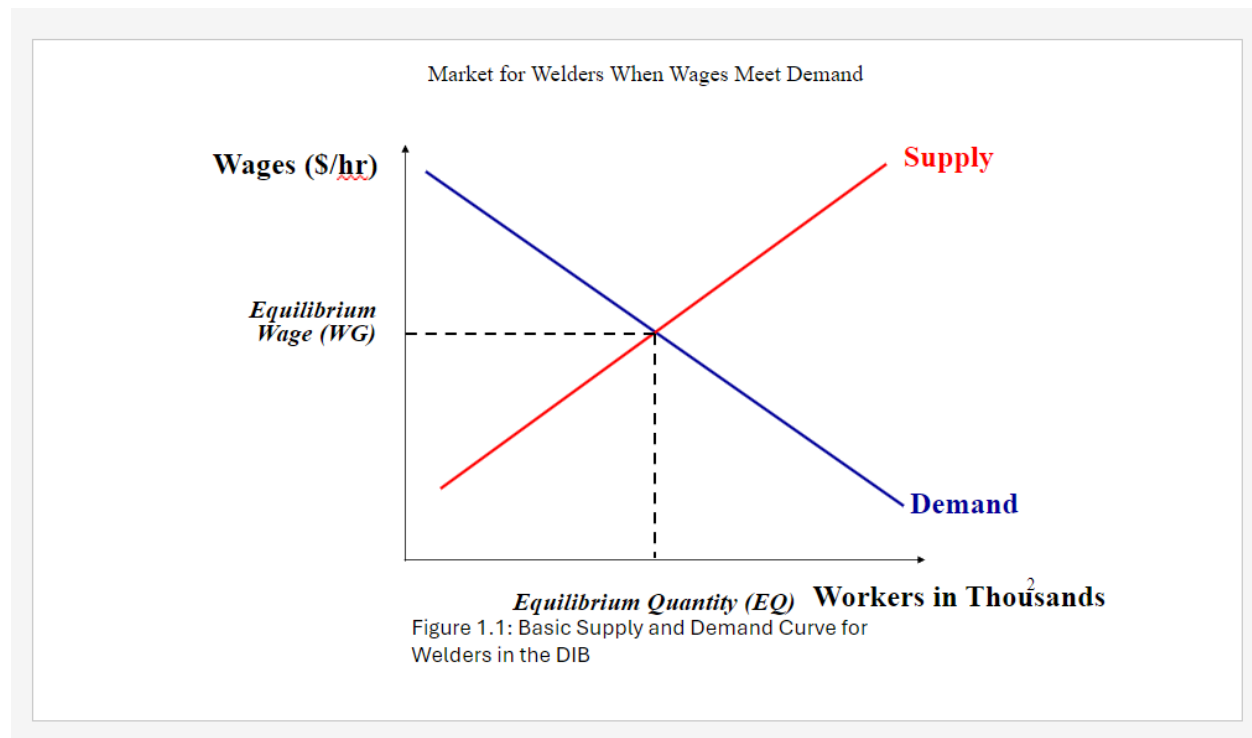
**Social:** On the social front, the labor market dynamics of the U.S. defense sector influence the OIB, which includes a workforce trained and skilled according to American standards and practices. The structure is also subject to public and political influence concerning military spending and employment. Public and political pressure to prioritize domestic job creation over outsourcing can also impede efforts to integrate allied nations' MRO capabilities, as there is often a strong push to maintain and secure U.S. domestic jobs, limiting the scope for international collaboration. The Berry and Kissell Amendments, two distinct yet related statutes that mandate certain goods procured by national security agencies to be manufactured within the United States, reflect the sentiments for domestic job prioritization.<sup>50</sup> The workforce's focus on domestic practices may not align with global best practices, potentially limiting the OIB's ability to innovate and adapt to new operational strategies to maximize allies' and partners' skilled labor pool to augment U.S. skilled workforce shortages for advanced MRO capabilities.

**Technological:** On the technological landscape, the OIB relies on American innovation and maintains a conservative approach toward integrating foreign technologies. While there is significant investment in research and development within the U.S., incorporating these technologies into the OIB's operations is often slow, with a preference for proven, traditional technologies over newer, potentially untested foreign innovations. Concerns over intellectual property rights and the potential loss of technological superiority also discourage deep integration of allies' technologies within the OIB. Additionally, cybersecurity risks associated with international data sharing can create hesitations in fully integrating allies into the digital aspects of MRO processes. The technological insularity of the OIB hampers its ability to stay at the cutting edge of global military technology trends, making it less competitive and slow to react to technological advancements to out-compete China.



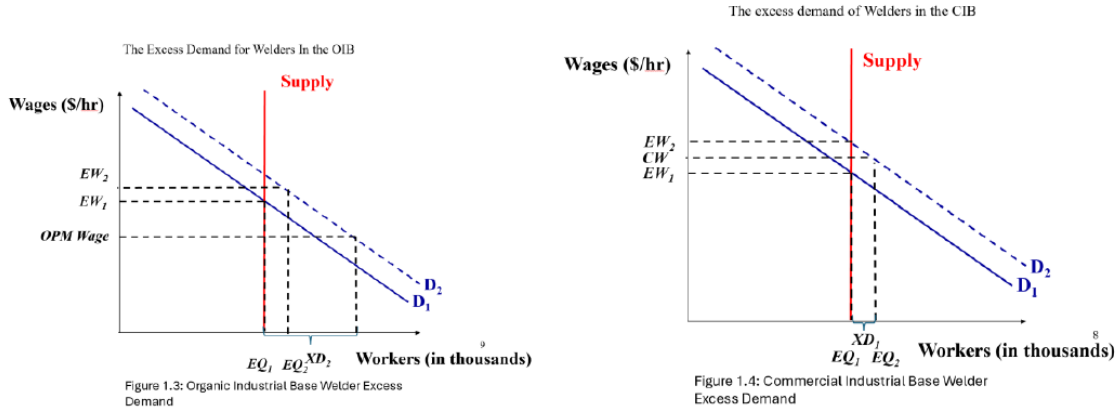
## Appendix C: Human Capital-Welder Example

This research examines how welder wages affect workforce quantity using supply and demand analysis. It demonstrates that an appropriate wage level encourages the right number of welders to enter the market, balancing worker wages and demand. Currently, the supply of welders is inelastic in the short term, meaning wage increases have minimal impact on increasing the number of welders available. This lack of responsiveness in supply creates challenges for the industry to meet demand, particularly in scenarios requiring a sudden surge in the workforce.



Figures 1.3 and 1.4 highlight that current wages in both the OIB and CIB are insufficient to attract the necessary number of welders and regulate demand. The Office of Personnel Management's (OPM) lower wages exacerbate excessive demand within the OIB's welder market. Comparatively, the CIB offers higher wages but still faces challenges in attracting

adequate welders. This situation underscores the broader issue of skilled labor scarcity within the Defense Industrial Base (DIB).



Implementing a reserve maintenance force (RMF) offers non-wage incentives for welders to join the Organic Industrial Base (OIB), addressing the disparity between current wages and equilibrium wages needed to meet demand. The RMF allows welders to work in DIB. This provides opportunities to serve their country and receive valuable benefits from working for the government. This model also expands the pool of skilled maintenance laborers available to the OIB.

The ultimate aim is to restore elasticity to the skilled labor workforce within the Defense Industrial Base (DIB). In the short term, the Office of Personnel Management (OPM) can encourage welders to transition to the OIB through improved wages and non-wage incentives. Since the national supply of welders is inelastic, increasing wages in the defense market may draw workers from the commercial sector, leading to unsustainable wage hikes. To address this, the DIB should tap into new markets for welders. Figure 1.5 illustrates the advantages of combining efforts to implement an RMF model and a Regional Sustainment Framework.

MRF and RSF Combining to Stabilize Wages Despite Increases in Demand

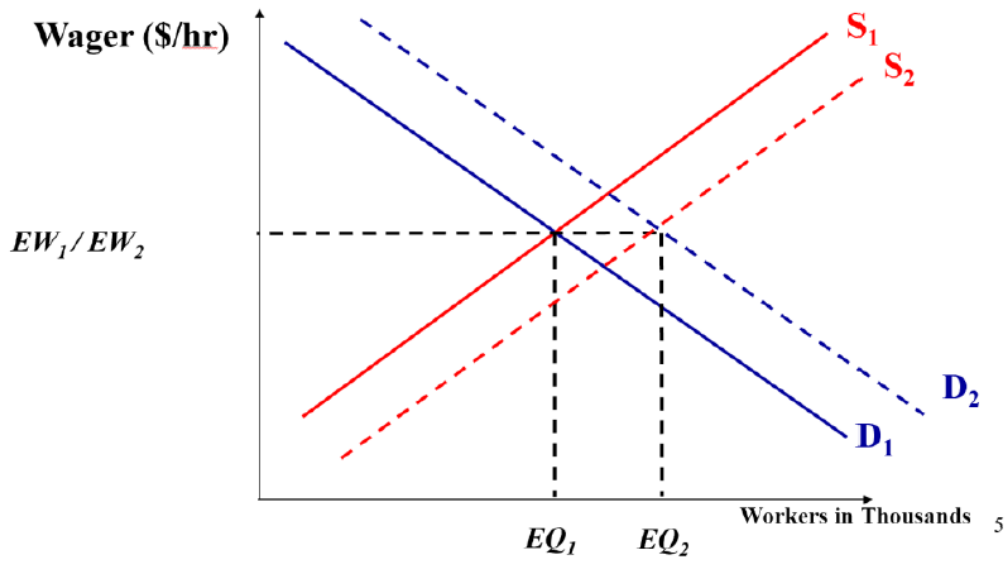


Figure 1.5: Implementing RSF and MRF shifts both supply and demand curves

## Appendix D: RSF Potential MRO Hubs Evaluation Criteria / Scorecard

To evaluate the suitability of locations in the Indo-Pacific for implementing RSF MRO hubs, it's essential to consider several factors. The following scorecard presents proposed criteria at the strategic level across seven categories. Each evaluation criterion is graded on a standard scale (e.g., 1-5, where one is poor and five is excellent). Category and criterion scores of less than 60% (3 out of 5) should come under scrutiny and implementation should be avoided.

Category	Evaluation Criteria	Description	Score (1-5)
<b>Strategic Importance</b>	Proximity to Potential Hot Spots	Closeness to areas likely to be involved in future conflicts or strategic operations against competitors like China.	
	Regional Influence	The geopolitical importance of the location in the Indo-Pacific.	
	Access to International Waters/Airspace	Strategic positioning for free and open access to international routes.	
	<b>Strategic Importance Total (15)</b>		
<b>Regional Alliances/Partners</b>	Host Nation Support	Level of local government and public support for international defense collaborations and interest for RSF implementation.	
	Allied/Partner Presence	Presence of allied and partner forces or operations in the area.	
	Political Stability	Stability of the political environment and risks of operational disruptions due to political factors.	
<b>Local/Regional Allies and Partners Total (15)</b>			
<b>Threat Levels</b>	Vulnerability to Attack	Risk of military attacks from adversaries.	
	Vulnerability to Cyber Attack	The extent to which the U.S. has visibility of and influence over relevant cyber architectures and their defensive posture	

Category	Evaluation Criteria	Description	Score (1-5)
	Intelligence Capabilities	Robustness of local intelligence infrastructure to monitor and respond to threats effectively.	
	Security Measures	Adaptability and effectiveness of existing security protocols. Assess the partner's ability to control Intellectual Property.	
	Relations to the PRC	Assess the partner's relation to the PRC and the likelihood that data on weapons systems, tactics and procedures will be passed on to the PRC (1 means excellent ties).	
<b>Threat Levels Total (25)</b>			
<b>Existing Relationship with the U.S.</b>	Defense Cooperation Agreements	Strength and breadth of formal defense agreements, treaties, or alliances with the U.S. to facilitate RSF collaboration and support.	
	Defense Trade and Technology Sharing	The extent of U.S. defense-related trade, including arms sales and technology transfers with target nations, supports the RSF's objective to integrate and leverage advanced technologies and logistical systems.	
	Political/Diplomatic Alignment	Degree of alignment on international policy issues, especially regional security and defense strategy.	
	Cultural and Historical Ties	The depth of cultural exchanges and historical relationships that would support long-term strategic partnerships and trust levels required for a unified, enduring sustainment strategy.	
	Existing U.S. Bases and Infrastructure	Consider the proximity to existing U.S. bases to the location for potential support and integration efforts.	
<b>Existing Relationship with U.S. Total (25)</b>			

Category	Evaluation Criteria	Description	Score (1-5)
<b>Operational Readiness</b>	Existing Infrastructure	Availability and condition of current facilities and equipment to meet RSF requirements. Include an assessment of facility's capacity to support projected workload/workforce.	
	Expansion Capability	Feasibility of expanding/upgrading infrastructure to meet future RSF requirements.	
	Logistical Connectivity	Effectiveness of transportation networks (air, sea, road) for moving personnel, weapons, and supplies.	
	Workforce Readiness	Evaluate the readiness of the local workforce to begin work within the desired scope. Consider factors such as technical competency, proficiency, and managerial experience.	
	Financial and Supply Self-Sufficiency	Assess the level to which the proposed RSF partner can manage their own business operations, to include sourcing supplies/material.	
	<b>Operational Readiness Total (25)</b>		
<b>Technological and Industrial Support</b>	Local Industry Capability	The extent to which local industries can augment RSF objectives by enhancing MRO activities and contributing to a sustained defense posture in the region.	
	Innovation Opportunities	Potential for local innovation to drive the development of new processes that align with the RSF's goals of ensuring advanced, agile, and adaptive sustainment initiatives.	
	Supply Chain Integration	How well the location integrates into global and regional supply chains, ensuring efficient flow of materials and services essential for military sustainment.	
	<b>Technological &amp; Industrial Support Total (15)</b>		

Category	Evaluation Criteria	Description	Score (1-5)
<b>Cost-Effectiveness</b>	Initial Investment Required	Assesses the upfront costs associated with RSF operations and how these investments align with long-term strategic benefits, ensuring sustainable military readiness.	
	Ongoing Operational Costs	Determines the economic viability of sustaining RSF operations over time, aiming to optimize operational efficiency and cost management in support of continuous readiness.	
	Economic Benefits	Focuses on the broader economic impact of RSF operations on the local economy, including job creation, infrastructure development, and local industry stimulation.	
	Demand Signal	Evaluate the projected demand for MRO of the component or system. Determine if there is ongoing workload to support the task.	
	<b>Cost-Effectiveness Total (20)</b>		
<b>Grand Total (135)</b>			

## **Appendix E: Possibilities and Limits of Partner Support Using the F-35 Case Study**

### *Possibilities of Partner Support*

Offering MRO services by partners and allies for the U.S. military and the joint use of weapon systems developed in the U.S. and sold to partners, e.g., in the Indo-Pacific region, brings economic, strategic, and political advantages for both sides.

#### *U.S. Opportunities*

When the U.S. utilizes the MRO capabilities of its partners and allies in their respective countries, there are at least twelve advantages. Firstly, (1) the U.S. can take advantage of the lower wage and labor costs. This is particularly evident in some countries in the Indo-Pacific region, including Malaysia, Thailand, and Vietnam<sup>51</sup>. By relocating maintenance work close to the place of use, (2) the operational readiness of the equipment can be increased, and (3) response times to problems can be shortened. (4) Moving heavy equipment from the Indo-Pacific region to maintenance facilities on the U.S. East Coast can take several weeks using sea and land transportation. In addition, (5) transportation incurs additional costs not incurred by on-site maintenance or repair. (6) The relocation of MRO services also creates new facilities that increase the strategic reach of the U.S., increase surge capabilities, and significantly reduce dependence on individual MRO bases. (7) In the event of a terrorist or targeted sabotage attack on an MRO facility in the U.S., at least some capacity will still be available. (8) Establishing regional MRO facilities is a powerful way for the U.S. to demonstrate its commitment to its allies. By entrusting them with this responsibility, the U.S. is showcasing its trust and building stronger relationships based on mutual understanding and respect.

If the partners buy U.S. weapons systems, there are further advantages for the U.S. (9) as the U.S. defense industry is a powerful economic engine, creating jobs and boosting the national



economy. The U.S. gains a surge capacity for wartime and strengthens alliances through military sales. (10) These sales lead to joint training and closer military ties, fostering trust and cooperation. Allies with advanced U.S. weaponry enhance regional stability, (11) reducing the U.S. burden. (12) Interoperable systems further improve allied cooperation and battlefield effectiveness.

### *Opportunities for Allies*

Maintaining and repairing U.S. military equipment holds immense potential for economic benefits for allied nations. There are at least nine benefits. Not only can the provision of MRO services (1) create employment opportunities, but it can also (2) significantly increase the stability and prosperity of local economies. Additionally, (3) local industries can acquire valuable expertise and enhance their capabilities by providing MRO services for complex military equipment. (4) This can lead to the development of a skilled workforce, further boosting economic growth, and (5) driving innovation in the region. The equipment produced in the United States is generally of high technology and quality. However, to maintain and repair this equipment, it is often necessary to transfer some technology. (6) This technology transfer helps to enhance the partners' capabilities, allowing them to strengthen their self-defense by establishing a robust industrial base. (7) Smaller countries buying complex weapons systems gain modern technology and potentially new U.S. partnerships for training and support, at least for the initial operation.

In the long term, providing MRO services, especially in combination with purchasing weapons from the U.S., (8) can strengthen relationships with the U.S. and lead to closer cooperation in other areas. This cooperation helps to build trust and mutual understanding between allies and partners. Additionally, (9) it can create a mutually beneficial relationship that can foster economic growth and development and improve regional security.

### *Case Study of F-35 MRO*

Sustainment for the F-35 differs from traditional weapons systems support, where the military services determine what is needed and look to organizations like the Naval Supply Systems Command and Air Force Materiel Command for support. F-35 sustainment instead applies an approach known as Contractor Logistics Support in which Lockheed Martin provides all supply support for aeronautics and software, and Pratt & Whitney supports engines.

Moreover, the F-35 has a distinctive global sustainment program in place. Instead of owning spare parts for their respective aircraft, all program participants are granted access to a shared global spare parts pool. This pool includes consumable and repair parts required to maintain or upgrade F-35 aircraft. Program participants do not purchase the spare parts directly. They acquire access to the spare parts pool based on factors such as the number of F-35 aircraft they own and the number of flight hours they intend to fly. Once a spare part from the global pool is installed on a participant's aircraft, ownership is transferred to the participant. This system is designed to reduce logistical burden and provide economies of scale for all program participants. The same applies to special tools and equipment.<sup>52</sup>

Lockheed Martin and Pratt & Whitney are responsible for developing, repairing, and managing the spares in the global spare pool, stored in over 50 facilities not located at the two prime contractors' main facilities worldwide.<sup>53</sup> These include three major storage facilities, the regional warehouses: Fort Worth for North America, Australia for Asia-Pacific, and the Netherlands for Europe.

Several facilities have also been set up worldwide for MRO-U services so that the aircraft do not have to return to Europe for these services. In Japan, there is an MRO-U facility for both the airframe and the engine<sup>54</sup>; in Australia, there is an MRO-U facility for the airframe<sup>55</sup>. All three

facilities are intended to provide services for aircraft in the region and aircraft from their own country, i.e., for U.S. armed forces when they deploy to this region.

### *Limits of Partner Support*

However, there are at least ten disadvantages for the U.S. when commissioning MRO services from partners, as listed in Chapters 4.1 to 4.3. Initially, there are no disadvantages for partners, provided that they ensure that the offer is at least reasonably economical for them. They may even forgo economic utilization to reap the benefits of technology transfer, establish their industrial base, or strengthen their partnership with the U.S.

### *Technical Challenges*

Allies may not have (1) the technological maturity to perform MRO services on U.S. military equipment. (2) Qualified personnel are, therefore, required. A lack of domestic industry and qualified personnel can significantly hinder allied countries' ability to maintain complex weapons systems. Education and training would require significant time and resources. In addition, (3) MRO services require specialized facilities such as workshops, special tools, and testing equipment<sup>56</sup>. Allied countries may not have this infrastructure, making it difficult to carry out this work or requiring enormous resources to develop such an industry. The extent to which an economic advantage still exists must be assessed case-by-case. (4) Ensuring a steady supply of spare parts is crucial for commissioned work, which might be difficult in certain countries.

### *Security Challenges*

By outsourcing MRO services to other countries, (5) the U.S. loses control over this work to a certain extent. They must rely on the contracted services being performed with the same quality and reliability in their own country without being able to regulate the industry in another

country. This can lead to concerns about security and confidentiality. (6) Outsourcing military equipment maintenance to other countries risks leaking sensitive technological information.

#### *Political Constraints*

(7) Political changes in allied countries can pose a problem for cooperation in maintaining and repairing military equipment. New governments in partner countries may be less interested in working with the U.S. or may have other priorities. They may even prohibit the performance of MRO services on U.S. equipment in their country.

(8) A relocation of MRO services to other countries could mean that the 50:50 ratio of OIB services to CIB services, set under 10 U.S.C. § 2466(a), is no longer sustainable<sup>57</sup>. This would mean a change in the legal basis. In addition, (9) there could be political resistance to the shift, as it would mean that OIB or CIB would be closed in some states because they are no longer being utilized. Senators and politicians from these states would undoubtedly try to prevent this to secure jobs and economic benefits in their states<sup>58</sup>.

In addition, (10) some national laws prevent certain technologies from being made available to partners. In the U.S., these are the International Traffic in Arms Regulations (ITAR)<sup>59</sup>. This U.S. export control system was designed when the U.S. had a technological edge it no longer maintains. As a result, the system now promotes U.S. technological inferiority by controlling technology widely available to U.S. rivals while discouraging research and development cooperation with allies and the commercial market.<sup>60</sup>

#### *Case Study of F-35 MRO*

The F-35 program was designed from the outset to operate a global fleet. This poses challenges for the JPO regarding the various customs regulations and import laws of the operating states, which have to be taken into account but have been resolved.<sup>61</sup> Even though, for example, a

Dutch court recently ruled that Israel F-35 cannot be supplied from the Dutch warehouse due to violations of international humanitarian law in the fight against Hamas<sup>62</sup>, there are still alternatives in the form of warehouses in the USA and Australia. The Israel F-35's high mission-capable rate in the last six months demonstrates the system's effectiveness.<sup>63</sup> However, this example also shows the complexity of the centralized supply of a "global fleet."

F-35 program partners and FMS customers are also concerned about the vast amount of sensitive data collected by the aircraft and sent back to the U.S. via a cloud-based network. This includes mission data, flight paths, sensor recordings, and potentially classified information. Lockheed Martin is known to be protective of its technology.<sup>64</sup> Partner nations fear limited control over the data transfer process and might not have full transparency into how the F-35 system operates.

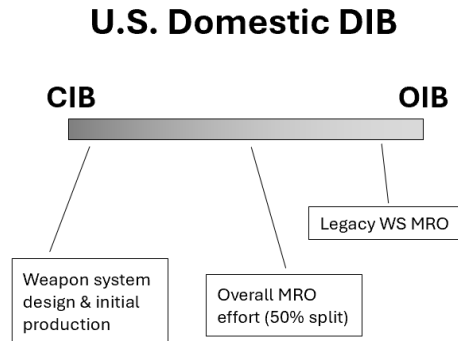
## **Appendix F: The Organic Industrial Base’s Place in the Defense Industrial Base**

In public discourse, the term “Defense Industrial Base” (DIB) often refers to the private sector industries which support the U.S. military.<sup>65</sup> Since there are 100,000 companies and subcontractors who contribute<sup>66</sup> and only one U.S. government, this is not an unreasonable shorthand. It fails, however, to capture the important interplay of public, private, and foreign entities which truly comprise the DIB. This annex will briefly review the three constituent parts and present a model for their interrelationships.

The Commercial Industrial Base (CIB) consists of the thousands of private firms who directly or indirectly provide goods and services to the Department of Defense. Weapon systems and their components are generally designed and built by these private sector firms in close cooperation with, and supervision from, the DoD. A corps of federal contracting and acquisition professionals solicit, oversee, and validate the work of the CIB to achieve desired outcomes and safeguard taxpayer investments. In some cases, but not all, the private sector also performs maintenance and sustainment for weapon systems.

The Organic Industrial Base (OIB) is the set of government-owned facilities and activities which produce and store some types of munitions and perform a portion of maintenance, repair, and overhaul (MRO) functions for DoD weapon systems.<sup>67</sup> U.S. law requires that no more than fifty percent of MRO activity be contracted to the private sector, so the OIB retains responsibility for a very large portion of this activity.<sup>68</sup> Most MRO activities fall along a spectrum between the CIB and the OIB. For example, government depots within the OIB rely on private sector firms for supplies, materials, components, and sometimes contracted workers. Some weapon systems, particularly recently developed platforms, are maintained wholly by the original equipment manufacturer. Some older platforms, by contrast, no longer

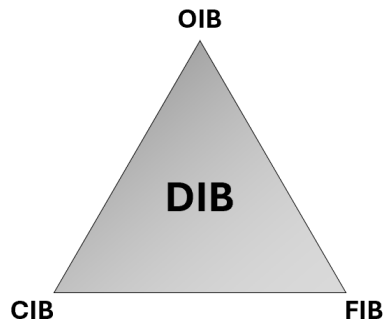
have an active private-sector producer, and are fully the responsibility of the OIB. This dynamic is depicted in **Fig. 1** along with some representative activities.



*Figure 1: Two-element model of U.S. domestic defense industrial base (not drawn to scale).*

In addition to the U.S. domestic CIB and OIB, foreign firms and governments also play several roles. First, foreign-based suppliers and component manufacturers are already integral elements of supply chains supporting domestic production and maintenance, with varying levels of visibility to the U.S. government and its major defense contractors; mapping these dependencies is an ongoing effort. Second, some acquisition programs, such as the F-35 fighter jet, intentionally distribute their manufacturing and production efforts to include multiple stakeholder governments. Third, in anticipation of possible near-peer conflict at substantial distance from the U.S. homeland, the DoD has instituted a concept known as the Regional Sustainment Framework (RSF), which intentionally distributes MRO activities into friendly foreign countries. This is intended to have a twofold benefit: to increase MRO effectiveness during a fight, and to deter such a fight from occurring by signaling greater capability and by showcasing alliances. The participation of the foreign industrial base (FIB) adds an additional dimension to the depiction above, as illustrated in **Fig. 2**.

## U.S. Defense Industrial Base



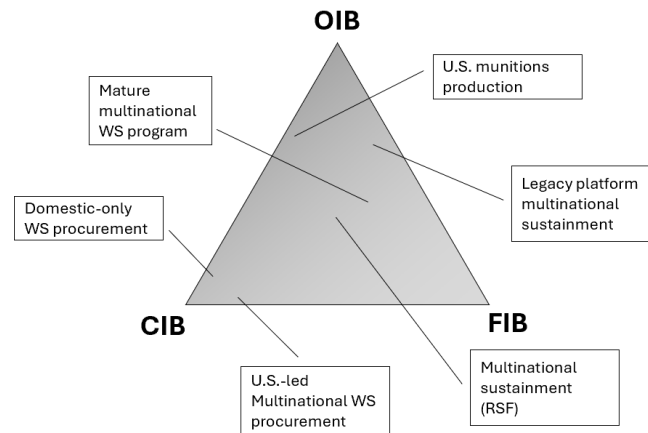
*Figure 2: Three-element model of the U.S. defense industrial base.*

Depicting the three elements of the DIB in this way allows observers to plot any DIB activity within the bounds of the resultant triangle. Placement of an effort's position on the diagram fosters a more complete understanding of how public and private resources support it and may identify resource and planning misalignments or oversights that could disadvantage the effort.

An effort's position within the triangle can change over time, or with policy change. For example, as a new weapon system is designed and produced, it may be almost entirely the responsibility of the CIB. Within four years of initial operational capability, DoD Instruction 4151.24 requires the OIB to establish core logistics capabilities for that system,<sup>69</sup> which will shift its placement toward OIB along the CIB-OIB axis. When the initial production of a platform ends and the private sector moves its focus to new efforts, MRO responsibility may eventually shift almost entirely to the OIB (except for inputs such as tools, raw materials, and components sourced from the private sector). Similarly, if the U.S. and a partner nation create shared overseas MRO capability, the activity would shift toward the interior of the triangle. Programs conceived as multinational would fall along the CIB-FIB axis until organic capabilities come online, again moving their placement into the interior. Several of these activities' approximate locations in the triangle are illustrated in **Fig. 3**.



## U.S. Defense Industrial Base



*Figure 3: Notional placement of select activities on the U.S. DIB model (not drawn to scale).*

Two considerations are noteworthy: First, foreign allies and partners have organic and commercial bases of their own, considered together in this model as “FIB.” The model assumes that the U.S. government works with partner nations without significant focus on foreign public-private distinctions which are largely outside U.S. control. Second, few if any activities will ever fall at the extreme vertexes of the model. Private-sector weapon system development is often directed by government interest and investment; organic MRO relies on tools, materials, components from commercial suppliers; and defense production anywhere in the world relies on complex global supply chains with multinational dependencies.

Despite popular portrayals of the defense industrial base as a private sector concern, it is best represented as three elements acting in an ever-shifting balance: The CIB, which consists of U.S. private sector suppliers and contractors; the OIB, or the U.S. government’s publicly held and strategically preserved capability to produce and maintain defense articles; and the FIB, which is the CIB and OIB of ally and partner nations. Every defense industrial activity can be represented as a balance of these three elements, with significant variation in which elements receive the preponderance of effort or resourcing, and

substantial change over the life of a program or in response to policy change. A deliberate understanding of a given activity's placement in or movement through the model will foster better resource alignment, sustainment planning, and multinational unity of effort.

## Appendix G: Rethinking the Organic Industrial Base Readiness Enablers

For several years, the Organic Industrial Base (OIB) industry study has used the Five Readiness Enabler model depicted at **Fig. 1**. This appendix will identify several issues with this model, both conceptually and graphically, and propose updates to enable more comprehensive analysis in the future.



*Figure 1. OIB Five Readiness Enabler Model*

### *Issues with present model*

- “Materiel” is a doctrinally sound term as defined in Joint Publication 4-070, but is most often used to describe supplies and equipment provisioned for active military forces. When discussing the OIB, “Materials” would be clearer.
- The arrows between the individual enablers, intending to show interrelationships among all five, only point clockwise. This gives the false impression of a sequence. Additionally, because of limited space on the diagram, not all enablers are depicted as interacting with the others. For example, Governance’s impact on Human Capital is not shown.
- Three of the enablers, Infrastructure, Materiel/Materials, and Human Capital, directly contribute to OIB production and consequent readiness. The remaining two, Governance and Finance, have only an indirect impact.

- “Finance” may be interpreted several ways: the actual flow of funds, which are spent on the three direct enablers; the system of using defense working capital funds (DWCF) to conduct OIB operations; or the broader rules established for paying for OIB activity (a blend of appropriations and the DWCF revenue model). The latter two can also be considered a Governance issue.
- The inclusion of two indirect enablers highlights the absence of Strategy, which shapes all OIB activity in response to geopolitical factors.
- The model does not capture that Innovation can affect readiness without necessarily relying on changes to the featured enablers.

Fig. 2 depicts a recommended revision to the readiness enabler model and submits it for evaluation by future OIB industry studies.

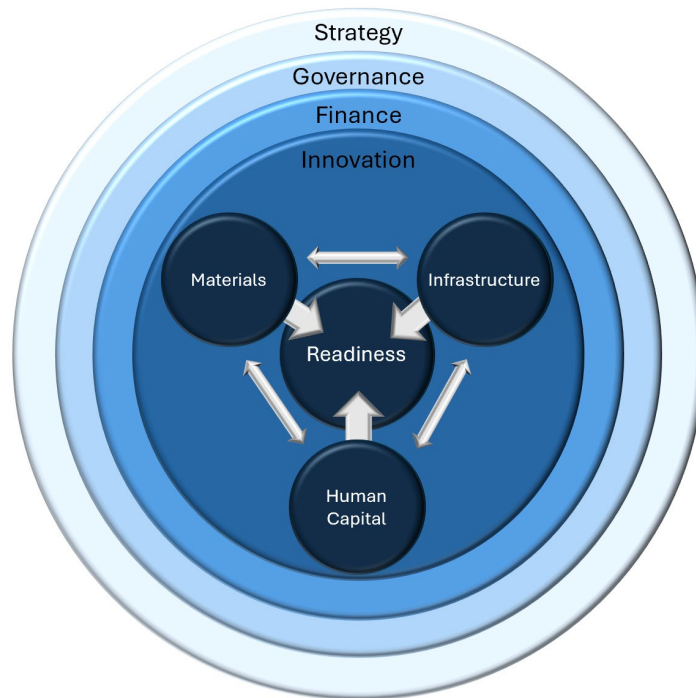


Figure 2. Proposed Readiness Enabler Model.

### *Features of the proposed model*

- Substitutes “Materials” for “Materiel” for clarity
- Depicts the nesting impact of
  - Strategy, which directs the U.S. government’s response to geopolitical realities in pursuit of U.S. interests;
  - Governance, which derives from policy in response to strategic guidance;
  - Finance, which is appropriated and provisioned according to the rules established by Governance; and
  - Innovation, which enables the creative use of fixed resources to improve outcomes.
- Depicts the three direct enablers in a position to impact readiness, and shows that each of the three can impact the other two.

Still undepicted in this model is the notion that the condition of readiness or the three direct enablers can have impact on outer tiers of the model. For example, low readiness levels may inspire changes in Governance or Finance, or Infrastructure problems may change Strategic calculus. But while acknowledging that this model is not perfect, it more accurately depicts the interrelationships of the five existing readiness enablers and places them in a broader strategic context.

## **Appendix H: Glossary**

A&P	Allies and Partners
AI	Artificial Intelligence
AMC	Army Materiel Command
ASD (S)	Assistant Secretary of Defense for Sustainment
BCA	Business Case Analysis
CIB	Commercial Industrial Base
CFR	Code of Federal Regulations
CONUS	Continental United States
OCONUS	Outside the Continental United States
DIB	Defense Industrial Base
DLH	Direct Labor Hours
DOD	Department of Defense
DODI	Department of Defense Instruction
DWCF	Defense Working Capital Funds
FIB	Foreign Industrial Base
FMS	Foreign Military Sales
FSRM	Facilities, Sustainment, Restoration, and Modernization
GAO	Government Accountability Office
GPA	Grade Point Average
GOCO	Government-Owned and Contractor Operated
GOGO	Government-Owned and Government Operated
GS	Government Schedule

IP	Intellectual Property
ITAR	International Traffic in Arms Regulations
JPO	Joint Program Office
LCSP	Life Cycle Sustainment Plans
MAJCOM	Major Command
MILCON	Military Construction
MRO	Maintenance, Repair, and Overhaul
NDIA	National Defense Industrial Association
NDIS	National Defense Industrial Strategy
NDMR	National Defense Maintenance Reserve
NDS	National Defense Strategy
NSS	National Security Strategy
OIB	Organic Industrial Base
OPM	Office of Personnel Management
OSD	Office of the Secretary of Defense
PEST	Political, Economic, Social and Technological Factors
PRC	People's Republic of China
RSF	Regional Sustainment Framework
SCP-P	Structure, Conduct, Performance, and Policy
STEM	Science, technology, engineering and mathematics
USC	U.S. Code.
WG	Wage Grade

## **Appendix I: Abstracts of individual papers**

### *1. Brooks, Tabu: The Impact of Government Policy to OIB Infrastructure and Performance*

The United States' (U.S.) Government policy plays a significant role in influencing economic and national security, ensuring the effectiveness and resilience of the Organic Industrial Base (OIB) infrastructure. The OIB is an essential ecosystem within the Department of Defense (DoD) comprised of government-owned facilities, including arsenals, depots, and shipyards, where skilled personnel perform maintenance, repair, and overhaul (MRO) services of critical equipment to optimize operational readiness, sustainment, and modernization.

Title 10 U.S.C. §2466 (50/50 rule) and other laws limit the amount of depot-level MRO services performed by non-federal personnel. To expand and forward project MRO capacity and capability to the point of need worldwide and prevail in contested logistics environments, the OIB must implement a comprehensive transformation from a current to future state to increase MRO services by leveraging existing policies and frameworks including the Regional Sustainment Framework (RSF) and enhance collaboration between private industry and Foreign Allies Partners (FAP) to align domestic and international industrial base resources adequately.

The PEST Analysis, (5) OIB Five Readiness Enablers model, and other frameworks evaluate the context and infrastructure of the current OIB and propose methods to enhance the OIB for the future. These frameworks identify opportunities to expand MRO services and analyze preliminary constraints caused by public policy intervention for laws, regulations, and standards in both domestic and international markets. Therefore, U.S. lawmakers and political officials should revise laws and policies to strengthen the OIB's ability to meet requirements during peacetime, aid during crisis, and forward project surge demands at the point of need



during conflict and ensure effective, flexible, and responsive sustainment to further Commercial Industrial Base (CIB) and FAP participation and collaboration to modernize the Warfighter.

## *2. Chapman, Benjamin: The RSF: A Strategic Imperative Requiring Judicious Implementation*

The following problems face the current force as it looks to the Indo-Pacific command: first, contested environments do not allow for freedom of movement along historically permissive lines of communication (LOCs); second, strategic transportation will be scarce in times of war, and LOCs will be congested. A strategic imperative exists to create a more resilient sustainment system with some measure of capability closer to the operating forces.

The thesis of this study is that there are significant opportunities for pursuing the RSF from the perspective of building relationships with allies and partners. For the Air Force, the primary benefit of RSF lay in component-level MRO rather than the U.S. attempting to replicate the full CONUS-style OIB depots at overseas locations. Further, the Air Force may consider capitalizing on RSF to expand the pool of locations to receive Depot Field Teams.

After reviewing the opportunities and costs of RSF, the analysis hinges on three frameworks. Porter's Five Forces model reviews new entrants into the MRO enterprise via RSF, including how such entrants will affect the supply chain, infrastructure, and quality factors. The Key Readiness Enablers are then employed to enumerate and categorize planning considerations for RSF. Finally, with these implications in mind, the author provides a Cost-Complexity model that describes the tradeoffs between small-scale OCONUS MRO that is more cost-effective—allowing for more RSF sites—versus more large-scale OCONUS MRO.

The research recommends that the commanders and their staffs conduct due diligence before establishing RSF initiatives through detailed planning and cost-benefit analysis. It also suggests that DoD leaders shape the Foreign Industrial Base by having multiple, dependable, allies and partners as a principal consideration.

### *3. De Souza, Eudes: Enhancing U.S. OIB Through Brazilian MRO Capabilities: Sustainability and Best Practices for Future Readiness*

Globalization and the decentralization of industries have compromised the sustainability of war efforts in equipment maintenance and repairs, affecting not only the United States (U.S.) but also areas close to conflict zones. These challenges reduce operational readiness, which is constrained by defense budget limitations and the varied repair capabilities for equipment and armaments across regions. However, since the primary focus of the U.S. National Security Strategy is the People's Republic of China (PRC), most studies concentrate on the Indo-Pacific, leaving a gap in research for South America. This study aims to compare Brazil's industrial practices and capabilities with those of the U.S., assessing their potential to enhance the U.S. Organic Industrial Base (OIB) and establish a Regional Sustainment Framework (RSF) in the U.S. Southern Command (SOUTHCOM). The analysis leverages the Structure-Conduct-Performance-Policy framework to assess and draw parallels between the Maintenance, Repair, and Overhaul (MRO) practices and industrial capabilities of Brazil and the U.S. The Means-Ways-Ends-Risks framework further supports strategic situation analysis, providing a robust methodological base for the study. The study identified Brazil's financial and governance practices that could benefit the U.S., alongside Brazil's aviation maintenance strengths with Embraer and submarine repair capabilities at its modern shipyard. The recommendations suggest adopting these practices and strengthening U.S.-Brazil ties to enhance the sustainability of U.S. military operations in SOUTHCOM through Brazil's MRO capabilities. The study emphasizes the critical role of international cooperation in boosting military readiness by integrating Brazil's proven MRO practices and capabilities into the U.S. framework, thereby improving operational standards and future RSF.

*4. Enwefa, Nkechukwuku: OIB of the Future: A Case for Leveraging Allies and Partners MRO Capabilities, Nested with the RSF*

The OIB is a legacy of the WWII and the Korean War eras. Analysis of its current structure, conduct, performance, and policies (S-C-P-P) indicates misalignment with the contemporary geopolitical environment, lacking the agility and adaptability necessary for effective military sustainment in a potential conflict scenario with China. The thesis argues that a future OIB that leverages the MRO capabilities of Pacific allies, partners, and foreign industries will boost U.S. military strategic flexibility and operational resilience. This complements the overarching goals of the RSF, striving to develop a global network that is more agile and responsive to enhance readiness and capability to respond to threats.

The paper employs PEST (Political, Economic, Social, and Technological) and the Theory of Constraints (TOC). The PEST framework identifies external factors that could impact allies' and partners' MRO integration. The TOC focuses on uncovering constraints that hinder collaboration with allies and partners to fully exploit the potential benefits of international partnership in MRO operations.

The analysis indicates that the OIB's current centralized structure, focused primarily on the U.S., leads to sustainment challenges in a potential scenario conflict with China, based on distance and contested logistic environment. Historical evidence supports shifting to a more diverse, allied-based MRO network to boost strategic flexibility and operational depth. Therefore, the recommendations call for robust MRO agreements with Pacific allies and partners to define roles, manage technology transfers, and handle disputes. It also advocates streamlining the logistical and regulatory frameworks to support international MRO strategy that aligns with the RSF.

*5. Heins, John: Updating America's Insurance Policy for the Cyber Age*

The U.S. military's Organic Industrial Base (OIB)'s ability to serve as "America's insurance policy" is in jeopardy. The rise of the cyber age has undermined the OIB's ability to contend with modern challenges. In addition to focusing on what warfighters need and what industry cannot or will not do, the OIB must add a third pillar: Defending itself from attack.

Balancing warfighting effectiveness with resiliency is a distinctly different task in the 21st century, where cyber capability has eliminated the sanctuary formerly afforded the OIB. Ongoing efforts to modernize and to distribute maintenance, repair, and overhaul (MRO) efforts into foreign countries come with new risks in cyberspace. The OIB will not play its part in the National Defense Strategy's "combat-credible forces prepared to fight and win" in the Indo-Pacific unless it focuses on operating under attack.

This paper explores the concept of "America's insurance policy" and uses two analytic models—the Five Readiness Enablers and the Theory of Constraints—to evaluate how present conceptions lag behind the new character of war. It also studies ways in which the threat environment has changed in recent years and juxtaposes those changes with present modernization efforts.

In order to preserve and bolster the OIB's cyber resiliency, it must invest 1% of its annual revenue in cybersecurity hardware, software, support contracts, and competitively paid expertise. Additionally, DoD should establish a joint "red team" responsible for thinking like an adversary to find cyber vulnerabilities which the services can prioritize and address. Finally, the OIB should also consider all cyber-architectural and modernization decisions through a cyber resiliency lens prior to implementation. These measures will preserve the OIB's ability to ensure the Nation's response in a time of crisis.

*6. Lee, Anthony: Sustaining and Expanding the OIB at the point of need*

With the rise of the People's Republic of China (PRC) and its challenge to the global order, it has become imperative for the department to ensure the resilience and flexibility of the OIB. The ability to provide maintenance, repair, and overhaul capabilities at the point of need is a crucial enabler to victory in the next strategic conflict. This short paper identifies three key lenses through which the OIB must be analyzed: domestic workforce readiness, leveraging allies and partners, and policy and governance.

The domestic lens highlights the need to fortify a multifunctional workforce within the OIB. The aging infrastructure and workforce continuity gap pose significant challenges that demand strategic planning and investment in human capital. It is crucial that the enterprise create a pipeline of versatile artisans that can be deployed to the domestic point of need. Secondly, to deter and triumph over future adversaries, the OIB will require interoperable capabilities amongst foreign allies and partners. Leveraging A&P capabilities and local workforce capacity will be essential to regional sustainment in the Indo Pacific region. Using Materiel Support Command – Korea as benchmark to employ cost sharing strategies to other A&Ps is a feasible model with cost saving benefits for the enterprise.

Lastly, reimagining the OIB requires that leaders consider not only near-term decisions regarding the sustainment of legacy capabilities but also the long-term impact of the RSF. For the RSF to have a lasting impact on future modernization systems, the regional sustainment concepts must be codified in policy and integrated early within the acquisition process. The development of flexible sustainment strategies will be essential to optimizing MRO decisions.

*7. MacFarlane, Matthew: Tackling the Workforce Gap: Using the Reserve Force Model to Bolster the OIB*

The consistent decline in the United States' manufacturing workforce directly impacts the readiness of the Defense Industrial Base (DIB). The Organic Industrial Base, within DIB, faces exacerbated human capital issues due to supply and demand challenges and vulnerabilities throughout the Five Readiness Enablers which limits incentives and productivity of a skilled workforce.

The thesis of this paper is that the implementation of a civilian maintenance reserve force will incentivize greater participation in the government-owned/government-operated OIB. However, due to the inelastic supply of skilled laborers within the United States, supplementing defense production and maintenance, repair, and overhaul (MRO) through foreign defense industries, such as the Regional Sustainment Framework, can immediately mitigate the domestic workforce shortages.

To analyze the current workforce environment of the OIB, supply and demand curves were used to show the inelasticity of skilled labor in the OIB. This curve was compared to the commercial industrial base, which experiences similar issues. Both are experiencing excessive demand. Further analysis showed that, as a Five Readiness Enabler (human capital, materiel, governance, finance, and infrastructure), human capital is currently impacted by vulnerabilities across the spectrum of readiness enablers.

To address the human capital issues within the OIB, this research recommends a blended effort of implementing a civilian reserve maintenance force while also seeking to offshore some MRO requirements to key allies and partners. Together these initiatives will return elasticity to the supply of skilled laborers, while also mitigating excessive increases in worker wages.

#### *8. Maynard, Chad: OIB Human Capital Challenges*

The organic industrial base (OIB) is vital to the safety and security of the United States. Many challenges are being worked through to ensure its effectiveness. People are the number one asset in any organization, and the OIB is no exception. Even though the OIB has many incentive programs to recruit and retain qualified personnel, they are not tackling the problem of not having a skilled workforce or a pay scale to ensure it can meet its demand efficiently or effectively.

This study uses a two-pronged approach to correct the OIB's human capital challenges. The first is having OPM look hard into the pay and qualifications of General Standard (GS) and wage-grade (WG) employees. This would enable the OIB to be competitive with the commercial sector and retain its skilled employees. The second approach is to use the military reserve force to fill gaps and seams in the OIB. Furthermore, the reserve force can be easily mobilized to support the Regional Sustainment Framework (RSF). To illustrate this, two frameworks were used to demonstrate how applying the above recommendations would further enhance the OIB: the supply and demand curve and the Five Readiness Enablers. The supply and demand curve model demonstrates how the demand curve shifts when the wage solution is implemented, and the supply curve shifts when augmented by the reserves forces. The second model discusses how all the factors work together, but without the right qualified people, the OIB cannot function properly and produce the readiness needed.

The solution proposed in this study is an investment in the OIB's future. The OPM wage solution could be a significant investment but would be offset by using the already programmed funding the reserve forces bring to the table. This is a win-win solution.



*9. Morris, Vinson: China's Military Modernization: An Assessment of Long-Term Sustainment*

The thesis of this research is that because sustainment is the most significant cost driver in the total lifecycle cost of US weapons systems, national security analysts must consider whether China's MRO service industry possesses a structural advantage, assisting in its quest to leapfrog the U.S. as the dominant military force in the world. Based on the Thesis: "While China's sustainment industry shares similarities with that of the U.S., notable differences emerge, particularly concerning production capacity, ratios of non-defense revenue within its defense SOEs, lack of commercial competition, and proximity to potential conflicts in the Indo-Pacific."

The SCP-P model and five forces analysis of China's MRO industry have highlighted China's advantage in production capability and flexibility to transition non-defense operations to defense-oriented tasks. China's isolationist approach suggests that MRO services will occur within China's borders without external assistance. China is gaining in its ability to develop technologically sophisticated systems while retaining capacity for mass production across its aircraft, maritime, missile, and land forces. Though China has no substitutes for MRO services, its production capacity and geographical proximity to conflicts in the Indo-Pacific region suggest it may not need to approach sustainment like the U.S. China is uniquely positioned to mass produce cheap, expendable systems close to the point of need.

This research recommends that DoD incentivize the early establishment of MRO services in future weapons system contracts and future Joint Systems life cycle sustainment plans include foreign partners. Lastly, Congress and DoD should centrally manage organic industrial base funds transitioning from a service-centric to a defense-wide resourcing approach.

10. *Niedermeier, Dirk: F-35 MRO: An Example for OCONUS MRO services within the RSF?*

The RSF is designed to bolster the Integrated Deterrence and enhance the readiness of U.S. forces. Collaborative partners can play a crucial role in maintaining the operational status of equipment by offering MRO services in their own facilities or those operated by their industries. Based on the thesis: *“An analysis of the F-35 program shows the promising benefits of leveraging allies and partners within the RSF for OCONUS MRO services and provides valuable insights for optimizing future cooperation. However, the F-35 program is unique and therefore not a good example for legacy weapon systems, especially when the U.S. uses them exclusively or primarily.”* the paper first examines the opportunities and limitations of partner support and then builds on this to examine F-35 MRO-U service possibilities in the Indo-Pacific.

Employing the SCP-P Framework and the OIB Readiness Model, the paper’s analysis indicates numerous potential benefits for the U.S. and its partners, e.g., eliminating expensive and time-intensive transportation and ensuring equipment availability for warfighters for longer durations. The F-35, with its worldwide sustainment network and global MRO-U facilities, aligns seamlessly with the RSF concept. The F-35 approach benefits the U.S. and its partners, including access to a global pool of spare parts, specialized equipment, and regional MRO facilities. This approach is suitable as a model for developing new weapon systems. However, the analysis indicates that not all partners in the Indo-Pacific region possess the necessary capabilities or confidence to maintain the advanced technology of the U.S. Moreover, the F-35 program’s unique features, mainly when solely operated by the U.S., make it unsuitable for legacy systems. Still, some older partner-operated systems (like F-16) could benefit from RSF MRO services in the Indo-Pacific.

## *11. Trent, James: Regional Sustainment, the OIB, and Deterrence Against the PRC*

This research seeks to address the following question: will the U.S. plausibly be better positioned under the proposed Regional Sustainment Framework (RSF) to achieve deterrence? Will it be better positioned to prevail if deterrence fails?

This paper has two conclusions. One, the U.S. organic industrial base (OIB) of the future, as envisioned by the RSF, would plausibly aid in deterring the PRC from initiating war with its neighbors. Two, the RSF would plausibly achieve the outcome of increasing U.S. readiness to prevail in an actual conflict. Supporting the first conclusion, evidence suggests that the OIB would complement and partially enable efforts to involve allies and partners (A&P) in an integrated deterrence framework, and that this has special significance in terms of the PRC and deterrence. Supporting the second conclusion, further evidence suggests that the RSF may force the OIB to refocus its activities from steady-state MRO other activities to better achieve necessary readiness aims.

This paper uses three frameworks. First, it divides the RSF's impact into orders of effect, meaning the plausible consequence of an RSF action, then, in turn, the plausible follow-on consequence of that action as a higher order of effect, and so on. This shows that the most impact would likely be felt in second- and third-order RSF effects. Second, it examines the impact of MRO activity abroad using Porter's Five Forces, showing a positive impact on MRO industry competitiveness. Third, it explores the structure, conduct, performance of the broader MRO industry, concluding that the RSF would likely lead to beneficial changes, particularly concerning intellectual property issues.

This research supports adoption of the RSF and recommends framing mechanisms that may aid in deterrence and OIB reform efforts.

*12. William, Susan: Enhancing MRO to Fortify Military Resilience and Strategic Readiness through the RSF*

The United States Department of Defense faces the ongoing challenge of maintaining military readiness through its Organic Industrial Base (OIB), which is responsible for the Maintenance, Repair, and Overhaul (MRO) of military assets. As global security landscapes evolve rapidly, the need for an agile and strategically aligned MRO operation becomes crucial to align with the Regional Sustainment Framework (RSF). This study addresses how the OIB can adapt to complex global supply chain challenges to secure MRO operations, enhancing military resilience and strategic readiness.

The thesis asserts that strategic realignment of the OIB with the RSF, which emphasizes adaptable MRO practices and confronts global supply chain challenges, is essential for maintaining continuous military effectiveness. By fostering a proactive and flexible MRO environment, the OIB can better support the military's capability to adapt to new threats and maintain operational readiness.

The research applies academic concepts such as Porter's Five Forces and the Theory of Constraints to analyze and enhance the strategic environment of the OIB. These frameworks provide insights into competitive pressures and operational bottlenecks, guiding strategic decisions to optimize MRO operations and strategic significance.

The paper recommends several strategies to enhance OIB operations: developing a diversified and resilient global supply chain, integrating advanced technologies like AI in MRO processes, expanding regional collaborations, adopting agile MRO practices, and fostering legislative and policy support to enhance U.S. military's operational readiness and its ability to respond to contemporary and future challenges effectively.

## Endnotes

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- <sup>58</sup> Estimate provided to Eisenhower School Class of 2024, Seminar 15 by an official with firsthand knowledge of the subject
- <sup>59</sup> “Article - DDTC Public Portal,” accessed April 20, 2024, [https://www.pmdtc.state.gov/ddtc\\_public/ddtc\\_public?id=ddtc\\_kb\\_article\\_page&sys\\_id=24d528fddbf930044f9ff621f961987](https://www.pmdtc.state.gov/ddtc_public/ddtc_public?id=ddtc_kb_article_page&sys_id=24d528fddbf930044f9ff621f961987).
- <sup>60</sup> William Greenwalt, “LEVERAGING THE NATIONAL TECHNOLOGY INDUSTRIAL BASE TO ADDRESS GREAT-POWER COMPETITION:,” April 2019, 46.
- <sup>61</sup> “The Global F-35 Effort: A Model of Cooperation,” DVIDS, accessed February 20, 2024, <https://www.dvidshub.net/news/443643/global-f-35-effort-model-cooperation>.
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- <sup>63</sup> “U.S. F-35 Sustainment Lead Details Israel Fleet Ops Since October | Aviation Week Network,” accessed April 11, 2024, <https://aviationweek.com/defense-space/budget-policy-operations/us-f-35-sustainment-lead-details-israel-fleet-ops-october>.
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- <sup>65</sup> Such as in this opinion column from 2023:  
“An Uncompetitive Defense Industrial Base Puts the Nation at Risk,” *Washington Post*, February 28, 2023, <https://www.washingtonpost.com/opinions/2023/02/28/pentagon-competition-weapons-ukraine/>.
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- <sup>68</sup> 10 USC Sec. 2464
- <sup>69</sup> U.S. Department of Defense, Depot Source of Repair Assignment Determination Process, DOD Instruction 4151.24 (Washington, DC: Department of Defense, 2018), <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/415124p.pdf?ver=9pIfDTEFJcO-JzQRRP5NUg%3D%3D>
- <sup>70</sup> The JP 4-0 definition is: “All items necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes.”