

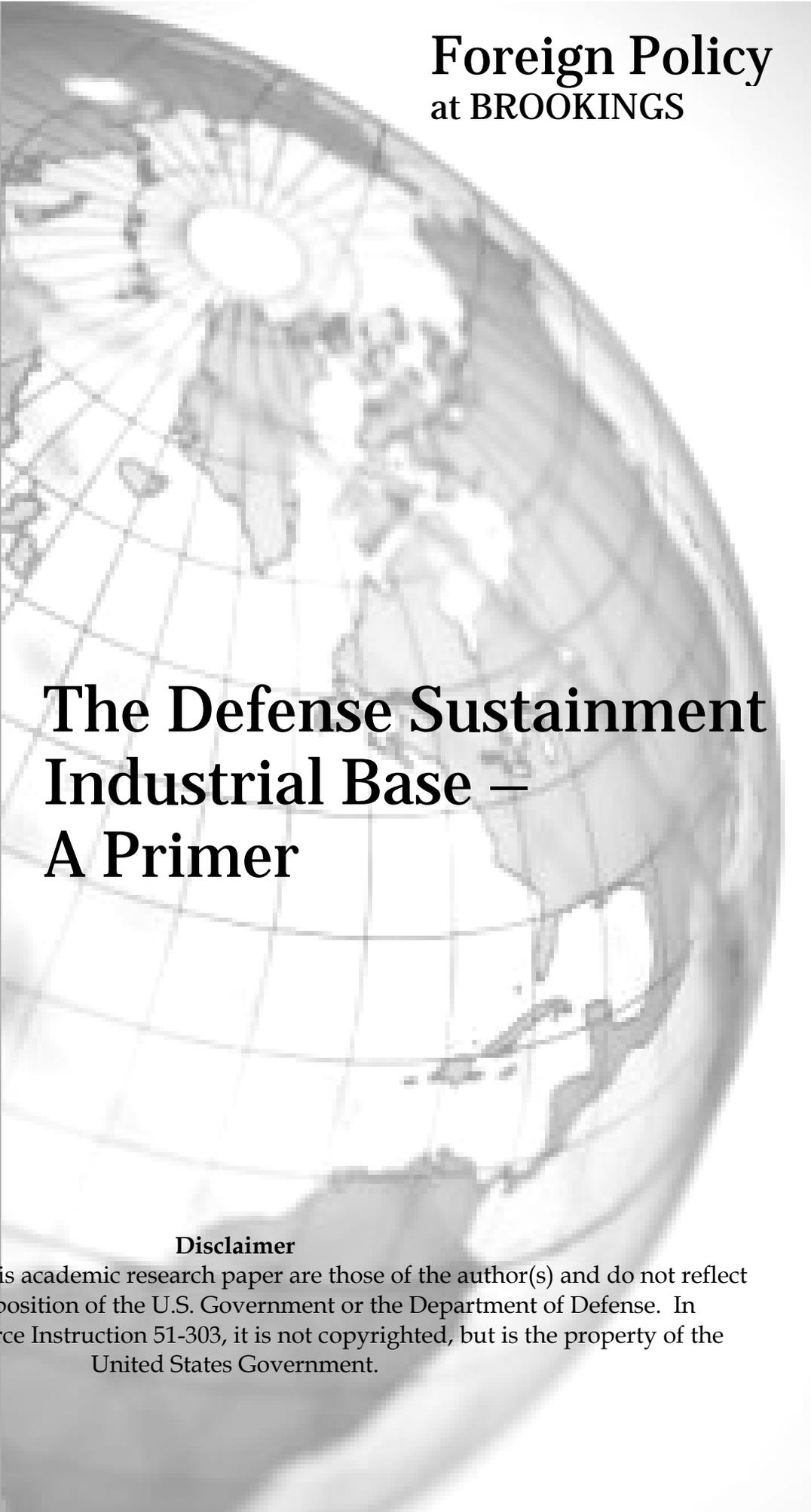
Foreign Policy
at BROOKINGS

The Defense Sustainment Industrial Base – A Primer

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21st CENTURY
DEFENSE INITIATIVE
POLICY PAPER
June 30, 2010





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PREFACE

This research examines the defense sustainment industrial base. The author did not begin this effort with a hypothesis to prove or disprove, but rather a desire to learn more about an issue essential to weapon system readiness. The goal in conducting research for this project was to gain a deeper knowledge of the subject and capture a sense of how it affects the availability of weapon systems. If deemed appropriate, this paper can be used as a primer on the issue for officers and DOD civilians who are about to enter the national level of logistics at a major command, a service staff, the Joint Staff or a staff in the Office of the Secretary of Defense. Finally, this study provides a summarized narrative for discussion by policymakers, proposes recommendations for policy development, and includes an extensive bibliography of literature on the subject for reference and further study.

EXECUTIVE SUMMARY

There is no shortage of discussion or concern over America's industrial base as it relates to national defense. The majority of the discussion has addressed the acquisition of major weapon systems, while comparatively far less debate has been devoted to the sustainment industrial base, which has a multitude of statutory requirements and competing stakeholders. Having the appropriate mix of public and private sustainment capacity and capabilities will play a crucial role in providing the DOD the ability to respond to the nation's security requirements. As even a brief discussion on each of the many facets of 21st Century weapon system sustainment could fill volumes, this work will attempt to highlight the importance of broader sustainment activities through a more narrow discussion of depot maintenance.

The projected decline in major weapon system acquisition in a fiscally constrained defense budget environment will present many challenges. As weapon systems are maintained for longer periods of service, often beyond their designed life-cycles, sustainment of those aging weapon systems will be integral to Joint Force readiness. Strategic vision regarding the public/private mix of the capabilities needed to sustain those systems will be critical to risk mitigation and weapon system availability.

The United States needs a national vision that articulates for leaders in government and industry what the future of the defense sustainment industrial base will look like. The vision should outline a strategic process for determining industrial base capacity, capabilities, and where those capabilities should reside within the public and private sectors. The vision should take into account the momentum of the DOD's current efforts to in-source previously contracted activities, include sustainment capabilities necessary for weapon system risk mitigation, and address partnerships with industry. Successful vision implementation should effectively manage expectations and inform the decision makers who facilitate investment decisions and plan sustainment strategies that are inextricably linked to weapon system readiness.

CHAPTER ONE

The Environment

The construct and health of the defense industrial base, including its ability to support Department of Defense (DOD) requirements and maximize readiness of the weapon systems, have been long debated topics in the United States. This debate exists in a complex environment influenced by a substantial domestic private defense industry and military service industrial capability, not to mention other statutes and directives which attempt to manage the capabilities needed to sustain DOD weapon systems.

There are varied viewpoints on what the appropriate mix of government and industry capability should be in weapon systems support. While there is statutory guidance in this area, it does not, and one should not expect it to, provide a comprehensive strategy for how the DOD will sustain its weapon systems. The current environment has developed over time as a function of many stakeholders, but the dynamics of weapon system age, reduced numbers of systems, and a projected decline in defense budgets necessitate a vision for the future.

The commercial sector is critical to America's ability to sustain its weapon systems, and many private industry leaders are eager to assist. There is no doubt that they have contributed and will continue to contribute immeasurably to the readiness of U.S. forces. When reflecting on the most basic private roles, it should be obvious that the chief responsibility of a corporation is to earn a profit for its shareholders, while the chief responsibility of the DOD is to provide national security to the nation. This is not to say that private entities do not desire to contribute to national security. In many cases, initiatives taken by the private sector are the key to advantages enjoyed by U.S. forces. However, at the most fundamental level it is the DOD's responsibility to shape and develop the capabilities it needs in a way that is most advantageous to national security objectives. A key aspect of that architecture will be the health of the private defense industry, and to be sure, clear communication of the DOD's desired future state.

A national level vision of what the defense sustainment industrial base should look like in the future would inform both government and industry leaders, enabling them to make appropriate decisions given diminishing resources. This vision should provide guidance for an integrated strategy for government and

industry, addressing a strategic process for determining what capacity and capabilities are needed and, just as important, where they should reside in the public and private sectors so as to mitigate risk in weapon systems readiness.

While this paper is more narrowly focused on the defense sustainment industrial base, students of this subject should be aware of an important body of work and recommendation for a broader vision titled the *National Security Industrial Vision*. Proposed by the Defense Science Board's Task Force on Defense Industrial Structure Transformation, and chaired by Dr. Jacques Gansler in July 2008, this report includes a broader landscape of new weapon system acquisition.

Terms are important. Often, participants in a discussion on defense matters will use the same words but mean different things, diminishing the value of the exchange.

A discussion about the defense industrial base could start in many places in American history, but it is best to begin with World War II. The strategic advantage that a robust industrial base provided the United States in the latter half of the 20th century began with the massive mobilization of commercial industry during World War II and the rapid production of a variety of weapon systems by the Arsenal of Democracy for the U.S. military and its allies. This success in the production of aircraft, ships, tanks and other pieces of military hardware eventually gave the U.S. military a capability edge that has subsequently shaped how Americans view the nature of war. The Cold War provided a sustained requirement for a commercial defense industry focused on the manufacture of very capable, and thus increasingly costly, systems. This need caused the defense industry in the United States to grow significantly. To sustain the large number of resultant weapon systems, the military services developed a significant government depot maintenance capacity that often employed large numbers of workers residing near those depots.

For the purposes of this discussion, the defense industrial base is defined as the public and private skills, knowledge, processes, facilities, materiel and equipment needed to design, develop, manufacture, repair and support DOD products.¹ Some have proposed that it is the responsibility of the U.S. government to make acquisition decisions to help sustain the defense industrial base, a responsibility that may even require action as extreme as the nationalization of private companies.² While the latter is an extreme approach, the DOD does take into account the impact on both the public and private components of the defense industrial base when making program decisions. Under Secretary of Defense for Acquisition, Technology and Logistics, Dr. Ashton Carter, has highlighted the importance of the issue: "I feel industrial base issues are completely legitimate because having the best defense industrial and

technology base in the world is not a birthright.”³ Since U.S. military spending is over \$700 billion out of the \$1.5 trillion in worldwide annual defense spending, it is no surprise that DOD spending has a significant impact on where investments in development and manufacturing are made domestically.⁴

It is no secret that while today’s weapons systems are extremely capable, they are also very expensive to develop, field, and sustain. One result of the high procurement costs and long timelines for the acquisition of modern weapon systems is that the services keep them in operation for longer periods of time. This trend to retain fielded weapon systems is amplified by the projections of decreased defense budgets, which make sustaining the systems a key factor in readiness for both the current fights and future contingencies.

It has been widely discussed that the United States has, over the past three decades, transitioned from a manufacturing oriented economy to a services focused economy. While this discussion will not attempt to gauge the degree to which this has occurred, it is clear that a great deal of the manufacturing and the engineering work previously conducted in the United States now takes place abroad.

A decrease in the acquisition of new systems has a direct effect on a defense industry that has major investments in skilled labor and production line infrastructure. This reduction has a secondary effect that goes beyond the original aircraft, ship or tank equipment manufacturers. There are a significant number of companies that supply the components, replacement parts and other repair capabilities for these weapon systems that are a very significant part of the equation. An arguably even more important yet rarely discussed factor is the engineering expertise and maintenance of the technical data needed to manufacture and maintain these subsystems. The point is not to argue whether the DOD needs to buy weapon systems just to keep defense focused companies in business but, rather, to stress that a comprehensive strategy must mitigate the secondary and tertiary effects created when the industrial base is not manufacturing new weapon systems. Sustainment of industrial capability should be an integral part and sometimes must be *the* integral part of that comprehensive industrial base strategy.

Defense Acquisition Industrial Base

The defense industrial base can be divided into two sectors: in terms of this paper, the first will focus on acquisition and the second will examine sustainment. What I term the “defense acquisition industrial base” includes the original equipment manufacturers that produce major defense acquisition program systems. For the most part, this is what the majority of defense

industrial base literature refers to. Original equipment manufacturers grab headlines for a number of reasons: acquisitions frequently involve large companies with recognizable names, which the civilian population can easily equate military acquisitions, such as the purchase of a new aircraft, to their own experiences buying new products, such as a car.

Mergers among a large number of major defense contractors have received a great deal of attention. Since the 1990s, over fifty major defense contractors have consolidated into just six prime contractors that essentially constitute U.S. corporate ability to accomplish complex weapon system development and integration. In addition to these leading defense “prime contractors,” there are hundreds of original equipment manufacturers (OEMs) responsible for subsystems and major components. These companies also have fallen prey to dramatic consolidation since the 1990s.

While analysis of this consolidation provides a clear understanding of the path that manufacturers of new weapon systems have taken thus far and why they have done so, it does not provide guidance for the industrial capability needed to sustain these weapon systems as they age. A view through the acquisition lens does not fully recognize how the industry transitions and absorbs change in research and development as well as procurement spending.

Defense Sustainment Industrial Base

The second sector, the defense sustainment industrial base, is often left out of discussion. The DOD definition for the sector is: the “package of support functions required to maintain the readiness and operational capability of weapon systems, subsystems, software and support systems.”⁵ The defense sustainment industrial base includes the government and industry mix of capability that provides those products and services. Widely recognizable companies in the defense acquisition industrial base, such as Boeing and Lockheed, are also important to the sustainment piece of the puzzle. Additional players, like Allied Signal and Textron, provide components and/or sustainment repair capability for weapon systems throughout their life-cycle. This is not to say that corporations must necessarily be exclusively in the Acquisition of Sustainment sector, but can be in both. It is helpful, however, to frame the discussion by thinking of the unique requirements of the defense sustainment industrial base that are not as frequently discussed.

The maintenance component of sustainment encompasses the repair and upgrade of weapon systems and their subsystems, and these activities are accomplished by both the government and industry. The debate over the right mix of these two providers is a main theme of this research and will be

addressed further in Chapter 2. When discussing what comprises maintenance, it will be important to keep in mind that maintenance is an area where tens of billions of dollars are spent annually by the services. With new acquisitions reduced, there may be a significant move by industry to make up for lost acquisition revenue by seeking to increase the maintenance workload they perform to sustain weapon systems already fielded. An articulated sustainment vision would manage expectation appropriately on both the government and industry side in this area.

Supplying the parts needed to sustain weapon systems is a complex endeavor. While this research will not attempt to add to the extensive body of discussion on the DOD supply chain, it is important to note that the DOD only manufactures a limited number of items and that the vast majority of manufacturing is accomplished by second tier commercial suppliers who manufacture components such as actuators, generators, and avionics units used to sustain weapon systems. When deemed appropriate, the DOD can harness internal talent and resources to, manufacture products, such as certain explosives, and to develop particular software. Software development is certainly a case where tension exists between the DOD, which views the development as integral to weapon system readiness, and the commercial sector, which might be reluctant to provide detailed drawings and technical data in this area out of fear it could lose market share. Whether these components need to be repaired or upgraded, the second tier supplier often possesses the technical knowledge and equipment to produce or upgrade these essential components. They provide parts for the original manufacturing of the weapon system and meet the demands of the supply system to maintain and upgrade the weapon system after it has been fielded as well as throughout its life-cycle. Second tier suppliers are of significant importance to weapon system readiness. There is a risk that they may exit the defense sustainment business for any number of reasons: corporate mergers and takeovers; business diversification; to pursue a more profitable market outside the defense environment.

The defense sustainment business is unique because unlike sustainment operations meant purely for the commercial sector, the DOD operates within the budgetary and oversight requirements of the Congress. In fact, the environment it operates under can sometimes make the DOD an unattractive customer for companies capable of producing precision manufactured parts that are also marketable outside of the defense environment. The military often requires specialized products that may have little utility to other consumers or may even be prohibited by law from being exported to other markets. Moreover, these specialized products or services are required in comparatively small quantities; usually just enough to meet needs for the short term. With a focus on not holding large inventories, the military orders small quantities, and when a

particular good is needed again in the future, the service will return to the industry and ask for another specialized small quantity. The fact that these products and services are needed as quickly as possible adds to the already complex process. In addition, DOD funding frequently is not of a long term nature. It is often difficult for a company to determine what level of commitment is really being made, and, therefore, what level of capital investment is reasonable for industry to make to achieve a return. While this discussion will not review the planning, programming, budgeting and execution system which links DOD strategic goals to programmatic requirements, there are some important legislative requirements that need to be taken into account when addressing the future of the defense sustainment industrial base.

Before discussing existing legislation, we should remind ourselves that “all politics are local” and that the military industrial base is no exception. The reader should guard against assuming that the Congress has a singular position on industrial base issues. It is easy to understand how constituents and their respective Members of Congress from a district or state with a major DOD depot might have a different view of the issue of government and industry mix than those that live in and represent a district where a major defense contractor carries out sustainment activities for weapon systems. The legislation affecting sustainment is varied. While it provides some specifics, it is no substitute for a comprehensive vision and strategic process needed to determine the right mix of capabilities and where they should reside in order to best support weapon system readiness.

Existing Legislation

There are a number of laws and clarifying DOD and service instructions that affect the defense sustainment industrial base. Without examining the entire spectrum of industrial base rules, it is useful to review a few of the most significant legislative requirements that guide the DOD’s behavior when interacting in this environment.

- *Core Logistics Capabilities* – This statute, U.S. Code, Title 10, Section 2464, was first enacted in 1984 and forces the DOD to identify the core logistics capabilities and the workload needed to “maintain and repair weapon systems and other military equipment” in accordance with requirements developed by the Joint Chiefs of Staff.⁶ The statute is intended to ensure that the logistics capabilities deemed critical to warfighting must be maintained within the government. Section 2464 states, in part:

“It is essential for the national defense that the DOD maintain core logistics capability that is Government-owned and Government

operated (including Government personnel and Government-owned and Government-operated equipment and facilities) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, national defense contingency situations, and other emergency requirements.”

This section also speaks to the need to maintain this capability and recognizes that a statutory requirement is necessary to ensure that this capability would remain organic to the U.S. government or could be revived if needed. The DOD asserts the need to:

“Assign such facilities sufficient workload to ensure cost efficiency and technical competence in the peacetime while preserving the surge capacity and reconstitution capabilities necessary to support fully the strategic and contingency plans prepared by the Chair of the Joint Chiefs of Staff under section 153 of this title”

The “Core Requirement” is a case where the language of a law might seem straightforward enough to implement, but the actual calculation is very challenging. DOD Instruction 4151.20 provides policy guidance, assigns responsibilities, and prescribes procedures to guide the services in this process.⁷ Each service has supplementary guidance and methods to develop the information required to meet reporting specifications. The government Accountability Office has investigated the DOD’s implementation of this requirement numerous times, and while the DOD has taken the following steps to standardize and clarify the data and processes, no single measurement has been found which provides an assessment of the comprehensive health of core logistics capabilities.

- *50/50 Requirement* – U.S. Code, Title 10, Section 2466, places limitations on the performance of depot-level maintenance of materiel. It states that not more than 50 percent of the funds made available in a fiscal year to a military department or defense agency for depot-level maintenance and repair workload may be used to contract non-federal government personnel for the given workload.⁸ The required mix of public and private depot-level funds expenditures has actually progressed from a 70/30 requirement when it was first enacted in 1982, to a 60/40 mix in the early nineties, to the current 50/50 required balance established in 1997.
- *Centers of Industrial and Technical Excellence* – U.S. Code, Title 10, Section 2474 prescribes how Centers of Industrial and Technical Excellence (depots) will enter into public-private partnerships for depot maintenance to provide

improved support to the warfighter and maximize the utilization of government facilities, equipment and personnel when certain criteria are met.⁹

“The Secretary designating a Center of Industrial and Technical Excellence under subsection (a) may authorize and encourage the head of the Center to enter into public-private cooperative arrangement to provide for any of the following:

“(A) For employees of the Center, private industry, or other entities outside the Department of Defense to perform (under contract, subcontract, or otherwise) work related to the core competencies of the Center, including and depot-level maintenance and repair work that involves one or more core competencies of the Center.

“(B) For private industry or other entities outside the Department of Defense to use, for any period of time determined to be consistent with the needs of the Department of Defense, any facilities or equipment of the Center that are not fully utilized for a military department’s own production or maintenance requirements.”

DOD Instruction 4151.21 provides policy, responsibilities and prescribes procedures for Depot Maintenance public-private partnerships that would be of use to any reader seeking further understanding of this subject.¹⁰

Minimum Capital Investment for Covered Depots, Section 2476, requires investment in the capital budget for designated depots and is another statute Congress has enacted to ensure the services maintain capability within the government critical to maintaining weapon systems. Section 2476 reads in part:

“(a) Minimum Investment. - Each fiscal year, the secretary of a military department shall invest in the capital budgets of the covered depots of that military department a total amount equal to not less than six percent of the average total combined workload funded at all the depots of that military department for the preceding three fiscal years.

“(b) Capital Budget. - For purposes of this section, the capital budget of a depot includes investment funds spent on depot infrastructure, equipment, and process improvement in direct support of depot operations.”

- *The Buy American Act* – U.S. Code, Title 10, Section 2533 covers determination of public interest by the SECDEF when considering the following:

The bids or proposals of small business firms in the United States which have offered to furnish American goods

The bids or proposals of all other firms in the United States which have offered to furnish American goods

The United States balance of payments

The cost of shipping goods which are other than American goods

Any duty, tariff, or surcharge which may enter into the cost of using goods which are other than American goods

A need to ensure the application of different rules of origin for United

States end items and foreign end items does not result in an award to a firm other than a firm providing a product produced in the United States

Any need to maintain the same source of supply for spare and replacement parts for an end item that qualifies as an American good; or to maintain the same source of supply for spare and replacement parts in order not to impair integration of the military and commercial industrial base

In this section, the term “goods which are other than American goods” means an end product that is not mined, produced, or manufactured in the United States or an end product that is manufactured in the United States but which includes components mined, produced, or manufactured outside of the United States the aggregate cost of which exceeds the aggregate cost of the components of such end product that are mined, produced, or manufactured in the United States.

Recently, Congress has had even more interest in the DOD’s ability to maintain weapon system readiness in the future environment. The 2009 National Defense Authorization Act (NDAA), Section 322’s language expressed this concern:

“The committee believes that when wartime operations in the Republic of Iraq and the Islamic Republic of Afghanistan cease, and supplemental appropriations for depot-related maintenance are reduced, DOD depots must not return to the post-Cold War environment where public- and private-sector facilities fought for limited available workload to the detriment of both.”¹¹

As a result, the NDAA directed the DOD to contract for an independent study of organic depot capability. The language specified that this study be conducted independently. The Logistics Management Institute (LMI) was chosen to conduct the study and has been given extensive access to sources throughout the DOD. The study will describe the current and anticipated depot maintenance requirement and make recommendations on: 1) requirements to maintain an efficient and enduring DOD depot capability; 2) changes to law; 3) methodology for determining core logistics requirements, including assessment of risk; 4) business rules that would incentivize the Secretary of Defense and the service secretaries to keep DOD depots efficient and cost effective, including workload levels required for efficiency, and; 5) strategy for enabling, requiring, and monitoring the ability of the DOD depots to produce performance-driven outcomes¹². The study is being conducted in two phases: research and data collection for the first 12 months, followed by analysis and reporting during the subsequent 10 months. The final report, which will include direct input from the Secretary of Defense and service secretaries, is due to Congress in October 2010.

This congressionally directed analysis focuses on the public sector capability, capacity, risk, workload, and other factors. Congress and the DOD must be as interested in private sector sustainment base analysis as they are in the DOD component. While the U.S. government does not control the private sector like it does the public sector, it must understand the critical factors that comprise its health in order to articulate a vision and implement strategies to shape the public and private mix of capabilities.

¹ *DOD Instruction (DODI) 5000.60*, Defense Industrial Capabilities Assessments, 15 October 2009.

² John Stanton, “Nationalize the U.S. Defense Industrial Base: Public Good Should Trump Private Greed,” Center for Research on Globalization, <http://www.globalresearch.ca/index.php?context=va&aid=2721>, 11 July 2006.

³ John T. Bennett, “Carter: DOD Plans Must Consider Industry’s Health,” *Defense News*, 2 September 2009, <http://www.defensenews.com/story.php?i=4261929>.

⁴ Loren Thompson, *Reversing Industrial Decline – A Role for the Defense Budget*, The Lexington Institute, 18 August 2009.

⁵ *DOD Weapon System Acquisition Reform Product Support Assessment*, Report of the DOD Product Support Assessment Team, OSD ADUSD Materiel Readiness, November 2009.

⁶ Core Logistics Capability, U.S. Code Title 10 Chapter 146, Section 2464.

⁷ *DOD Instruction (DODI) 4151.20 Depot Maintenance Core Capabilities Determination Process*, 5 January 2007.

⁸ Limitations on the Performance of Depot-Level Maintenance of Materiel, U.S. Code Title 10, Chapter 146, Section 2466.

⁹ Centers of Industrial and Technical Excellence: Designation; Public-Private Partnerships, U.S. Code Title 10, Chapter 146 Section 2474.

¹⁰ *DOD Instruction (DODI) Public-Private Partnerships for Depot-Level Maintenance*, 25 April 2007.

¹¹ House Report 110-652, *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009*, Report of the Committee on Armed Services, House of Representatives on H.R. 5658 together with Additional Views (Including cost estimate of the Congressional Budget Office), 16 May 2008.

¹² *Study of Future DOD Depot Capabilities*, Logistics Management Institute Update for the DOD Maintenance Symposium, 26 Oct 09 Phoenix Arizona.

CHAPTER TWO

Key Players and Efforts

For all readers, but especially those preparing to enter into a staff assignment at their service headquarters, the Joint Staff, or the staff of the Office of the Secretary of Defense (OSD), it is helpful to have some appreciation of the key players in the debate over what sustainment capabilities government and/or industry should accomplish. Both OSD and the services recognize that this is an enduring, critical factor and have responded with a number of ongoing efforts to improve weapon system support.

Department of Defense

Of the many offices on the OSD staff that participate in this environment, there are three worth mentioning within the office of the Under Secretary of Defense for Acquisition, Technology, and Logistics because of their engagement with defense sustainment industrial base policy. The first is the office of the Deputy Under Secretary of Defense for Industrial Policy (OSD IP). IP has generated a number of reports of interest that are available on their website, including the Annual Industrial Capabilities Report to Congress. The Director of Industrial Policy stated that “the U.S. Defense Department will renew its focus on the strength of the industrial base that supplies it, paying special attention to the companies below the prime contracting level”.¹ The health of the industrial base was addressed to a greater extent in the most recent QDR than in previous efforts, and it calls for a “more sophisticated relationship” with the industrial base. The level of understanding required to make this type of relationship a reality will require a strategic process that informs decision makers and balances expectations.

The next office of mention is Assistant Deputy Under Secretary of Defense for Maintenance Policy and Programs. This office serves as the principal advisor for policies and procedures concerning maintenance support of major weapon systems and military equipment, and it provides the functional expertise for centralized maintenance policy and management oversight for all weapon systems, military equipment maintenance programs and related resources within the DOD. Moreover, it establishes and maintains managerially competent, technologically sound and adequately resourced maintenance policies and programs that maintain the desired levels of weapon systems and military equipment readiness to accomplish the Department's missions. The ADUSD

chairs the Maintenance Executive Steering Committee and the Joint Group on Depot Maintenance, which encompasses much of the general officer and Senior Executive Service leadership responsible for steering DOD and service weapon system sustainment policy. There are a number of reports on their website, including the DOD Maintenance Strategic Plan.

The final office of mention is the office of the Assistant Deputy Under Secretary of Defense for Materiel Readiness (ADUSD MR), which is tasked with advising and assisting the DUSD for Logistics and Materiel Readiness. The policies, procedures and implementing actions it helps to establish help integrate acquisition and sustainment processes into a life-cycle management framework intended to optimize weapon system materiel readiness. ADUSD MR led the DOD Weapon System Acquisition Reform Product Support Assessment effort, a year long study with 65 participants from each service, industry and other DOD agencies with a focus on weapon system product support and life-cycle management to achieve affordable outcomes for the warfighter.² Major recommendations included the adoption of a Product Support Business Model and an integrated defense industrial base and a Supply Chain Operational Strategy.

For the reader reviewing recent efforts in this area, it is also important to note the Defense Science Board (DSB) Task Force on Defense Industrial Structure for Transformation. The study was chaired by Dr. Jacques Gansler and addressed the constraints imposed by the current defense industry on the U.S. armed force's ability to defend against 21st century threats.

The task force identified four key findings:

- There is a critical need for the DOD to establish a National Security Industrial Vision, working with industry to ensure realization of an improved customer/supplier relationship.
- DOD must also drive business practice transformation of its own in support of a 21st century military.
- The government must facilitate the rapid and affordable acquisition of needed weapons, systems, and services that are world-class.
- The DOD acquisition workforce must be strengthened in order to facilitate the timely and cost effective acquisition of military capabilities and provide enhanced government oversight of program management.

The report proposed nine recommendations that it felt were necessary for the DOD to achieve an appropriate National Security Industrial Base. The need to

“Articulate a National Security Strategy”³ is most relevant to this research. While the DSB’s recommendation is broader than the scope of this research and focuses on the new acquisition sector, it provides a comprehensive look at the issue across DOD. The Board reported that three significant actions will be required by the DOD to implement its recommendations:

1. Restructuring of the government and industry relationship
2. Incentivizing industry to transform itself to meet 21st century security environment requirements
3. Rebuilding and reshaping the government and industry workforces

There are several other ongoing processes meant to mitigate risk in weapon systems support:

- The Depot Source of Repair Process considers contract and organic sources, existing depot maintenance capabilities in all military services, and joint contracting opportunities. Another is the Business Case Analysis (BCA) process, which determines the best value support strategies.⁴
- The BCA is a decision support document that identifies alternatives and presents business, economic, risk, and technical agreements for selecting an alternative to achieve organizational or functional missions or goals. A great deal of criticism has been levied at the BCA process, largely because the logistics information technology infrastructure is not advanced enough to provide clear analysis to decision makers reliant upon the BCA process.
- The Diminishing Manufacturing Sources and Material Shortages (DMSMS) management process is used by program managers to oversee the risk of obsolescence throughout the entire life-cycle of a weapon system in order to reduce impacts on readiness. The Defense Acquisition University provides coursework and makes use of the DOD DMSMS Guidebook to assist program managers in implementation planning.⁵
- Students of this subject should also look at the DOD Manufacturing Technology Program (MANTECH), which falls under the Office of the Under Secretary of Defense for Advanced Systems and Concepts. The MANTECH program invests in the development of manufacturing processes and capabilities to support defense-essential product technologies. The program emphasizes maturing defense-essential

technologies emerging from development to foster rapid, low-risk transition of advanced technology from the laboratory to new systems or to extend the useful life of existing military systems.⁶

- A final program of mention at the DOD level is the Trusted Foundry Program, which is designed to provide a ready source of high performance semiconductors through U.S. owned manufacturers within production facilities in the United States. This program was implemented to hedge against the trend of semiconductor fabrication plants moving overseas and becoming a source of supply of sensitive defense systems.⁷

Air Force Specific

The United States Air Force Depot Maintenance Strategic Plan is an overarching document that gives a good sense of the Air Force's approach to defense industrial base issues and outlines efforts to support the warfighter's mission. It states that this mission will be accomplished by: assessing and posturing capabilities and technologies in support of future workloads; leveraging partnering; maintaining world class infrastructure and process through transformation initiatives; sustaining viable complementary private industry repair capability, and; retaining a professionally skilled workforce.⁸ Two senior steering forums are worth noting: the Integrated Life-Cycle Management (ILCM) Forum, whose focus is to give more effective control over weapon system support, increase flexibility to respond to changing operational needs, optimize the use of program dollars, and enable a proactive satisfaction of legislative requirements, and the Air Force Industrial Base Council (AFIBC), whose role is to address mitigating strategies for Air Force level risk. There is a significant repository of information on the Industrial Base Planning Community of Practice available through the Air Force Portal. Both of these forums are comprised of the general officer and Senior Executive Service members from the Air Force Secretariat, the Air Staff and Air Force Materiel Command.

For specifics within the Air Force, the appropriate point of contact varies widely according to the focus of interest from the Air Staff or Air Force Materiel Command. For a more strategic view of issues, the Office of the Deputy Assistant Secretary of the Air Force for Logistics is extensively engaged in both of the aforementioned forums and as well as with OSD and industry. Its mission is to: provide guidance, direction and oversight on matters pertaining to the overall supervision of logistics, including materiel readiness and product support; supply chain integration, distribution, planning and programming, and logistics systems management; maintenance of weapon systems and military equipment; depot maintenance management, including planning, performance and capabilities, and; total life-cycle management (sustainment). SAF/IEL has the

purview to provide a vector as to who within the different staff organizations might be appropriate for an issue.

¹ Antonie Boessenkool, "QDR Aims to Protect Industrial Base," *Defense News*, 16 Nov 2009, <http://www.defensenews.com/story.php?c=FEA&s=CVS&i=4376835>.

² *DOD Weapon System Acquisition Reform Product Support Assessment*, Report of the DOD Product Support Assessment Team, OSD ADUSD Materiel Readiness, November 2009.

³ *Creating an Effective National Security Industrial Base for the 21st Century: An Action Plan to Address the Coming Crisis*. Defense Science Board Task Force on Defense Industrial Structure for Transformation, staff study, July 2008.

⁴ *DOD Weapon System Acquisition Reform Product Support Assessment*, Nov 09.

⁵ *DOD Instruction (DODI) 4140.1-R DOD Supply Chain Management Regulation*, paragraph C3.6, 23 May 2003.

⁶ Department of Defense Manufacturing Technology Program, <https://www.DODmantech.com/>.

⁷ *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009*, Section 254, 14 Oct 08.

⁸ *United States Air Force Depot Maintenance Strategic Plan*, April 2008.

CHAPTER THREE

Depot Maintenance Capacity and the Mix

Determining how much capacity is needed, what capabilities are required and where they should be located is central to the future health of the defense sustainment industrial base. This chapter will briefly discuss the scope of assets, type of activities and the public/private construct, in order to lay the foundation for the debate over determining how and in what manner components should be arranged to best support national security interests.

Maintenance in Context

Once again, it is important to clearly define our terms to avoid ambiguity and miscommunication. The context of these terms must also be addressed so that the reader can attain an accurate sense of the complexity of the issue.

For instance, “supply chain” is a label that is commonly used in the commercial sector. The supply chain, not to be confused with the singular term “supply” as a specific function within that chain, consists of maintenance, supply, and deployment and distribution. Joint Doctrine uses the term “supply chain” to describe these integrated functions, but some service guidance describes them as the “logistics chain,” which avoids confusing the entire chain with only one of its individual functions. For further explanation, *Joint Publication 4.0* provides a good example of how the term supply chain is used in military lexicon and how it contributes to Joint Force Commander requirements.¹

Levels of Maintenance

Though terminology varies from source to source, maintenance activities are often broken into three levels of capability which are codified in the DOD Depot Maintenance Strategic Plan.²

- Organizational maintenance consists of the on-equipment tasks necessary for day-to-day operation, including inspection and servicing and remove-and-replace operations for failed components including line-replaceable units or weapon-replaceable assemblies.
- Intermediate maintenance consists of off-equipment repair capabilities possessed by operating units and in-theater sustainment organizations. These capabilities can be quite

extensive, and include remove-and-replace operations for subcomponents of line replaceable units – often called shop replaceable units or assemblies – local manufacture, and other repair capabilities.

- Depot maintenance consists of all repairs beyond the capabilities of the operating units, including rebuild, overhaul and extensive modification of equipment platforms, systems and subsystems. The depot level is the ultimate source of repair.

While this paper does not address the debate both within and outside the services over the public and private mix of workload and capability at the organizational and intermediate maintenance levels, its absence does not imply that it is not a critical debate. Rather, it is an issue that directly affects resource expenditures, risk and weapon system availability for the warfighter but, unfortunately, falls beyond the scope of this research. It should also be noted that some services do not distinguish between organizational and intermediate level maintenance and refer to the combination of these two levels as field level maintenance.

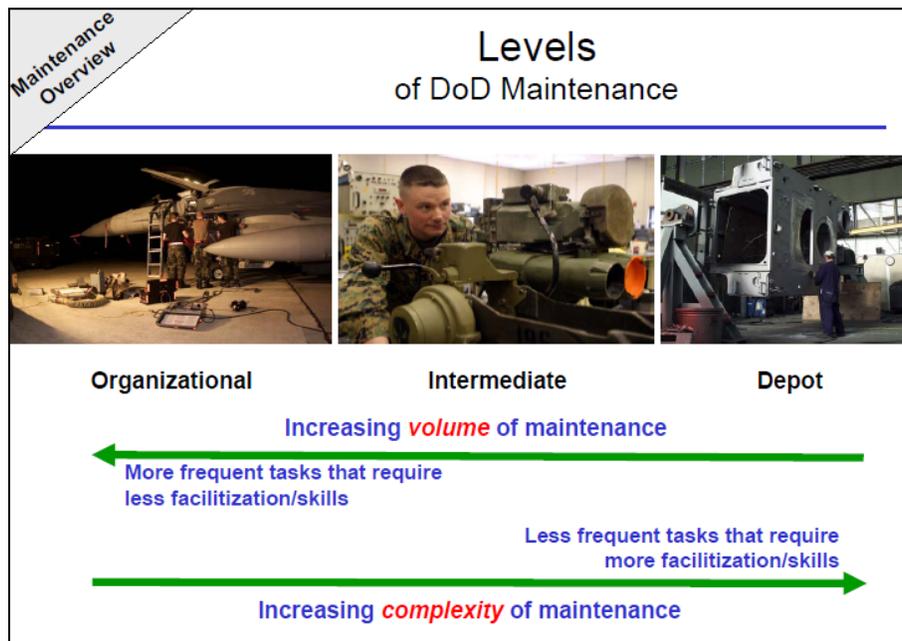


Figure 1 Level of Maintenance (2008 DOD Maintenance Factbook)

Depot maintenance is a level of repair, not a geographical location. Depot maintenance can occur at any number of locations, including a unit’s regularly assigned base or post. The services vary in their application of depot level maintenance in and beyond the traditional “brick and mortar depots” in the

United States, but it is important to note that a significant amount of depot work is being conducted in the Central Command Area of Responsibility and other overseas locations. That being said, when framing the discussion on depot maintenance and when reviewing congressional guidance on the issue, the scope and location of what is deemed Major Depot Activities is central. These activities represent a national capability for weapon system support and a significant number of government jobs at their respective locations.

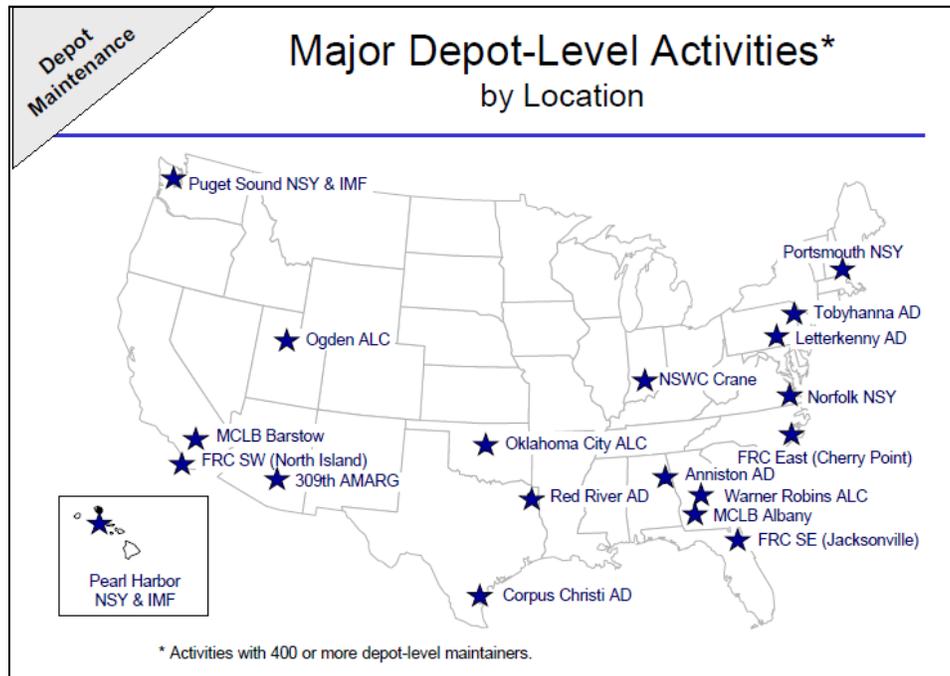


Figure 2 Depot Maintenance by Location (2008 DOD Maintenance Factbook)

A note of reference to Air Force readers familiar with the Air Force’s Air Logistics Centers (ALC) and their depot operations: the Air Force’s ALCs are very large, consolidated operations with multi-system and sub-system capabilities. Some DOD depot operations in other services are smaller in scope and workforce, an important distinction that needs to be taken into account when determining what the future of the defense sustainment industrial base should look like.

Capacity and Capability

Returning to the theme that terms are critical, it is important to differentiate the descriptors of “capacity” and “capability.” In their simplest terms, capacity is “how much” and capability is “what” one can do. Since depot capacity and capability are central to the discussion on the sustainment of weapon systems, it

is worthwhile to provide some brief context on these terms as they relate to depot maintenance.

DOD has a standardized methodology for measuring depot capacity through direct labor hours, based on a standard 40 hour, 5 day work week.³ The standardized methodology was established so senior leaders could assess capacity and associated utilization of the 22 major depots throughout the DOD. Of course, work activity within a depot can, and often does, exceed the 40 hour work week, but the standardized methodology still allows comparisons to be made across the entire enterprise. DOD's policy is to provide "organic maintenance for inherently governmental and core capability requirements in accordance with Title 10, Section 2464." To accomplish this requirement, it must monitor the capacity and utilization of its depots.⁴

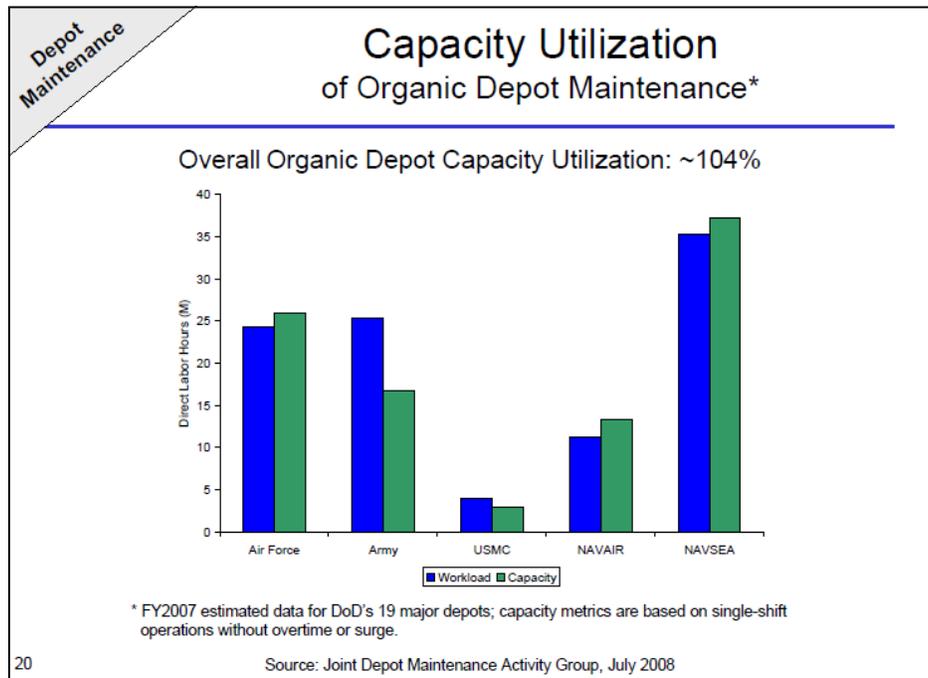


Figure 3 Capacity Utilization

Capability is the specific ability to accomplish the sustainment task needed to support the weapon systems. It can include manufacturing needed for the refurbishment of bearings, non-destructive inspection, corrosion control, calibration, or the repair of composites and low observable components. Though the list varies according to the type of weapon systems being maintained, it is useful to think of the three components needed to execute sustainment operations: equipment, skilled personnel, and information and materiel. These will be addressed in the next chapter.

The Mix

As discussed, the DOD has always relied on the commercial sector to manufacture the vast majority of weapon systems as well as components for national defense. During the Cold War, the military services developed a robust depot infrastructure and associated sustainment capabilities to support the large standing fleet of weapon systems. As budgets and force structure were reduced in the 1990s, many sustainment activities were outsourced to save resources. This outsourcing was capped by the 50/50 Requirement, as previously discussed, and assured continued DOD capability. But as the acquisition of new weapon systems decreases, the commercial sector will look for ways to make up lost revenue and preserve their industrial and engineering capability. From private industry's perspective, it is only logical that they migrate from the original manufacture of weapon systems to sustainment. The evolution of public and private mix is key to both fleet readiness and the health of private firms. A unified vision is needed so that resources are deployed in a balanced approach instead of in a scramble for public and private workload.

¹ *Joint Publication 4.0, Joint Logistics*, I-12, July 2008.

² *Department of Defense Depot Maintenance Strategic Plan 2008*, Office of the Assistant Deputy Under Secretary of Defense For Maintenance Policy and Programs.

³ *Department of Defense Handbook 4151.18-H, Depot Maintenance Capacity and Utilization Handbook*, 10 March 2007.

⁴ *Department of Defense Directive 4151.18, Maintenance of Military Materiel*, 31 March 2004.

CHAPTER FOUR

Components of Capability

There are four components of capability that must be considered when assessing the needs for weapon systems sustainment. It is not the desire of the DOD, nor is it fiscally possible, that all the industrial capability needed to support weapon systems be operated by the U.S. government. The DOD has appropriately relied on industry to provide much of this capability and one could argue that this approach has been a key to its success. This chapter will first discuss the components that, when fused together, make up a capability, before moving on to a discussion of whether that capability should reside in the public or private domain.

Equipment

The equipment required to sustain weapon systems is wide-ranging: from heavy industrial press machines used to manufacture bulkheads for aircraft, to micro-technology used to repair circuit cards. Equipment is a capital investment that requires both the initial investment and follow-up sustainment that keeps it effective. Some equipment may have applicability for many weapon systems and may be of use on commercial products. Others are highly specialized and in the case of a commercial entity may be proprietary in nature. Equipment is also developed and used in a wide variety of circumstances. The equipment could be owned by the services and located in a government facility, and could be operated either by government employees or contractors. It could also be purchased by the government but physically located in a private company's facility, like the "Air Force Press Program" of the 1950s, where a beneficial partnership existed between the two parties. The equipment could also be owned and operated exclusively by a commercial entity.

Skilled Personnel

This sector involves the skilled technicians who do the actual work on the component or the weapon system. DOD personnel accomplishing maintenance in particular, is a significant portion of the force structure. Military and DOD civilian field level maintainers (a combination of organizational and intermediate level) comprise roughly 605,000 personnel, while approximately 75,000 DOD maintainers perform depot level maintenance.¹ Just as important, the skilled personnel component also includes the associated engineering intellectual capital and expertise. The engineering expertise needed for precision production of

repair parts and repair processes is perishable and must be viewed as a critical resource to be managed in addition to the artisans that accomplish the actual repair and other maintenance actions. The source of the engineering expertise has far reaching consequences; it is not difficult to recognize that an organic engineering community within the government that knows what is best for its system is valuable. The alternative is to consult with the supporting contractor on what they think is best for the system. In many cases, this may be what is best for that particular contract and not for the entire platform as a fleet management team.

Information

At first consideration, it might appear as though the subject of information could fall under skilled personnel, but it really merits separate mention. Information is critical in every aspect of 21st century military operations and sustainment is no exception. There is a significant and important body of discussion about the significance of information and the visibility of that information across the supply chain. The need for information begins when a demand signal is sent for a repaired or manufactured part. The supply, distribution and maintenance portions of the supply chain all have information requirements for their role in returning the weapon system to mission capable status.

While an understanding of information and its visibility across the supply chain is critical to weapon system support, my discussion will more narrowly focus on the information needed to enable the component or weapon system to be manufactured or repaired. Decisions during the acquisition phase of weapon system procurement concerning data rights have far reaching effects throughout the lifecycle of a weapon system. Whether to purchase data rights in the early stages of acquisition is a critical crossroads for the government. If data rights are not purchased, and it is later determined they are needed for software changes, critical component repair, or weapon system upgrade efforts later in the lifecycle, costs can soar. Commercial providers will often plan on providing these data services in the future as part of their business model and will have made investments to support that concept, increasing prices.

Materiel

Materiel must be available to complete the production cycle. The spectrum of materiel and related issues ranges from high grade metals to completed subcomponents, such as precision bearings that the government is in competition for with others in the global market. The availability of the materiel needed to accomplish weapon system support is interwoven with the equipment, skill and information components, and all must be effectively integrated to maximize

system availability. While items that are difficult to procure on the commercial market might be difficult for both a private entity and the government to obtain, if the government has the organic capability, it might be able to mitigate risk in this area. The DOD may not be in competition with anyone for materiel that has a solely military purpose, but the timely availability of that materiel will be key in accomplishing needed sustainment actions.

¹ 2008 *Department of Defense Maintenance Fact Book*, Office of the Assistant Deputy Under Secretary of Defense for Maintenance Policy and Programs

CHAPTER FIVE

What are the Risks?

There is no shortage of risks involved in the sustainment of weapon systems throughout their lifecycles, especially when they are required to operate beyond their original design criteria. Rather than provide a comprehensive list of risks associated with this endeavor, this chapter will propose an interrelated set of risks that culminates in an unbalanced scramble for sustainment capability between the public and private sectors. The end result is a negative effect on weapon system readiness.

The DOD construct for weapon system program management is inherently risky. Program managers operate in many facets of acquisition and logistics, and a great many are focused on the sustainment aspect of lifecycle support. During the acquisition of a weapon system, program managers make sustainment decisions in the early phases that persist throughout the weapon system's deployment based on optimal cost, schedule and performance of the associated platform. Since this is the criteria used to measure the performance of an acquisition program, it is reasonable to assume that cost/benefit analysis of sustainment options are weighed in the same manner. Therefore, the acquisition program manager for a weapon system would not normally and, arguably, does not have the purview to, effectively contribute to the management of sustainment capability across their service with their current scope of responsibilities. As stated, the title of "program manager" applies to a broad range of positions across acquisition and sustainment. While some program managers are responsible for entire weapon systems, others manage subsystems such as sensors and propulsion. Their viewpoint is, consequently, determined by the specifics of their responsibilities. A change in the program management architecture could enable a view of sustainment capability across the enterprise, such as precision manufacturing or low observable technology across all weapon systems. There is "no one size fits all" construct that could apply to the vast range weapon systems operated by the DOD because of their varying degrees of complexity and maturity. However, acquisition reform efforts need to enable a more holistic sustainment capability view across a Service and across the DOD.

Until the drought of new acquisition programs is over, major defense companies will look for ways to make up for lost business and preserve industrial capability by pursuing sustainment work that was previously accomplished by the DOD. This strategy, which has been occurring for years, will likely accelerate in the

future. From the standpoint of a commercial defense entity, a push into sustainment will enable the company to retain its perishable engineering expertise and incorporate the maintenance and repair services which provide employment for a technically competent workforce and utilization of industrial facilities. In a period that is projected to experience a reduced overall defense budget, sustainment activities often provide an attractive buffer to mitigate the effects of a limited acquisition environment. Without a construct vision for the sustainment industrial base that properly manages expectations, companies may expend valuable capital and unnecessarily forego non-DOD business.

Another risk to the health of the defense sustainment industrial base is that sustainment capability may be available from industry to meet the U.S. government's requirements, but the cost may be prohibitive. Costs may be unacceptably high because there is a limited quantity and it is a seller's market. Alternatively, the U.S. military may be the only customer for the capability and, due to a decrease in the number of weapon systems operated in the current environment, would represent too small a portion of the market share for the company to maintain the historical cost structure. Since the U.S. military may no longer comprise a large enough part of the company's market share, the price of providing that capability may not benefit from the economies of scale that accompany a capability needed by a broader customer base, resulting in higher costs to the government. If the only option for a DOD required sustainment capability comes from the commercial sector and is cost prohibitive, it may drive the Department to make decisions which impact weapon system availability.

An even worse situation would witness commercial companies exiting the market and ceasing production of sustainment capabilities no matter the price. While the DOD could, of course, take on previously commercial work, the cost of reestablishing engineering expertise would be very costly to redevelop in addition to the capital investments necessary to bring sustainment activities on line.

It may seem as though the two aforementioned risks could only occur in an "either/or" scenario. But when considering the stakes involved - tens of thousands of weapon systems, hundreds of thousands of personnel, and tens of billions of dollars - it is not out of the question that both could occur within the expansive and diverse DOD sustainment environment. The danger that both risks manifest themselves simultaneously, coupled with the DOD's limited organic industrial capability, necessitates the creation of a vision for the defense sustainment industrial base and a strategic process to determine the appropriate public and private mix of those capabilities, even if the process is difficult to accomplish.

CHAPTER SIX

The Pendulum Swing

The U.S. military has looked to private industry for sustainment capability throughout its history. In the rapid push to reduce force structure after the end of the Cold War, many activities formally performed by the DOD were outsourced to the private sector. The move to outsource those capabilities was not without controversy but, in the end, it was viewed as a way to preserve overall capability in an environment experiencing a decrease in the number of platforms and constricted budgets. Although the projected cost savings of contracted capabilities did not always meet projected levels, the momentum to outsource permeated the defense environment. The outsourcing of DOD activities in general, not just in the realm of weapon system sustainment, has received a great deal of attention in recent years, centering on the question of what is “inherently governmental.” This question was particularly pronounced during recent debate over high dollar threshold contracts in Iraq and Afghanistan.

After the change of administration in 2009, the DOD launched a major initiative to insource many previously contracted services. Insourcing is the conversion of currently contracted services and functions to DOD civilian or military performance, or a combination thereof. On April 6, 2009, the Secretary of Defense announced that the DOD would scale back the role of contractors in support services.¹ The directive did not specify or limit classes of contracted services to be transitioned from the private to public accomplishment, but it gave guidance to assist the departments in their evaluation and implementation based on existing policies, statutes, and regulatory requirements.

Much of the literature concerning the DOD’s call for reduced levels of outsourcing has addressed the potential cost savings of doing the work organically versus contracting a private firm to accomplish it. Another part of the discussion centers on the debate regarding which types of work, outside of the logistics lanes, are inherently governmental. This issue made headlines during the controversy over contracted personal security activities in Iraq. The tragic death of soldiers in Iraq due to faulty wiring in construction that had been contracted out was especially troublesome.

Another question should be vigorously debated in the context of insourcing: what is the appropriate balance of weapon system support capabilities and

associated capacity between DOD and private industry. The movement to insource a wide variety of contracted support provides an opportunity for robust debate over bringing in, and often back in, those weapon system support capabilities that were outsourced in the 1990s or were originally contracted to the private sector because of wartime rapid acquisition requirements.

There will be no shortage of advocates supporting an opportunity to secure workload at the DOD depots. While jobs during a challenging economic environment are important, the longer term capability within the DOD to provide core weapon systems support is paramount and should be the overriding factor in determining what sustainment capabilities are appropriate to insource. Given its size and numerous internal and external stakeholders, it will take exceptional skill and leadership to guide the DOD through a process that focuses on system readiness and sustainment capability versus workload and job opportunities.

Determining what capabilities should be accomplished by the government as opposed to private industry is a complex and controversial task to say the least. There are many stakeholders in the process, both inside and outside of the government, which do not share the same viewpoint and, in many cases, have categorically opposing priorities. The DOD's priority should be to retain those capabilities that enable support of weapon systems during peacetime and surge capacity during war, including technical competence and resources. The defense community needs a vision that manages the expectations of stakeholders and enables investment and risk mitigation for both government and industry participants.

Reorganization of sustainment processes will inevitably face push-back. Organizational and institutional inertia often forces a continuation of familiar processes, even if they not needed. There is a delicate balance between retaining capability that is truly needed to maintain aging weapon systems and retaining capability for a government operation simply because it has or can easily re-establish the equipment, skill set, materiel and processes. Short term job security often has its roots in unquestioningly familiar yet unnecessary needs of the services. The balance between retaining needed capability while not hindering innovation and the realization that new approaches need to be pursued will be difficult for the DOD to find.

¹ *Secretary of Defense Memo for Secretaries of the Military Departments on In-sourcing Contracted Services—Implementation Guidance*, 28 May 2009.

CHAPTER SEVEN

Conclusions

The primary goal of this research was to gain a deeper understanding of the issues impacting the defense sustainment industrial base. The completed product may be useful as a primer for officers and DOD civilians who are about to enter a staff environment where they need to be familiar the complexity of the debate. Yet a study and review of the dynamics and dilemma would be remiss without proposing recommendations for consideration.

First, the DOD should articulate a vision for the defense sustainment industrial base that provides guidance and effectively manages expectations with government and industry so that senior leaders can make appropriate capital investment and workload planning decisions. The primary objectives for DOD's formulation of this vision should first of all be to mitigate risk in weapon system availability, and secondly, to avoid costs. For this vision to be effective, it will have to be decisive. Almost by definition, this decisiveness will make it unpalatable to some stakeholders. It will require a sustained effort by leadership at the highest level, effective communication that warfighting capability is at stake, and collaboration with key stakeholders to realize the vision.

Second, as part of the implementation of this vision, the DOD's effort to insource activities previously contracted out to commercial entities should specifically pursue core capabilities necessary for weapon system support. This recommendation is not to make a push for labor intensive workload that would transfer a predetermined number of jobs from the commercial to the government sector. Rather, this recommendation is to focus on the *capabilities* which truly need to be within the DOD's sphere without regard to the number of jobs attached to those capabilities.

Third, as part of vision implementation, the program management architecture should be modified to elevate industrial capability program manager-like leaders who have crosscutting purview across weapon systems in critical capabilities, such as precision manufacturing and low observable technology. These industrial capability program managers would be in a better to position to pursue innovative partnerships with industry needed to preserve capability for the nation over a single platform. Innovative partnerships could take many forms. The Air Force's Heavy Press program in the 1950s for industrial capability is a good example. The development of a Civil Reserve Air Fleet-like

program, instead of airlift capacity, also demonstrates a similar partnership for industrial capacity.

Much is at stake, and with broad recognition that robust defense budgets will not continue, a vision for the right mix of public and private sustainment capabilities will provide better readiness strategies for both systems already fielded and those in the acquisition pipeline to support the Joint Force.

GLOSSARY

ADUSD	Assistant Deputy Under Secretary of Defense
AT&L	Under Secretary of Defense for Acquisition, Technology and Logistics
BCA	Business Case Analysis
DMSMS	Diminishing Manufacturing Sources and Material Shortages
DOD	Department of Defense
MANTECH	Manufacturing and Technology Program
NDAA	National Defense Authorization Act
OSD	Office of the Secretary of Defense
USAF	United States Air Force

defense acquisition industrial base. Original equipment manufactures that produce major defense acquisition program systems.

defense industrial capability. The skills and knowledge, processes, facilities and equipment needed to design, develop, manufacture, repair and support DOD products. Defense industrial capabilities include private and public industrial activities.

defense sustainment industrial base. The package of support functions required to maintain the readiness and operational capability of weapon systems, subsystems, software and support systems

depot capacity. The amount of workload, expressed in actual direct labor hours, that a facility can accommodate with all work positions manned on a single-shift, 5-day, 40-hour week basis while producing the product mix that the facility is designed to accommodate.

depot maintenance. That maintenance performed on materiel requiring major overhaul or a complete rebuild of parts, assemblies, subassemblies and end-items, including the manufacture of parts, modifications, testing and reclamation as required. Depot maintenance serves to support lower

categories of maintenance by providing technical assistance and performing that maintenance beyond their responsibility. Depot maintenance provides stocks of serviceable equipment by using more extensive facilities for repair than are available in lower level maintenance activities.

maintenance. All action taken to retain materiel in a serviceable condition or to restore it to serviceability. It includes inspection, testing, servicing, classification as to serviceability, repair, rebuilding and reclamation.

service. The military services: Army, Navy, Marine Corps, and Air Force.

sustainment. The supportability of fielded systems and their subsequent lifecycle product support - from initial procurement to supply chain management (including maintenance) to reutilization and disposal.

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