FUTURE CAPABILITY OF DOD MAINTENANCE DEPOTS

REPORT LG901M2

Nicholas J. Avdellas, Ph.D.
Joseph L. Berry
Michael D. Disano
David M. Oaks, Ph.D.
Earl R. Wingrove III

LMI

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Executive Summary

The *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009* directed the Department of Defense to contract for an independent study on the effectiveness and efficiency of DoD organic maintenance depots providing the logistics capabilities and capacities necessary for national defense. The study was done in two phases. The first phase addressed the primary laws, regulations, and policies guiding depot maintenance performance and financial reporting; it also considered several topics that have shaped the depot maintenance environment. Phase one provided baseline data for key areas of depot maintenance, data that illustrated how well the organic depots responded to the increased and often unanticipated requirements they faced from FY01 to FY08. An interim report that documented the results of phase one was delivered to Congress on December 22, 2009.[1] During phase two, we assessed the organic depot maintenance enterprise and analyzed what is required for an efficient and enduring set of capabilities out through FY15 and beyond.

For the past 9 years, the military services have been on a war footing, with personnel and equipment in a continuing cycle of deployment, redeployment, and recovery. The response to these increased requirements by both DoD's organic depot activities and the commercial sector was remarkable. For example, execution of depot maintenance from all sources grew by 41 percent, with DoD's organic segment of that total hovering above 50 percent. By FY09, the work performed by just the organic facilities had grown by more than 30 million direct labor hours from FY01 levels.

As the nation moves away from the current war footing, the high levels of organic depot maintenance activity will not be sustained. This is due to several factors, including a drawdown in combat operations and the replacement of older systems with newer ones. Potential reductions in the overall defense budget, and a likely elimination or large reduction in war-supplemental funding could further reduce

[1] LMI, *Future Capability of DoD Maintenance Depots: Interim Report*, LG901M1, Nicholas Avdellas et al., December 2009.

depot activity.[2] These factors signal an uncertain future for the organic depot maintenance system.

Several challenges complicate the organic depots' ability to respond to an uncertain future: an ambiguous statutory framework for depot maintenance, including a definition that is subject to interpretation; acquisition decisions that could be better connected to considerations of the organic depot system; an inconsistent application of the core determination process that could destabilize future capability; and oversight reporting that does not provide timely warning of eroding capability or workload.

Critical to meeting these future challenges, Congress and DoD must adopt a coordinated voice with respect to their commitment to maintaining an efficient and enduring organic depot maintenance capability. With this definitive expression of support, tactical and strategic improvements have a much greater chance of success.

We recommend several tactical changes to ameliorate the challenges facing the organic depots, including a revision of the statutory framework of depot maintenance, a linking of acquisition and sustainment policies and outcomes with regard to depot maintenance, the strengthening of the core determination process, and an improvement in depot maintenance reporting. While these tactical "fixes" will be beneficial, they get the depots only so far. The existence of multiple semiautonomous management structures makes it difficult, if not impossible, to address the depots' challenges uniformly and efficiently.

Enhanced, integrated management of the execution of organic depot maintenance will yield a number of long-term benefits not achieved under the current management structure. These benefits include DoD-wide capacity and workforce utilization, the integration of management information and reporting systems, and the minimization of unplanned capability and capacity duplication. At the strategic level, enhanced, integrated governance is required to best manage the day-to-day workload across all organic depot-level capabilities.

Because a revised corporate depot maintenance management structure is a significant cultural change for DoD, it should be approached deliberately, and with determination. To give full credibility and commitment to an assessment of management integration options for the organic maintenance depots, we propose Congress establish an independent commission to accomplish a complete and intensive review of the organizational options presented in this report. If the depot maintenance stakeholders perceive the idea of a commission as analogous to a Base Closure and Realignment Commission (BRAC) effort or too susceptible to political pressure, Congress should direct a series of facilitated forums that include all relevant stakeholders. These discussions will enable a careful crafting of solutions for the integrated management of DoD's organic industrial base.

[2] The depots supporting the Army and Marine Corps are the most likely to see significant workload reductions as forces return from Iraq and Afghanistan. After making reductions in overtime and on-site contractor personnel, the depots should be able to manage further workforce reductions through normal attrition as long as the reductions do not exceed 7–8 percent per year.

We summarize our major conclusions and recommendations in Table ES-1.

Table ES-1. Summary of Major Conclusions and Recommendations

Conclusions	Recommendations
An update to current depot maintenance-related legislation would better support depot maintenance determination, accountability, and management.	Revise the statutory framework of depot maintenance. ◆ Revise the statutory definition. ◆ Adopt a comprehensive definition of depot-level software maintenance. ◆ Require better information; accommodate any exclusions or exceptions within the reporting structure.
Acquisition decisions are not well aligned to considerations of the organic depot system.	Closely link acquisition and sustainment policies and outcomes with regard to depot maintenance. ◆ Designate completion of a core logistics analysis as a specific exit criterion for Milestone A review. ◆ Make core requirements determination process and source-of-repair decisions early in the acquisition process.
Ineffective application of a core methodology destabilizes future capability.	Strengthen the core determination process. ◆ Structure the revised core determination process so that it is visible and readily understood. ◆ Align core and 50/50 in a single statute. ◆ Require all contracts that include sustainment as part of the statement of work to provide an annual estimate of the amount of funding expended on depot-level maintenance.
Oversight reporting does not give timely warning of eroding capability or workload.	Improve depot maintenance reporting. ◆ Provide a more complete accounting of all products and services being purchased from the depot provider—procurement, modernization, and sustainment elements. ◆ Make available a more complete presentation of the contributions of all providers of depot maintenance. ◆ Catalog, verify, validate, and accredit requirements determination methods and the presentation of risk for every major depot product line being resourced. ◆ Present depot requirements in an operational context, linking inputs to the depots' ability to achieve the outputs the services require to meet combatant commander needs.
Enhanced governance is needed to improve the execution of organic depot maintenance.	Establish an independent commission or sponsor a series of facilitated forums to review the major alternatives for improving organic depot maintenance management and execution: ◆ Enhanced status quo ◆ Commodity executive agents ◆ Commercial management ◆ Public corporation ◆ Defense agency or command.

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Chapter 1
Overview

The *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009* directed the Department of Defense to study the effectiveness and efficiency of DoD organic maintenance depots providing the logistics capabilities and capacities necessary for national defense. The study was conducted in two phases. The first phase addressed the primary laws, regulations, and policies that guide depot maintenance performance and financial reporting. It further considered several topics that have shaped the current depot maintenance environment. The first phase provided baseline data for key areas of depot maintenance, data that illustrated how well the organic depots responded to the increased and often unanticipated requirements they faced from FY01 to FY08. An interim report that summarized the results of phase one was delivered to Congress on December 22, 2009.[1]

This report presents the results of the second study phase. This chapter presents our views of the problems within the current organic depot environment, describes the difficulties that DoD will face in coping with an uncertain future for depot workload, and presents recommendations for improvements, both in the short term and in DoD's enduring approach to organic depot maintenance. The remaining chapters present additional details about these problems and our recommendations to ameliorate the challenges facing the maintenance depots. Several appendixes provide background material, including a formal response to this study provided by the Office of the Secretary of Defense.

INTRODUCTION

An array of perspectives exists with regard to DoD's stewardship of its organic depot maintenance enterprise, ranging between those who see a direct tie between combatants and maintainers and those who view depot maintenance as an activity best performed by the private sector. These incongruent perspectives have led to a variety of initiatives over the past 50 years that have attempted to address endemic concerns about depot maintenance. Most efforts have focused on reducing redundant capabilities and divesting DoD of unneeded capacity as the nation drew down from World War II and Cold War levels, with fluctuations in the desired allocation of work between public and private providers contributing to the discussions. Congress has, at times, supported positions on both sides of these issues (e.g., the initial 60/40 legislation, base realignment decisions, advocating to keep specific sites open), as has DoD (e.g., periodic preference for outsourcing and efforts to retain specific organic sites).

[1] LMI, *Future Capability of DoD Maintenance Depots: Interim Report*, Report LG901M1, Nicholas Avdellas et al., December 2009.

Depot history is further clouded by at least seven instances of recommendations to create a single depot maintenance command or manager as the preferred direction in the evolution of the organic depot maintenance capability and as a way to achieve the desired performance. Those recommendations have been advanced by various bodies—Congress, DoD review panels, the Government Accountability Office (GAO), and the Joint Staff. None has been implemented. Instead, we observe a continuation of the multitude of customer-provider encounters playing out in weapon system acquisition and sustainment, without a consistent or integrated strategic vision.

Interestingly, the current legal and policy framework for organic depot maintenance suggests, at least ostensibly, a much clearer congressional intent. For example, current law requires DoD to maintain a ready and controlled source of organic depot maintenance. Accompanying provisions define depot maintenance and attempt to foster investments and related actions that support future organic depot viability.

The problem is, despite the legal requirements, Congress and DoD have not adopted a coordinated voice with respect to their consistent, disciplined commitment to maintaining a ready and controlled source of depot maintenance. They have not agreed on the meaning of "ready and controlled source," let alone how best to achieve it. This is due, in part, to the range of perspectives noted above. The multiple viewpoints continue to challenge facets of DoD's government-owned and government-operated (GOGO) industrial capability.

This lack of concurrence harms future organic depot viability because the enterprise will face tremendous pressures without clear institutional backing. As the nation plans to move away from a war footing over the next few years, the currently high quantity of depot maintenance activity, both organic and commercial, will not be sustained because of

- an almost certain reduction in the requirement for depot maintenance and
- a possible reduction in the funding for depot maintenance requirements.

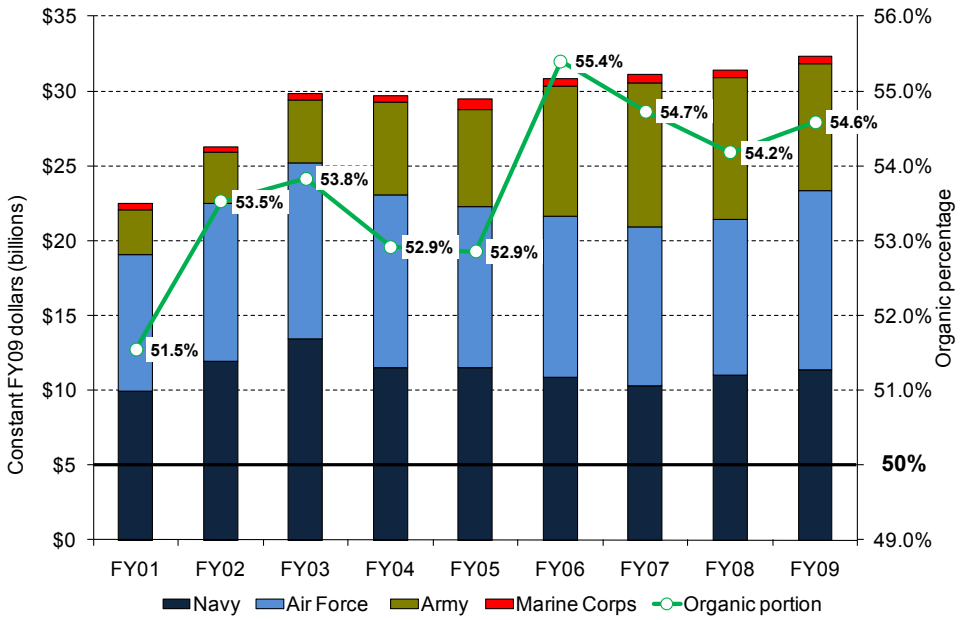
These points are likely to reinvigorate scrutiny of DoD's organic depot enterprise and highlight two potential vulnerabilities. One vulnerability could arise if the requirements and buying power of the military services are significantly reduced. The other could surface if the organic facilities face an erosion of their core capabilities because of a near-term reduction in orders, a problem compounded by today's system acquisition practices. Based on these vulnerabilities, and the results of a fresh reexamination of DoD's depot maintenance workloads, policies, and practices, we conclude that DoD's ability to efficiently assign workload across its maintenance depots could be improved by several tactical or strategic improvements.

CURRENT ENVIRONMENT

DoD operates 17 major depot activities,[2] employing more than 77,000 personnel and expending more than 98 million direct labor hours (DLHs) annually.[3] The depots' mission is to provide a ready and controlled source of depot maintenance. Each major organic depot is designated by its respective military department secretary as a center of industrial and technical excellence (CITE) within its core area of expertise. The property, plant, and equipment of DoD's depots are valued at more than $48 billion. That infrastructure comprises more than 5,600 buildings and structures, with 166 million square feet used for depot maintenance.[4] Appendix A provides additional information about the major organic depots.

For the last 9 years, the military services have been on a war footing, with personnel and equipment in a continuing cycle of deployment, redeployment, and recovery. The response to these increased requirements by DoD's major depot activities and by the commercial sector has been remarkable. As Figure 1-1 shows, execution of depot maintenance from all sources grew by 41 percent (in FY09 constant dollars), with DoD's organic segment of that total hovering above 50 percent.

Figure 1-1. Growth in Total Depot Maintenance Work and Organic Share



Source: 50/50 report data for the years indicated.

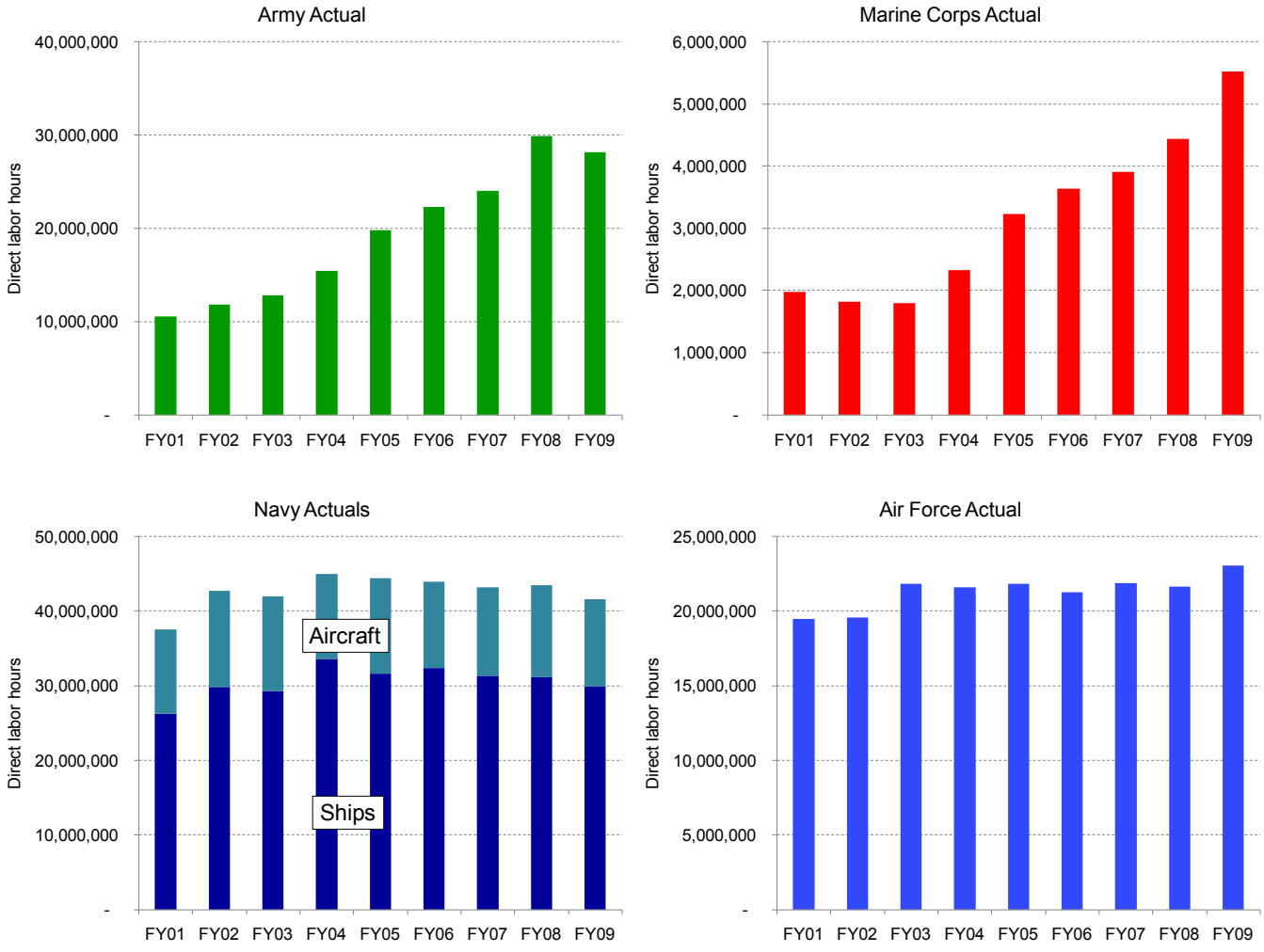
[2] DoD traditionally considers depot maintenance activities as "major" if they employ 400 or more personnel and perform depot-level maintenance.

[3] For comparison, in 1987, DoD had 38 major depots that employed almost 160,000 personnel and performed close to 200 million DLHs of maintenance.

[4] Military service data indicate that 5,610 buildings or structures are used to support depot maintenance; in some cases, depot maintenance usage represents less than 100 percent of building capacity.

By FY09, the work performed by just the organic facilities had grown by more than 30 million DLHs from FY01 levels; however, organic workload increases were not uniform across the military services (see Figure 1-2). Post-FY01 growth in maintenance work at Navy and Air Force depots, combined, reached 17 percent at its height in FY04. This reflects some wartime surge; more generally, it indicates a modest increase in demand for maintenance. This level of demand from the Air Force and Navy reflects the operation of an essentially constant inventory of aircraft and ships. In contrast, the Army and Marine Corps experienced a combined increase of 144 percent for depot work by FY08, primarily because of the added intensity of equipment operation in combat.

Figure 1-2. Organic Depot Maintenance Response to Wartime Demands



Note: The Army's DLHs reflect work at the five major organic Army depots only.

We have likely seen the high-water mark in demand for depot maintenance arising from the current conflicts.

VULNERABILITIES

Two vulnerabilities could affect the future viability of the organic depots.

Vulnerability 1: Significant Reduction in Future Requirements

Two principal factors—changes in operations tempo and changes in inventory—will drive uncertainty as requirements and workload evolve. Neither factor is under the control of the organic depots.

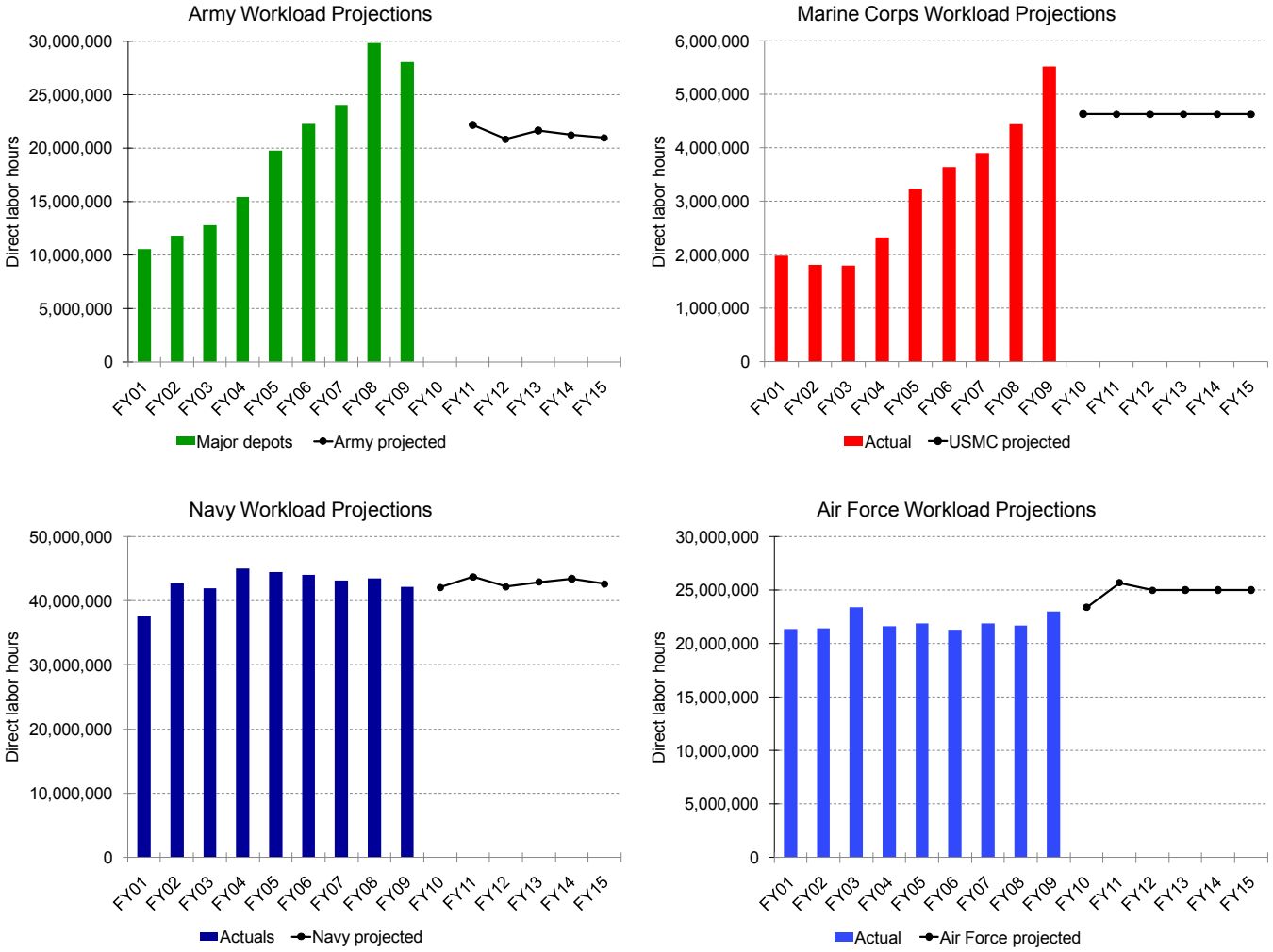
Changes in inventory will affect organic depot workload through various channels. Force structure decisions could result in fewer items assigned to operating forces. The purchase of new items could cause a temporary reduction in depot maintenance requirements, while canceling acquisition programs could result in increased requirements for depot maintenance of older existing systems intended for replacement. Source-of-repair decisions could work to replace organic workload with commercial support.

Even if inventory remains constant during a given period, depot workload may be affected by equipment usage rates. This could be particularly apparent in the ground forces (Army and Marine Corps), which experience greatly increased equipment use profiles when deployed to combat zones. If subjected to repeated deployments, the profiles are even more dramatic.

Figure 1-3 shows the military services' estimates of future workloads through FY15. These estimates portray a level of effort at or just above pre-war levels for the Navy and Air Force, and a level of effort significantly above pre-war levels for the Army and Marine Corps.

Although the military services predict steady workload for the foreseeable future, the prevailing environment—with the drawdown of contingency operations and inventory pressures—suggests a period of uncertainty in the external drivers of that workload.

Figure 1-3. Service Organic Workload Projections



Note: The Army's DLHs reflect work at the five major organic Army depots only. FY10 Army projections unavailable.

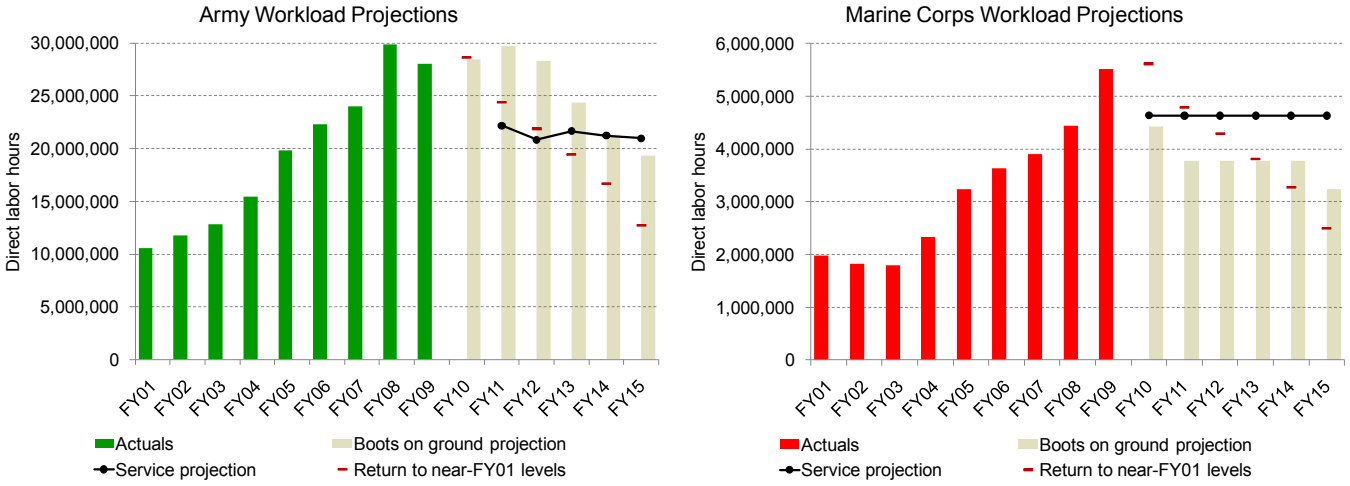
THE DRAWDOWN OF OPERATIONS

The Army and Marine Corps workload projections are likely to be the most vulnerable to change.[5] The high year for deployed ground forces was FY07, when roughly 190,000 soldiers and marines were deployed in and around Iraq and Afghanistan.[6] Current policy calls for all combatant forces to be out of Iraq by the end of 2011, with forces to begin withdrawing from Afghanistan in July 2011. These drawdown policies formed the basis for alternative future depot workload projections (see Figure 1-4).

[5] The Marine Corps anticipates a second *wave* of requirements for its organic depots that is driven by the significant amount of equipment that shifted directly from Iraq to Afghanistan without undergoing a reset.

[6] Washington Headquarters Services, Directorate for Information Operations and Report, *Active Duty Military Personnel Strengths by Regional Area and by Country*, September 30, 2009.

Figure 1-4. Alternative Organic Workload Projections



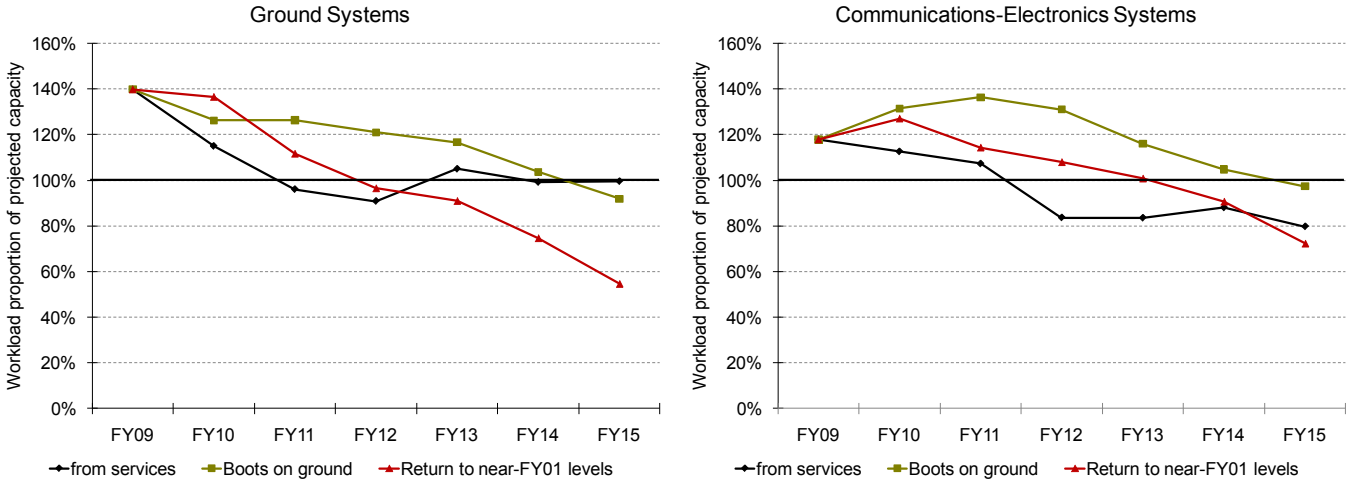
The shaded bars in Figure 1-4 represent alternative future workloads based on the correlations between equipment use and depot maintenance workloads of deployed ground forces, with a 2-year lag factor (the "boots on ground" projection). As the number of deployed ground forces declines, the boots on ground projection shows depot workload returning to FY05 levels by the end of FY15. A second projection, indicated in the figure with red tick marks, represents a gradual return to near-FY01 levels of depot maintenance spending and shows the lowest level of projected workload by FY15. As in the past, there is a likelihood the nation will shift resources from defense to other pressing needs. If the DoD returned to prewar levels of depot maintenance, there would be a substantial reduction in workloads at the ground service organic depots.

The military services provided their forecasts of baseline capacity at the depot level of detail.[7] Comparing the Army and Marine Corps forecasts of future workloads and the "boots on ground" and "return to near-FY01 levels" projections against future baseline capacity projections yields the utilization percentages shown in Figure 1-5.[8] Capacity utilization below 100 percent suggests underutilized capacity. While there appears to be some underutilized capacity in FY14 and FY15 for communications and electronics work, ground systems capacity may be underutilized beginning in FY12 if future projected workload follows the pattern represented by the "return to near-FY01 levels" estimate.

[7] A single shift, 40-hour workweek is the standard for computing baseline capacity for DoD depot maintenance activities, as described in DoD 4151.18H, *Depot Maintenance Capacity and Utilization Measurement Handbook*, March 10, 2007, p. 10.

[8] The Army and Marine Corps depots are grouped by commodity area, with the Albany, Anniston, Barstow, Letterkenny, and Red River depots in the "ground systems" category, and the Tobyhanna depot in a separate category of "communications-electronics."

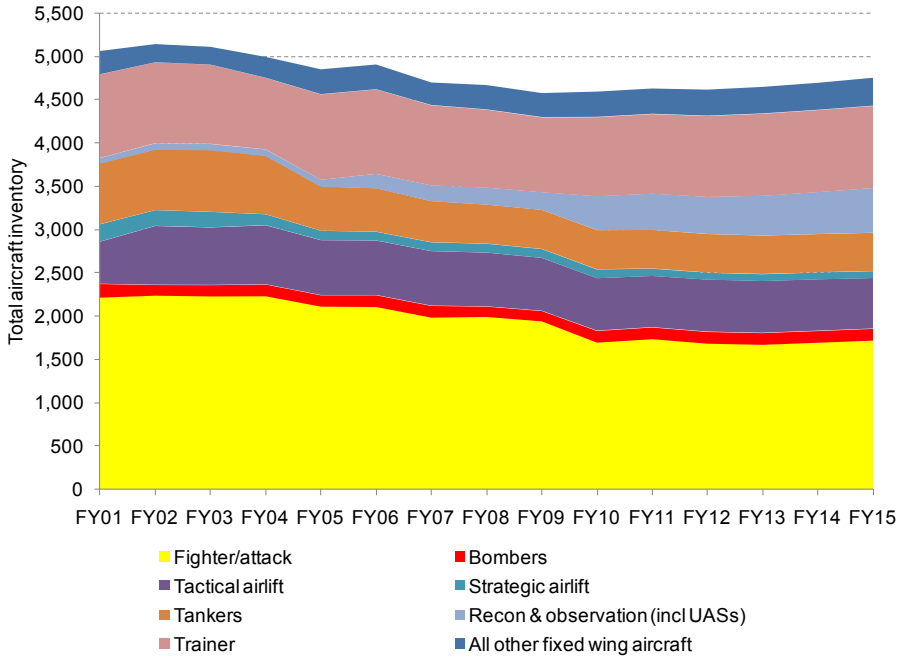
Figure 1-5. Projected Organic Workloads as Percentage of Projected Organic Capacity



INVENTORY PRESSURES

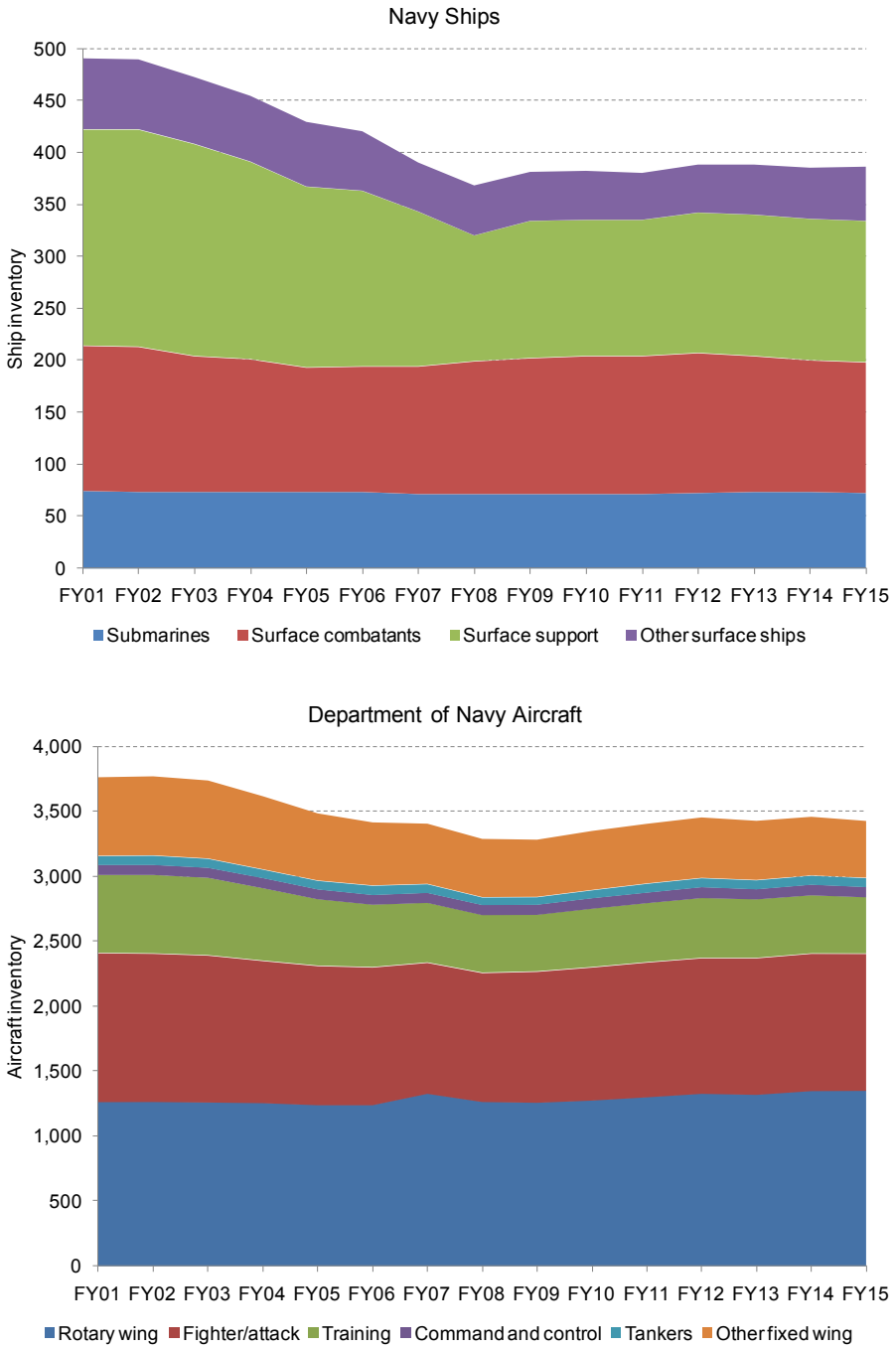
An examination of current and projected inventory levels shows the Air Force's aircraft numbers are mostly flat through FY15 (see Figure 1-6). The Air Force has already experienced a modest reduction in fighter/attack (F/A) aircraft and is expecting a growth in unmanned aerial systems (UASs).

Figure 1-6. Air Force Historical and Planned Aircraft Inventory



The Navy's ship inventory (see Figure 1-7) of major surface combatants and submarines, both historical and projected, remains steady throughout the FY01–15 period.

Figure 1-7. Department of the Navy Historical and Planned Ship and Aircraft Inventories



Department of Navy aircraft, including those operated by the Marine Corps, showed a reduction in fighter/attack and other fixed-wing aircraft from FY01 to FY09, with an essentially flat inventory thereafter.

These steady or modestly declining inventories are consistent with the organic workload projections of the Air Force and Navy; but some government officials and entities are advocating dramatic force structure cuts. For example, among the multiple actions proposed by the Sustainable Defense Task Force[9] was a call to reduce the number of the Navy's strategic submarines by half and attack submarines by a third. Such reductions in attack submarines could generate excess capacity (on the order of 6 million DLHs), while a large reduction in the strategic submarine fleet would call into question the need for one of the two dedicated maintenance facilities formerly known as Trident refit facilities.

Vulnerability 2: Reductions in Near-Term Work and Core Sustaining Workloads

Determining appropriate funding levels for defense has traditionally presented a challenge to the Congress and DoD when the nation transitions from war to peace. The current transition from the conflicts in Iraq and Afghanistan is further complicated by pressures associated with current economic crises and by actions taken by some of the military services to fund baseline workload requirements with overseas contingency operations (OCO) funds.

The current economic crises put pressure on Congress to reduce federal spending. The Department of Defense will likely not be immune. There are already calls for reduced force structure and funding levels.[10] Even if inventories and operations tempos remained constant, decisions to reduce funding support for depot maintenance could decrease the amount of work performed in the organic depots and, by extension, their core sustaining workloads.

Difficulty Justifying Required Financial Resources

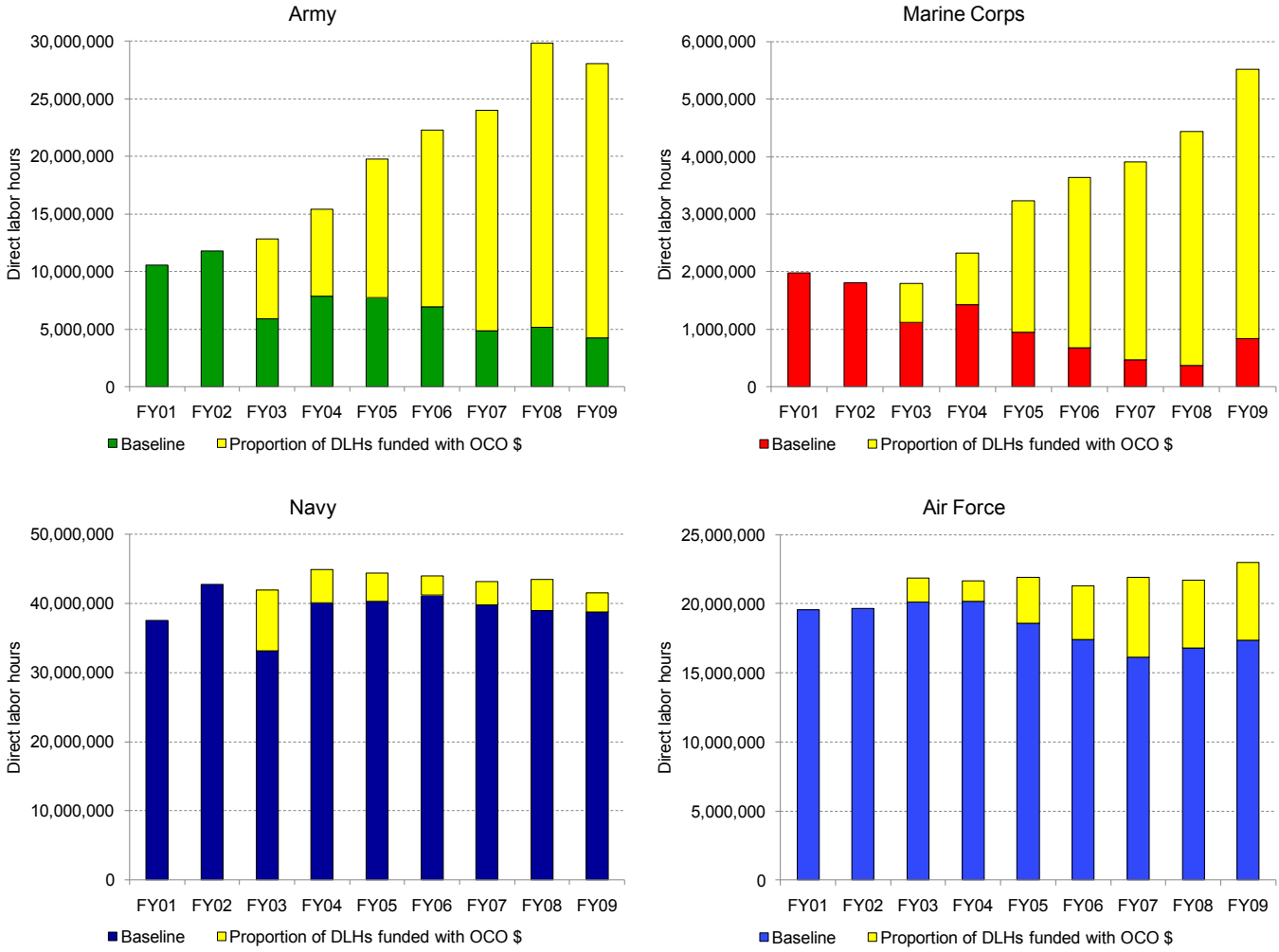
These financial pressures are potentially diverse and far-reaching. In these times of increased fiscal austerity, Congress could reduce DoD's overall budget. More likely, particularly in the short-term, Congress could reduce OCO funds, which the Army and Marine Corps have used extensively for depot maintenance.

Figure 1-8 shows the proportions of DLHs by military service that were funded with base and OCO dollars.

[9] Report of the Sustainable Defense Task Force, *Debts, Deficits, and Defense: A Way Forward*, June 11, 2010.

[10] Significant reductions in force structure are suggested by the Sustainable Defense Task Force, *Debts, Deficits and Defense: A Way Forward*, June 11, 2010. The National Commission on Fiscal Responsibility and Reform, *The Moment of Truth*, December 2010, recommends cuts in security and non-security spending along with annual limits for war spending.

Figure 1-8. Proportions of Organic Workloads Funded with Baseline and OCO Dollars



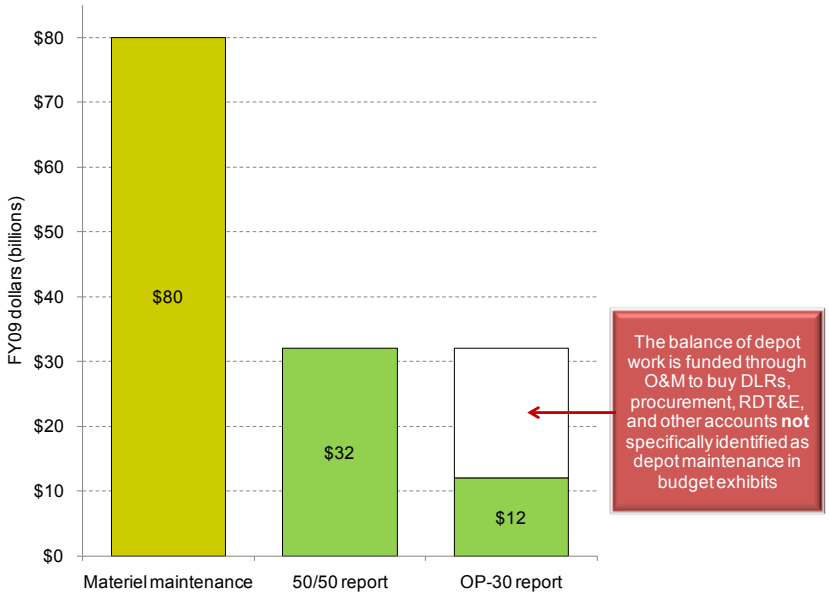
Source for OCO funding proportions: *Defense Materiel Readiness Board Report to Congress*, January 2010, Table B-1.
Note: The Army DLHs reflect work at the five major organic Army depots only.

In the 3 years before 9/11, military service depot maintenance (at least the portion reported in the Operations and Maintenance [O&M], Depot Maintenance Program, base budget exhibits [OP-30s]) was funded at levels ranging from 67 percent to 90 percent of stated requirements. Since 9/11 and the influx of significant supplemental funding, base depot budget funding has eroded to levels below pre-war levels, particularly for the Army and Marine Corps.

Figure 1-9 illustrates the estimated total cost of field and depot maintenance in FY09, depot expenditures reported in the 50/50 report,[11] and depot funding submitted in the OP-30 budget exhibits. Only 38 percent of depot maintenance funding ($12 billion of $32 billion) can be readily identified in current OP-30 budget exhibits.

[11] 10 U.S.C. §2466 prohibits the military departments and defense agencies from contracting to the private sector more than 50 percent of their depot maintenance work. Each year, DoD must report to Congress whether it met this requirement.

Figure 1-9. Maintenance Cost Estimates for FY09



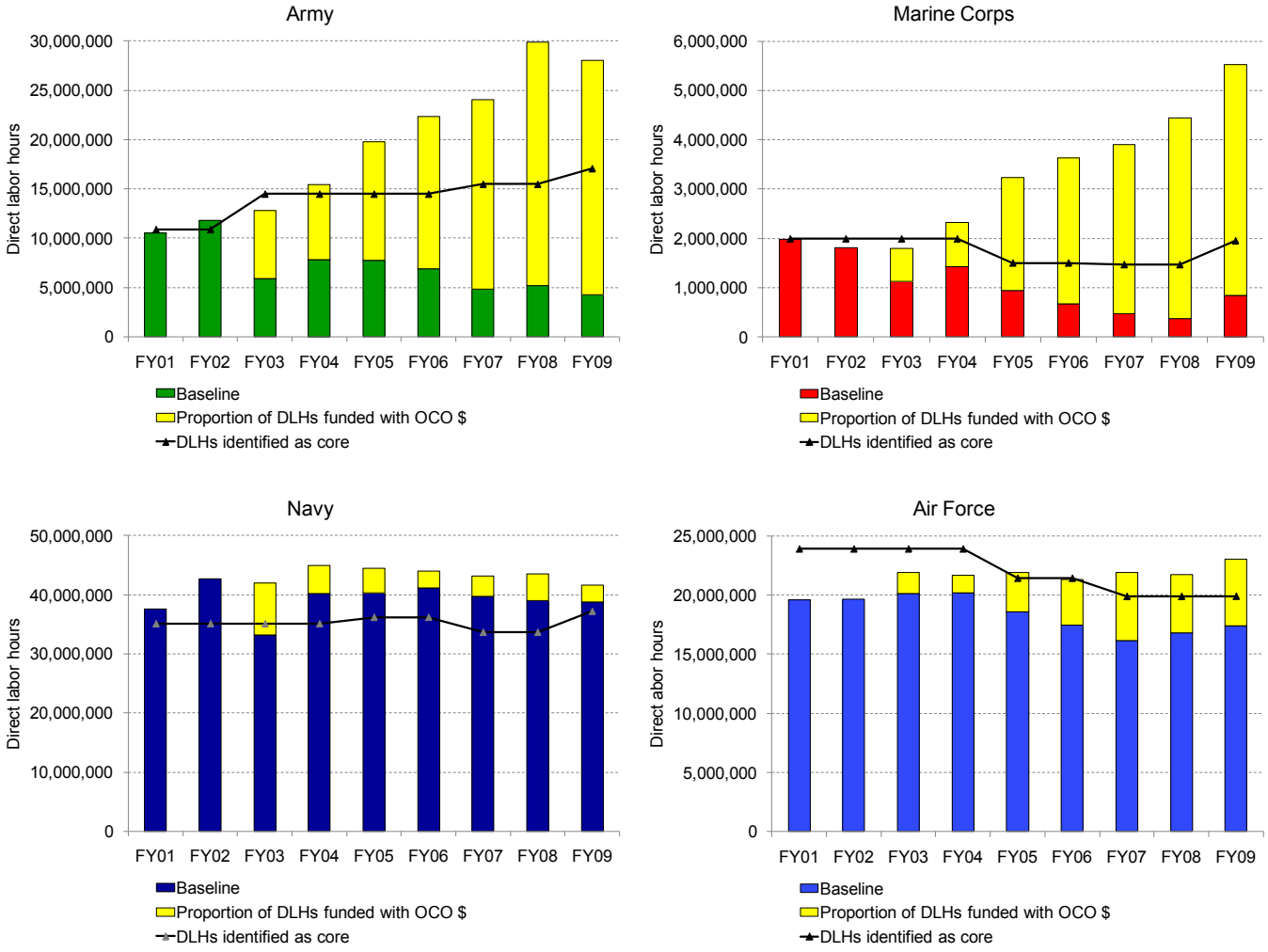
Note: DLR = depot-level repairable; RDT&E = research, development, test, and evaluation.

Looking within military service budgets, the resources required for the performance of materiel maintenance are segmented into several independent budget exhibits or reports with varying degrees of detail. These exhibits and reports typically focus on where and how the funds are expended, rather than making the case for the expected outcomes of the funding. As a consequence, DoD and congressional reviewers are limited in their ability to address risks associated with underfunded base programs within competing military service priorities.

FUNDING THREAT TO CORE CAPABILITIES

As noted previously, organic depot workload through FY15 could be significantly reduced from the levels the military services are currently projecting. This potential reduction is particularly evident for the Army and Marine Corps. We estimate that workload for these two services could be lower than service projections by as much as 39 percent and 46 percent, respectively. Further, in their recent budget submissions, some of the military services have not supported base funding up to the level of their reported core workloads, relying on OCO funding to make up the difference (see Figure 1-10). Thus, near-term budget pressures could jeopardize the sustainment of core depot maintenance capabilities.

Figure 1-10. Core Levels in Relation to Baseline Funded Organic DLHs



Source for DLHs identified as core: Service submissions to Office of the Secretary of Defense (OSD).
Note: The Army DLHs reflect work at the five major organic Army depots only.

Efforts to comply with 50/50 reporting in practice may not sustain core capability either. A military service manager could assign work not required to maintain a skill base or capability (such as trainer aircraft, which are not Joint Chiefs of Staff–tasked items) to an organic depot merely to avoid violating 50/50 limits. While such work assignments could increase the utilization of organic facilities, they also could result in a mismatch of work selected to comply with 50/50 reporting, versus work that exercises core capabilities.

CHALLENGES OF AN UNCERTAIN FUTURE

Several challenges complicate the organic depots' ability to respond to an uncertain future: an ambiguous statutory framework, acquisition decisions that are not connected to considerations of the organic depot system, an inconsistent application of the core determination process, and oversight reporting that does not provide timely warning of eroding capability or workload. The multiple semiautonomous management structures also make it difficult to address the depots' challenges uniformly and efficiently.

Statutory Framework of Depot Maintenance Must Be Updated to Improve Clarity and Application

DoD relies on and reacts to the statutory framework for depot maintenance to guide a wide range of activity and decision making. This framework must be carefully restructured to consistently and simultaneously address the entire DoD organic industrial base. The different military service interpretations of depot maintenance directly affect the development of core capability requirements and sustaining workloads, as well as the 50/50 calculations. For example, the Navy operates 18 Ohio class submarines. These submarines are maintained primarily at two installations: Trident Refit Facility, Kings Bay, GA, and the former Trident Refit Facility, Bangor, WA (now a component of Puget Sound Naval Shipyard and Intermediate Maintenance Facility, Bremerton, WA). By the Navy's interpretation of the current statutory definition, these submarines do not undergo routine depot maintenance.

The definition of depot-level software maintenance is also ambiguous. While 10 U.S.C. §2460, *Definition of Depot-Level Maintenance and Repair*, states "…the term includes (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair…" There apparently is no July 1, 1995, source documentation and no other DoD-wide definition is available.

In addition to defining depot maintenance, 10 U.S.C. §2460 provides guidance on accounting for depot maintenance by listing exceptions to the definition. Any major modification designed to "improve performance" is not considered depot maintenance, although it may be accomplished by a depot. The installation of parts for a safety-related modification is depot maintenance, but not the acquisition of those parts. The nuclear refueling of an aircraft carrier is not depot-level maintenance; but how is maintenance work classified when it is performed in conjunction with refueling?

Acquisition Decisions Could Be Better Aligned to the Organic Depot System

DoD Instruction (DoDI) 4151.20, *Depot Maintenance Core Capabilities Determination Process,* covers only tasked or fielded systems, not systems that are still in the acquisition process. In addition, there is little or no guidance for jointly developed systems, such as the Joint Strike Fighter. This lack of guidance results in ad hoc acquisition methods.

Often, core requirements are not identified early enough in the acquisition process to allow for the establishment of organic core capabilities within the 4 years mandated by DoD policy. This lapse leads to the original equipment manufacturer (OEM) providing the plant and equipment needed to perform depot maintenance. Once this has occurred, it is not economical for DoD to establish a duplicate public-sector maintenance capability.

Implementation issues also occur. Shortfalls in core-sustaining workload can arise from inconsistent calculations and incorrect uses of the concept of "like" workloads that inappropriately reduce core requirements. Table 1-1 shows the shortfalls in the workloads necessary to sustain core capabilities.

Table 1-1. Workload Shortfalls (DLHs)

Service	2007		2009	
	OSD-approved core requirement	Sustaining workload shortfall	OSD-approved core requirement	Sustaining workload shortfall
Army	15,493,688	−930,354	17,090,943	−732,800
Navy	33,642,563	−275,100	37,210,581	−404,943
Air Force	19,857,131	−1,704,000	19,872,473	−3,410,000
Marine Corps	1,466,385	−204,536	1,951,527	0
Total	70,459,767	−3,113,990	76,125,524	−4,547,743

Source: An analysis of 2007 and 2009 service submissions to OSD.
Note: OSD = Office of the Secretary of Defense.

Effective Core Capabilities Determination Process Essential to Ensure Future Capability

DoD's acquisition and maintenance policies lack core capability emphasis and guidance. Current acquisition guidance provides relatively little direction for a core analysis. This absence of emphasis and direction could be construed lack of importance. DoDI 5000.02*, Operation of the Defense Acquisition System*, prescribes current acquisition policy relating to core logistics capabilities, but only in consolidated legislation tables. GAO found that 48 of 52 major programs failed to identify core requirements within the required timeframes. Twenty of

those programs did not identify a core requirement until either the production and deployment phase or the sustainment phase of the acquisition process.[12]

There also is a need to clarify the meaning of "ready and controlled" as the risk management framework for DoD depot maintenance management. As 10 U.S.C. §2464 currently defines it, ready and controlled means government-owned and government-operated, including government personnel and GOGO equipment and facilities. For some systems, this model may not be appropriate or cost-effective. For example, B-2 bomber work performed by a commercial workforce in a government facility may, in practice, be no less ready and controlled than if it were done in a GOGO activity.

An updated "ready and controlled" risk management framework must support a broader set of industrial base "core" considerations that address depot maintenance provision and management choices in support of contingency requirements.

Better Oversight Reporting Is Needed for Timely Warning of Eroding Capability or Workload

When reporting core requirements, the military services identify the depot maintenance workloads (in DLHs) required to efficiently satisfy core capability requirements, again at the commodity level. The results are forwarded to OSD, where the requirements and sustaining workloads are consolidated and approved.

In contrast to core requirements, the Secretary of Defense is required to submit a report to Congress that identifies the percentage of the funds expended (or anticipated to be expended) in the past, current, and next fiscal years for depot-level maintenance performed by the public and private sectors.

Representatives from the military departments have advised LMI that, because yearly results are reported to Congress, the military services take proactive steps to ensure the 50/50 percentage limitations are not violated; they anticipate adverse actions for failure to comply. Of course, these steps sometimes result in organic workload assignments that are not required to retain a skill base or capability (but may contribute to efficiency). In contrast, core workload receives limited visibility outside OSD, and the military services view it more as a reporting requirement than a management tool.

[12] GAO, *Depot Maintenance: Actions Needed to Identify and Establish Core Capability at Military Depots*, GAO-09-83, May 14, 2009.

Enhanced Governance Required to Improve Outcome-Oriented Depot Maintenance Execution

The *Government Performance Results Act* (GPRA) tasks federal agencies to prepare annual performance plans that cover all program activities set forth in their budgets. These performance plans must include outcome-related goals and objectives for the major functions and operations. Further, the *National Defense Authorization Act for Fiscal Year 2010*, Section 805, *Lifecycle Management and Product Support*, directed the Secretary of Defense to ensure product support managers (PSMs) are consistent in how they plan, develop, field, and manage the product support and sustainment (including depot maintenance) of DoD's major weapon systems.

Despite this congressional guidance, DoD has yet to explicitly recognize the attributes and limitations of the "governance models"[13] now in use for weapon system sustainment, or how the organic depots' contribution to product support performance could be linked to individual product support strategies and materiel readiness outcomes.

Depot managers often view the critical processes as being beyond their control. As a result, the managers engaged in providing these critical services were limited in their ability to ensure decisions affecting individual product support strategies were consistent with the corporate strategy. Without this alignment to strategy, they could not set, or pursue, balanced and shared performance targets to meet the outcomes expected by their customers (this is perhaps less true for those depots supporting low density, high value capital assets). These managers are also less likely to be engaged in governance bodies, more likely to focus on output (rather than outcome), and less likely to be engaged in process improvement or share information with individual PSMs.

Adopting an outcome-oriented approach to weapon system sustainment requires a better understanding of the complex relationships among inputs, outputs, and the organizations that affect the outcomes for materiel readiness. Despite the mandate for performance-based support strategies, many activities within organic depot maintenance continue to operate under a best-effort standard of performance that lacks, for example, clear links between outcome-based metrics and financial resources.

DoD needs a better understanding of how an outcome-focused strategy could positively influence the mission, functions, goals, and tasking statements of individual depot organizations that contribute within the community of providers. This understanding could be achieved, in part, through a better grasp of how organizations supporting multiple weapon system outcomes can balance these demands and track performance-to-plan with a product-outcome focus.

[13] A governance model is a generalized depiction of the formal and informal organizations and processes used to manage the achievement of some goal.

NECESSARY TACTICAL IMPROVEMENTS IN POLICIES AND PRACTICES TO COPE WITH WORKLOAD UNCERTAINTY

The current set of policies and laws results in a wide divergence of analysis, planning, and oversight of organic and contractor depot maintenance across DoD management levels. This situation leaves the military services in a difficult position to take on their near-term challenges.[14] The tactical improvements in policies and practices described below will help them cope with workload uncertainty.

Revise Statutory Framework for Depot Maintenance

Congress and the DoD should work together to update, align and revise the statutory framework for depot maintenance. Specific changes should include the following:

- *Revise the statutory definition of depot maintenance.* Drop exclusions from the statutory definition of depot maintenance. The tendency to combine matters of definition and policy with reporting requirements over time has confused the initial intended linkages especially for those senior managers not routinely involved with depot maintenance. If costs are excluded for a specific report (such as the 50/50 report) or the development of core requirements, then those exceptions or exclusions should be added to statutes that mandate reporting requirements.

- *Require better information*. If a tasked weapon system will, by the new statutory definition, never undergo depot maintenance, DoD should notify Congress of that fact before exiting Milestone B of the acquisition process. DoD should also identify and report all current tasked weapon systems that do not undergo depot maintenance.

- *Adopt a comprehensive definition of depot-level software maintenance*. In lieu of the current phrase, "the term includes (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair…," adopt a single, consistent definition, or set of definitions, for use by all of the military services. The International Organization for Standardization (ISO) has an international standard set of definitions[15] that would serve as a good starting point. For consistency, DoD should generally conform to the private-sector definition of software maintenance.

[14] The services are taking actions in anticipation of the future environment. For example, the Army is revising its core depot maintenance calculation method and using products from the analysis as input to the development of its program objective memorandum. (Chapter 4 contains a further discussion of this ongoing effort.) Actions such as these would be facilitated by the tactical improvements we suggest.

[15] ISO/IEC 14764:2006, *Software Engineering–Software Life-Cycle Processes–Maintenance*.

Link Acquisition and Sustainment

DoD should revise its policies to more closely link acquisition policy with sustainment outcomes.

- *Make core requirements determinations and source-of-repair decisions early in the acquisition process to enable better organic and private-sector source-of-repair and investment decisions*. This could force decisions to be made at the systems level, rather than the component level, but the benefits gained by the public and private sectors will likely outweigh any associated disadvantages.

- *Designate the completion of a strategic core logistics analysis as a specific exit criterion for Milestone A review*. That analysis should identify whether there will be core requirements associated with the item or system being acquired. The identification of core requirements and sustaining workloads should be made an exit criterion for Milestone B. A specific review authority should be assigned, with an affirmative determination that the process was properly applied and completed before exit approval.

Strengthen Core Determination Process

Core and 50/50 should be aligned in a single statute.

To maintain a meaningful workload floor, the military services should be required to first satisfy organic workloads accounted for in 50/50 reporting with tasked systems only. This requirement would ensure essential and enduring work is assigned to the depots.

DoD should also strengthen the existing core determination process. The process should be based on a visible, understandable method that is routinely and consistently applied—and repeatable (to the extent possible). DoD should also develop and publish guidance on how to identify and plan for the establishment of a core capability. That guidance should include the following:

- *Clarify the meaning of "ready and controlled" as the risk management framework for DoD depot maintenance management*. 10 U.S.C. §2464 currently defines it as government-owned and government-operated (including government personnel and GOGO equipment and facilities). For some systems, this model may not be appropriate or cost-effective. For example, B-2 bomber work, which is performed by a commercial workforce in a government facility, may be no less ready and controlled than if it were performed in a GOGO activity. An updated "ready and controlled" risk management framework must support a broader set of industrial base "core" considerations that address depot maintenance provision and management choices in support of contingency requirements.

- *Improve the core capabilities determination process* to
  - address joint systems and systems in acquisition;
  - provide additional guidance on the use of joint staff scenarios;
  - ensure capability to maintain each type of tasked weapon system;
  - emphasize facility requirements, funding responsibilities, and importance of obtaining technical data as part of the initial acquisition;
  - ensure redundancies are deliberate; and
  - identify instances where like workloads are used to sustain a core requirement that should be clearly identified to OSD for a positive understanding of reasonability.

Although core is currently viewed as a reporting requirement, it could—with some improvements—be used as a foundation for a powerful business process. Core capability requirements could be used as a basis for the following:

- Capital investments, especially the development of new depot capabilities
- Baseline maintenance budgets.

Improve Depot Maintenance Reporting

DoD should initiate action to catalog, verify, validate, and accredit requirements determination methods for each of the major depot product lines being resourced. This effort should identify best practices within the military services in the requirements determination and risk presentation processes.

Congress, through DoD, should drive a more complete accounting and require an integrated presentation of all services being purchased from the depot provider (procurement, modernization, and sustainment elements)—with no exclusions. DoD should push for a more complete understanding of the contributions of all depot providers in the maintenance of the major product lines influencing the materiel availability elements.

DoD should present depot requirements in an operational context, linking inputs to the ability to achieve the outputs the services require to meet the needs of the combatant commanders. To illustrate, consider the traditional way core workload requirements are presented:

> …to maintain engine maintenance core capability, we need to achieve 2,341 DLHs.

This same information could be presented as

> …to maintain engine maintenance core capability and proficiency on the F100, we need 2,341 DLHs to overhaul 10 F100 engines in the fiscal year.

To increase the accuracy of 50/50 reporting, any contract that includes sustainment as part of the statement of work should provide an annual estimate of the amount of funding expended on depot-level maintenance. The program manager, or administrative contracting officer, should validate those estimates based on the original business case, or "should cost" analysis, and certify reasonableness.

As part of the annual budget submission, Congress should direct the Secretary of Defense to identify all depot maintenance requirements and funding—no matter how it is funded or performed. The annual submission should include an assessment of current and future core capabilities and associated workloads and expected public-private workload distributions. Any vulnerability in core, workforce, or readiness should also be identified.

Congress should direct improved reporting of 50/50, core requirements, and sustaining workloads. Because the military services report 50/50 to Congress, that reporting requirement directly affects their behavior. In contrast, core data submitted to OSD reflects increases in core sustaining workload shortfalls. As part of a revised process, Congress should mandate the reporting of core requirements and sustaining workloads on a biennial basis, and include the identification of like workloads, workload shortfalls, and unfunded requirements.

A More Effective Organizational Approach for the Execution of Organic Depot Maintenance

DoD's organic depot maintenance system may face substantial workload reductions between now and 2015 as a result of reduced operations, anticipated changes to inventory, and expected funding pressures. Although each military service has addressed various parts of sustaining a controlled and ready source of maintenance in an environment of uncertain resources, those efforts will not result in the fundamental, system-wide change.

Resolving the long-standing and emerging issues with DoD's depot maintenance program cannot be accomplished overnight. We strongly support the premise that reorganization, by itself, will not produce near-term, measureable improvements in performance or immediate efficiencies; however, a more effective organizational approach could facilitate, accelerate, and institutionalize these needed changes over the long run.

Despite the precedents for increased organizational integration in other DoD support areas, the military services have consistently opposed a similar realignment for their maintenance depots. Over the past 40 years, various organizations have proposed a range of organic depot maintenance management consolidation options; but none have been implemented. Based on this history of organic depot maintenance, we conclude that OSD cannot implement change of this magnitude on its own.

If Congress and DoD pursue the need for greater organizational integration, we believe getting it right will require a complete and independent assessment of options and a well-crafted implementation process. Such a process requires both leadership commitment and a well-conceived, fully justified, and thoroughly documented plan for determining the best organizational option. If a change is preferred, a comprehensive, incremental plan is essential to successful implementation. The creation and maturation of a successful and integrated organization also would require significant time and a sustained effort.

To give full credibility and commitment to an assessment of viable management integration options for maintenance depots, we propose Congress establish an independent commission to accomplish a complete and intensive review of the organizational options presented in this report (see Chapter 6), as well as any variations or additional options. The commission should consist of a chairperson with sufficient reputation and experience to lend prestige and credibility to the final report and recommendations. Further, membership should be structured in a manner that enables effective and unbiased consideration of the key issues and options.

If the proposed commission recommends an organizational change, then it should provide an implementation strategy with a realistic timeline that prescribes general steps for implementation of the alternate organizational construct. If the Secretary of Defense accepts the proposed alternative organizational option, then DoD should quickly develop comprehensive implementation planning.

If the depot maintenance stakeholders perceive the idea of a commission as a Base Closure and Realignment Commission (BRAC) effort or too susceptible to political pressure, then Congress could direct a focused series of facilitated forums. These forums should include all relevant stakeholders, including congressional and service staffs, the Joint Staff, and OSD, along with appropriate commercial entities and affected labor unions. The discussions should be designed to enable a careful crafting of solutions for an integrated management of the DoD's organic industrial base.

COMMITMENT TO A READY AND CONTROLLED SOURCE OF DEPOT MAINTENANCE

The tactical recommendations in this report should improve various aspects of performance; but, without a definitive expression of commitment to an organic base from both Congress and DoD, these recommendations and the longer-term strategic integration of depot maintenance execution will be hobbled, just like so many attempts that have gone before. Therefore, Congress and DoD must make a strong, concerted commitment to an enduring and effective organic depot capability to ensure the existence of this ready and controlled source of weapon system maintenance.

Chapter 2
Workload

This chapter addresses organic depot workload, beginning with a review of the current environment, the military services' estimates of future workload, and our assessment of future workloads.

Two principal factors—inventory and operations tempo (OPTEMPO)—drive workload; both are external to the control of the depot maintenance community. Changes in inventory affect organic depot workload in two major ways: force structure decisions can result in fewer items assigned to operating forces, and acquisition decisions can cause the unanticipated replacement of older items with newer ones that initially require fewer repairs. Operations tempo, the intensity and rate of equipment usage, can also affect depot workload, even if inventories remain constant. This is particularly apparent in the ground forces (Army and Marine Corps) that experience greatly increased equipment use profiles when deployed to combat zones.

ANALYSIS OF THE CURRENT ENVIRONMENT

The 1990s were a period of defense consolidation following the close of the Cold War. Because of force structure reductions, Congress and DoD realigned the maintenance organization and closed several maintenance activities, reducing the number of major organic depots to 17.

Table 2-1 and Table 2-2 show the levels of troops deployed in support of Operation Iraqi Freedom (OIF)[1] and Operation Enduring Freedom (OEF). The scale, duration, and intensity of the two campaigns have generated substantial increases in the maintenance work performed by the 17 organic depots, expanded the deployment of some depot assets, and augmented current capabilities with non-traditional approaches.

[1] On September 1, 2010, OIF was renamed Operation New Dawn. For simplicity, this document only uses the name OIF to refer to past and future operations in Iraq.

Table 2-1. Forces Deployed in Support of OIF

Date	Total	Army	Navy	Air Force	Marine Corps
September 2003	183,002	152,815	10,070	13,572	6,545
September 2004	170,647	101,932	15,988	17,511	35,216
September 2005	192,600	132,400	14,500	19,800	25,900
September 2006	185,500	119,500	20,200	20,200	25,600
September 2007	218,500	138,500	24,900	23,800	31,300
September 2008	190,400	121,500	20,400	21,400	27,100
September 2009	164,100	111,800	20,300	20,300	11,700

Source: Washington Headquarters Services, Directorate for Information Operations and Reports, *Active Duty Military Personnel Strengths By Regional Area And By Country (In and around Iraq/Afghanistan, including deployed members of the Reserve Components)*.

Table 2-2. Forces Deployed in Support of OEF

Month/year	Total	Army	Navy	Air Force	Marine Corps
September 2002	5,200	3,641	195	854	509
September 2003	10,400	7,283	391	1,709	1,018
September 2004	15,200	10,644	571	2,497	1,487
September 2005	19,500	15,000	200	3,200	1,100
September 2006	21,500	15,900	700	4,700	200
September 2007	25,240	19,200	700	5,300	40
September 2008	32,300	21,000	1,400	5,800	4,100
September 2009	66,400	44,400	3,200	8,100	10,700

Source: Washington Headquarters Services, Directorate for Information Operations and Reports, *Active Duty Military Personnel Strengths by Regional Area and by Country (In and around Iraq/Afghanistan, including deployed members of the Reserve components)*.

Equipment supporting the two theaters of operation fall into two broad categories:

- Unit equipment that returns with a military organization at the end of its tour
- Theater-provided equipment (TPE)[2] that remains in theater for use by successive units.

High OPTEMPOs and harsh physical environments over a prolonged period have stressed weapon systems and other equipment supporting the military operations. These conditions created maintenance demands far in excess of those experienced during peacetime. Even with these challenges, the military services continued to

[2] Also known as "stay behind equipment," the TPE concept was developed to save transportation costs and simplify rotations. Its large-scale adoption meant that weapon systems and equipment were available when units arrived in theater. For maintainers, it meant increased reliance on field-level (organizational and intermediate) maintenance in the theater of operations and fewer opportunities for depot-level maintenance until the systems or equipment eventually returned home.

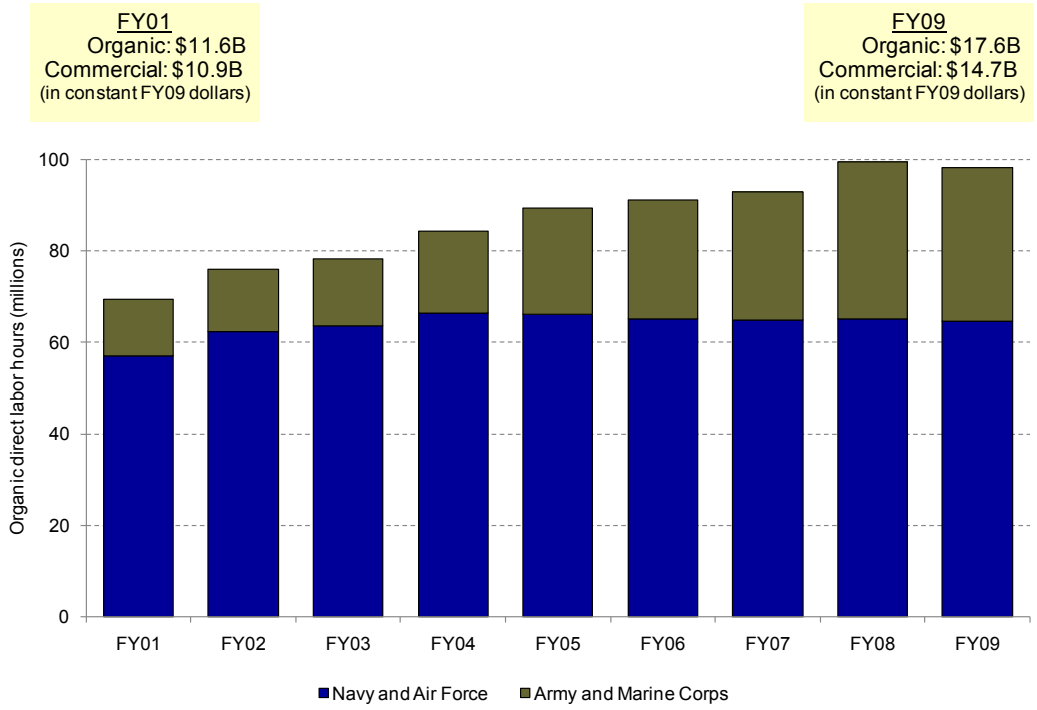
report high equipment readiness rates. In fact, in testimony before the Senate Armed Services Committee, Subcommittee on Readiness and Management Support, the Assistant Commandant of the Marine Corps stated that the mission capable rates of deployed forces' ground equipment remained above 90 percent.[3]

The excellent support provided U.S. combat forces is testimony to the superb job performed by the organic depots and it highlights the important role of forward-deployed depot capabilities as ready and controlled sources of depot-level maintenance.

MAJOR ORGANIC DEPOTS

In 2001, and prior to any major response to 9/11, DoD obligated $22.5 billion for depot maintenance. The 17 major organic depots accomplished 52 percent ($11.6 billion) of this work. The remainder was carried out by the commercial sector. By FY08 (the year with the highest post-9/11 workload), total depot workload at the 17 major organic depots had increased by 43 percent from pre-war levels (see Figure 2-1).

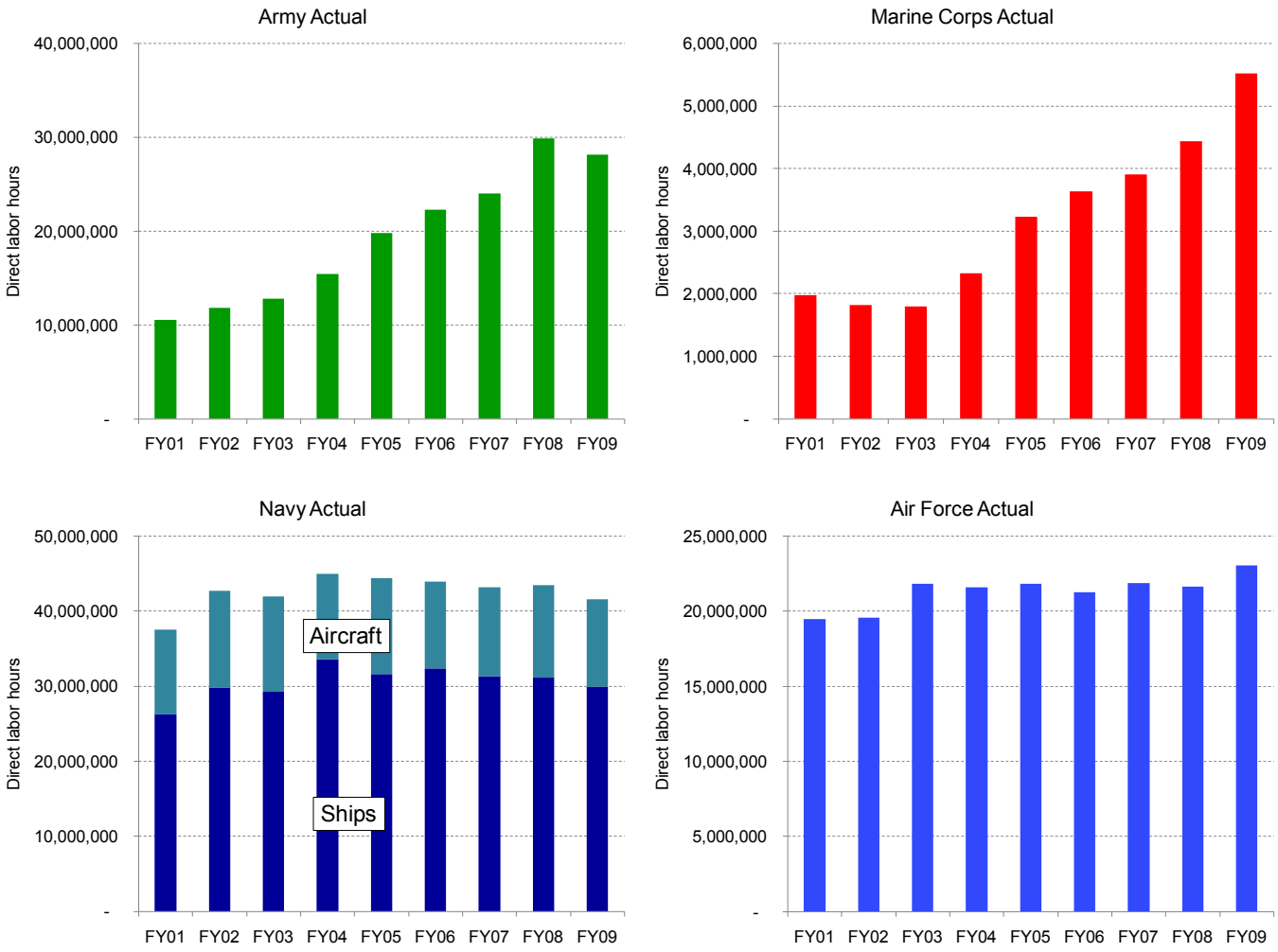
Figure 2-1. Depot Maintenance Response to Wartime Demands



[3] Prepared statement of General Robert Magnus, Assistant Commandant of the Marine Corps, Senate Armed Services Committee Subcommittee on Readiness and Management Support, March 13, 2008.

Organic workload increases were not uniform across the military services (see Figure 2-2). The increase in depot work for Navy and Air Force depots combined was 17 percent at its highest point in FY04. In contrast, the Army and Marine Corps increased their demands for depot work by a combined 144 percent between FY01 and FY08. Fundamental differences in the wartime operating environments and the ability of past maintenance practices to absorb wartime requirements explain the predominance of this disparity.

Figure 2-2. Organic Depot Maintenance Response, by Military Service



Note: The Army DLHs reflect work at the five major organic Army depots only.

Navy and Air Force increases reflect some additive wartime requirements performed within the context of calendar-based, scheduled depot inductions on a static inventory of high-capital value aircraft and ships. These aircraft and ships operated in environments that were not significantly different from peacetime operations. In contrast, Army and Marine Corps ground units began operating at tempos and in environments very different from peacetime. As a result, Army and Marine Corps

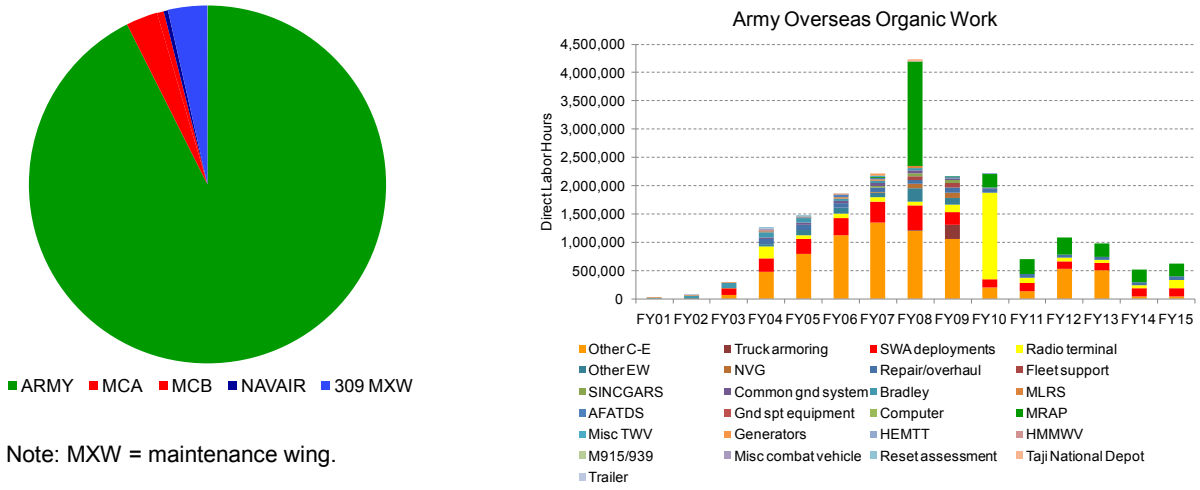
equipment required maintenance (including what they referred to as "reset") at levels well in excess of pre-war needs, both in terms of depth and frequency.

Forward-Deployed Depot-Level Maintenance Capabilities

One development in current operations that affected depot-level maintenance workload was the decision to create a stay-behind set of ground equipment in the U.S. Central Command (USCENTCOM) area. TPE remains in theater and is used by successive rotations of units. The TPE concept was developed in response to the particular characteristics of the theater: the difficulty in using the lines of communications in both Iraq and Afghanistan, the ability to establish secure logistics support bases in the area, and the cost (in terms of both dollars and time) of moving hundreds of heavy vehicles and associated equipment with each rotation of a major combat unit.[4] For maintainers of TPE, this meant increased reliance on field-level (organizational and intermediate) maintenance and fewer opportunities for traditional depot-level maintenance.

In Figure 2-3, the relative military service shares of *overseas* organic depot-level work performed FY01–09 is shown on the left. As would be expected, the Army was the biggest consumer of this work. The bar chart on the right provides details on the Army work. In-theater organic depot-level maintenance requirements increased dramatically from FY01 to FY09, with the big spike the result of mine-resistant, ambush-protected (MRAP) vehicle work. Looking at the period FY09–15, Army requirements are projected to peak in FY10 and then decline substantially.

Figure 2-3. Overseas Organic Depot-Level Work



Note: MXW = maintenance wing.

[4] U.S. Transportation Command (USTRANSCOM) officials have noted that while a single sealift ship has the capacity to carry more than a month's worth of the vehicles brought in by air, it takes 22 to 30 days by ship for them to reach their destination in the USCENTCOM area of responsibility. Cynthia Bauer, media officer for USTRANSCOM, "Sealift of Mine-Resistant, Ambush-Protected Vehicles Begins", November 30, 2007.

DoD's depots within the continental United States (CONUS) have played an important role in the accomplishment of this depot-level maintenance at forward locations. They deployed technicians and artisans (in field service teams, voyage and battle damage repair teams, and forward repair activities) to perform needed equipment repair or support. For example, Red River and Anniston Army depots established forward repair activities in Kuwait to service engines, transmissions, final drives, and generators. Those activities were also capable of repairing combat vehicles.[5]

The Army National Guard's aviation classification and repair depot (AVCRAD) units are a special category of forward repair activity. Comprising mainly uniformed military personnel, they perform intermediate-level helicopter maintenance but possess some depot-level capabilities, such as component repair and replacement and the testing and certification of assemblies and systems. This capability to repair and replace components on helicopters in theater increased the availability of these very important items. In addition, AVCRADs are capable of providing maintenance support for similar aircraft of the other military services (e.g., UH-1N, HH-60, and SH-60).[6]

Forward-deployed depot maintenance has met the peculiar and evolving needs in the USCENTCOM area. In the current conflict, depot maintenance has blended with intermediate-level maintenance activities, been frequently undertaken in partnership with commercial providers, and tended to focus on component replacement and repair, testing of items, and some reconfiguration of major items (such as the MRAP). The depot system responded well to emerging demands from the theater in the absence of existing deployment plans. The flexibility and rapid response capabilities proved the forward-deployed depot repair activities are valuable contributors to national defense.

Contribution of Maintenance Capabilities beyond the Major Depots

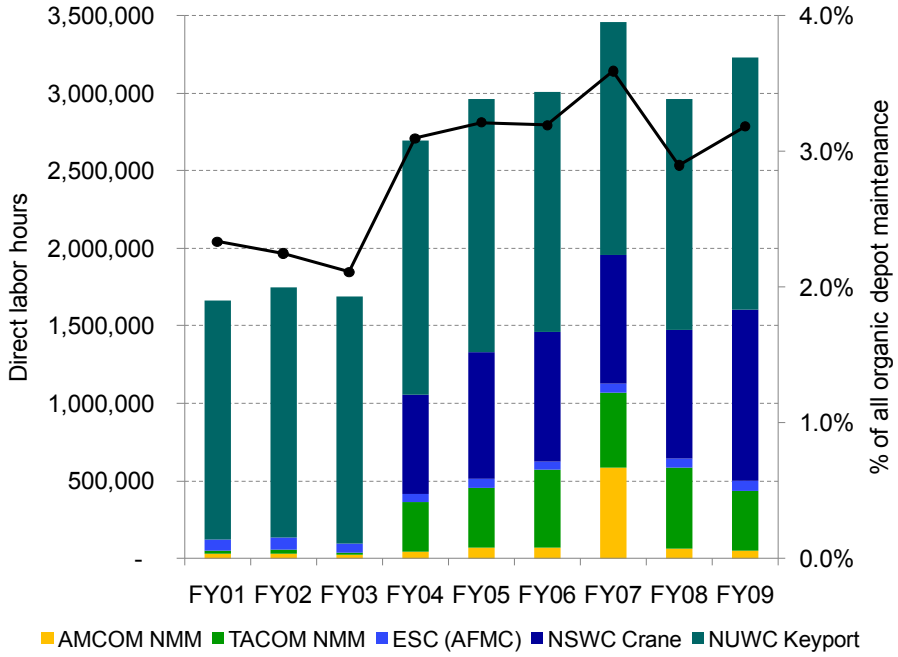
Other DoD entities have contributed organic depot maintenance capacity and output. They include the Navy's surface and undersea warfare centers; the Army's manufacturing arsenals, AVCRADs, National Guard readiness sustainment maintenance sites, and (intermittently) directorates of logistics; and the Air Force's Electronic Systems Center (ESC).

Figure 2-4 provides some evidence of the recurring depot-level work produced by several of these entities. During the past few years, their combined efforts have consistently contributed between 3 and 4 percent of the organic system's direct labor output, with more than two-thirds coming from the Navy's warfare centers.

[5] Diane K. Morales, *DoD Maintenance Depots Prove Their Worth*, http://www.almc.army.mil/alog/issues/MarApr04/DOD_Maintenance_Depots.htm.

[6] Based on interviews with members of the 1109th AVCRAD, Connecticut Army National Guard.

Figure 2-4. Non-Major Organic Depot Maintenance Contributions



Note: AMCOM = U.S. Army Aviation and Missile Life Cycle Management Command; TACOM = U.S. Army TACOM Life-Cycle Management Command; NMM = National Maintenance Managers; ESC (AFMC) = Electronics Systems Center, Air Force Materiel Command; NSWC Crane = Naval Surface Warfare Center Crane Division; NUWC Keyport = Naval Undersea Warfare Center Keyport Division.

While the primary mission of these non-major depot entities is manufacturing and fabrication, depot maintenance work may offer an opportunity for them to maintain their skill base when their primary work is slow.

Absent a core minimum workload, these non-depot entities are unable to accurately project manufacturing or depot maintenance work more than 12–24 months in advance. For example, according to arsenal officials, the Future Combat System, which was recently cancelled, would have represented approximately 50 percent of Watervliet Army Arsenal's out-year workload. This comes on the heels of the cancellations of Crusader and the non-line-of-sight howitzer. This sort of workload uncertainty has led to nine reductions in force between 1991 and 2002.

Rock Island Army Arsenal has attempted to lessen the effect of weapon system cancellations by manufacturing parts for other defense organizations outside the Army. For example, approximately 20 percent of the arsenal's current work is for the Defense Logistics Agency.

To assist in efforts to obtain steady future Army work, Rock Island Army Arsenal has obtained a legal opinion that states the following:

> Army Acquisition Officials have a responsibility for identifying requirements that can be manufactured within the organic base (government-owned, government-operated [GOGOs] and government-owned, contractor-operated [GOCOs]), for conducting make-or-buy analyses on those requirements in accordance with the Army Arsenal Statute, and for having those requirements manufactured within the industrial base where the make-or-buy analyses demonstrate that those requirements can be manufactured on an economical basis and, additionally, to the extent necessary to support the requirement in law to maintain an essential nucleus of government-owned facilities.[7]

The arsenal is also actively pursuing increased foreign military sales work.

Each manufacturing arsenal we visited cited underutilization as a recurring theme. They consider themselves in competition with other depots and federal facilities for available workload. They mentioned the absence of a coordinated strategic plan for assigning them workload and, thus, the absence of long-term plan for their sustainment. They felt a CITE designation by the Army would allow them to better compete for work and bring greater program manager attention to their capabilities.

FORECASTS OF FUTURE ORGANIC DEPOT WORKLOADS

According to the report accompanying *National Defense Authorization Act for FY2009*,

> …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.[8]

To analyze the future environment, we must make reasonable estimates of future workloads at the military services' organic depots. The basic drivers of the need for depot maintenance are the ownership and operation of military equipment. Our review of the data from FY01 through FY09 indicates these drivers act differently for the air and sea services than they do for the ground services.

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[7] Memorandum from Kathryn T.H. Szmanski, Chief Counsel, U.S. Army Sustainment Command to Brigadier General Larry Wyche, Commanding General, U.S. Army Joint Munitions Command, "Organic and Private Ammunition Bases – Legal Opinion," May 27, 2009.

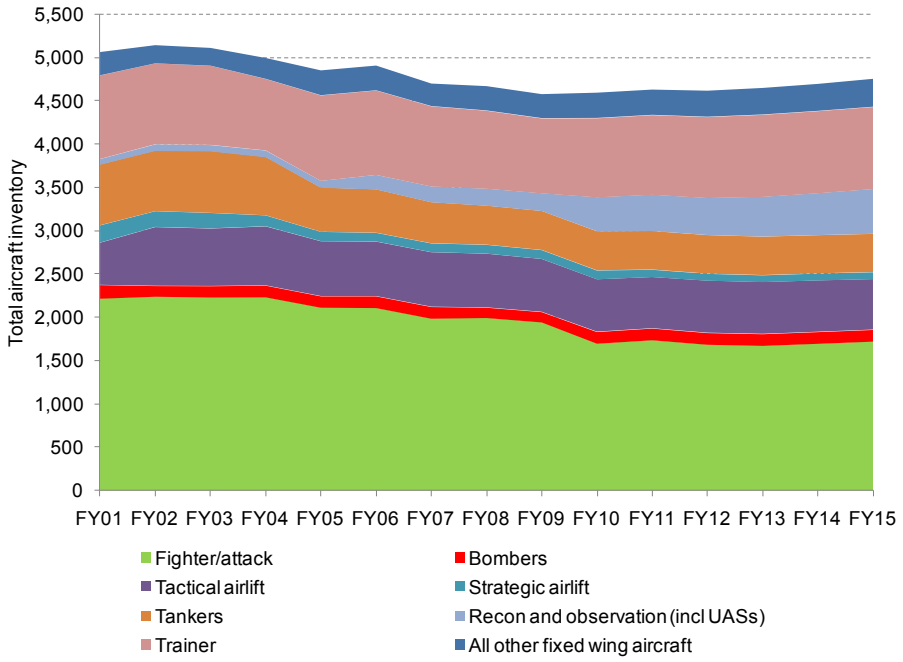
[8] *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009: Report of the Committee on Armed Services, House of Representatives, on H.R. 5658 together with additional views* (including cost estimate of the Congressional Budget Office), House Report 110-652, May 16, 2008, p. 333.

Air Force and Navy

The leading driver of depot maintenance demand for the Air Force and Navy is ownership of ships and aircraft, which they operate at generally the same rates from year to year.[9] For example, the Air Force's flying hours per fighter/attack aircraft were 277 in FY01 and 273 in FY08. Similarly, the average flying hour program for fighter/attack aircraft in the Navy in FY01 was 243 flying hours per aircraft; in FY08 the average was essentially unchanged at 252 flying hours per aircraft.[10] For Navy ships, steaming hours per aircraft carrier were 2,982 in FY01 and 3,073 in FY09. Comparable figures for other surface ships were 1,882 and 2,068, respectively. Operating rates for submarines were an important exception: they increased from 1,118 steaming hours per submarine in FY01 to 2,125 in FY09, with most of that increase occurring by FY03.

Given these results, we examined weapon system inventories for the Air Force and Navy to gain an appreciation of what drives workloads at their major organic depots. Focusing first on the Air Force, the overall aircraft numbers were mostly flat, although fighter/attack aircraft experienced a modest reduction; UASs are expected to increase in the out years (see Figure 2-5).

Figure 2-5. Air Force Historical and Planned Aircraft Inventory



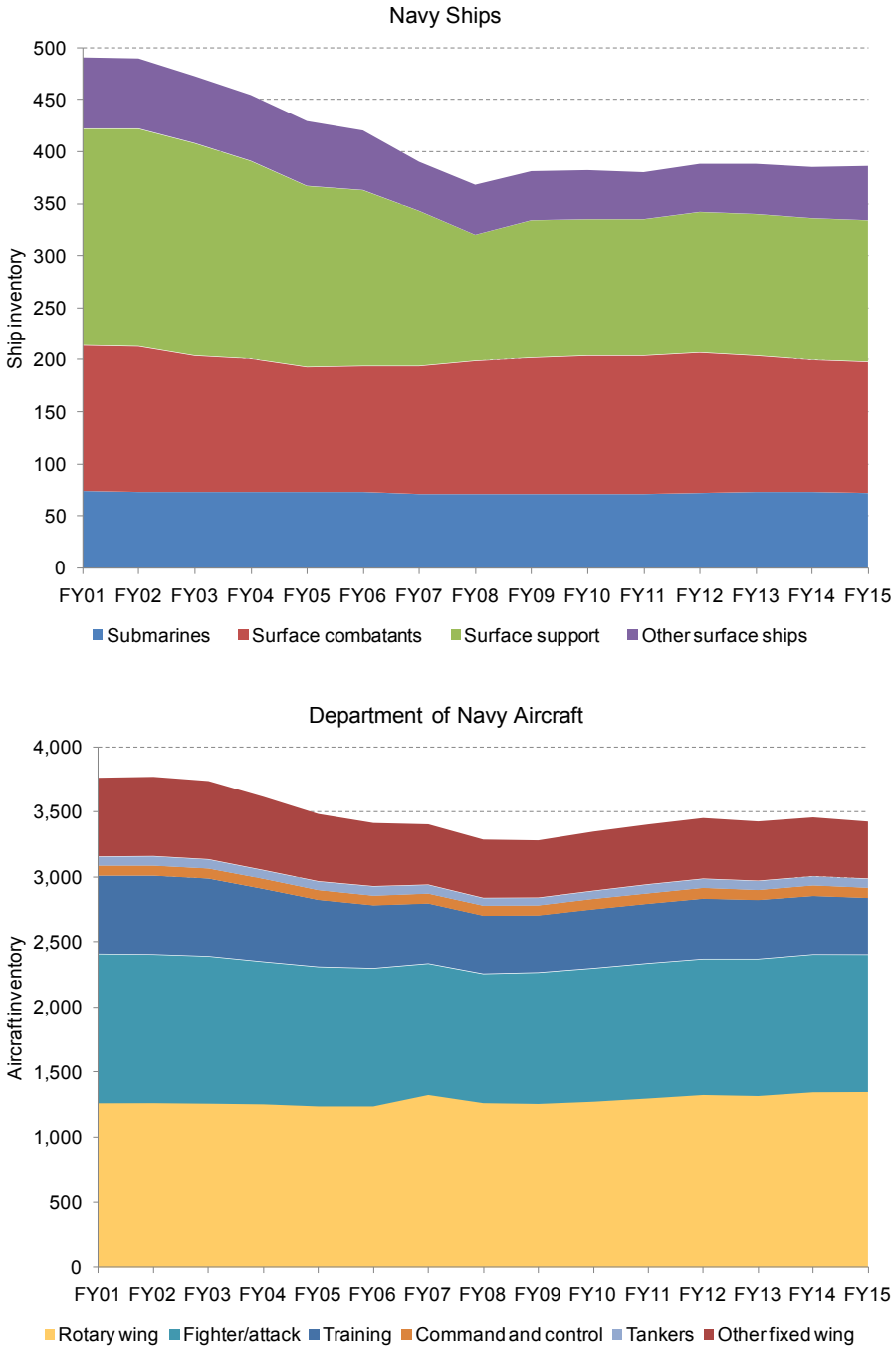
Department of the Navy aircraft showed a reduction in fighter/attack and other fixed wing aircraft from FY01 to FY09, with an essentially flat inventory thereafter (see Figure 2-6). The Navy's ship inventory (i.e., the number of major surface

[9] Flying and steaming hours as reported in response to the NDAA 322 data call.

[10] OPTEMPO data for FY09 were incomplete at the time of the 322 data submission.

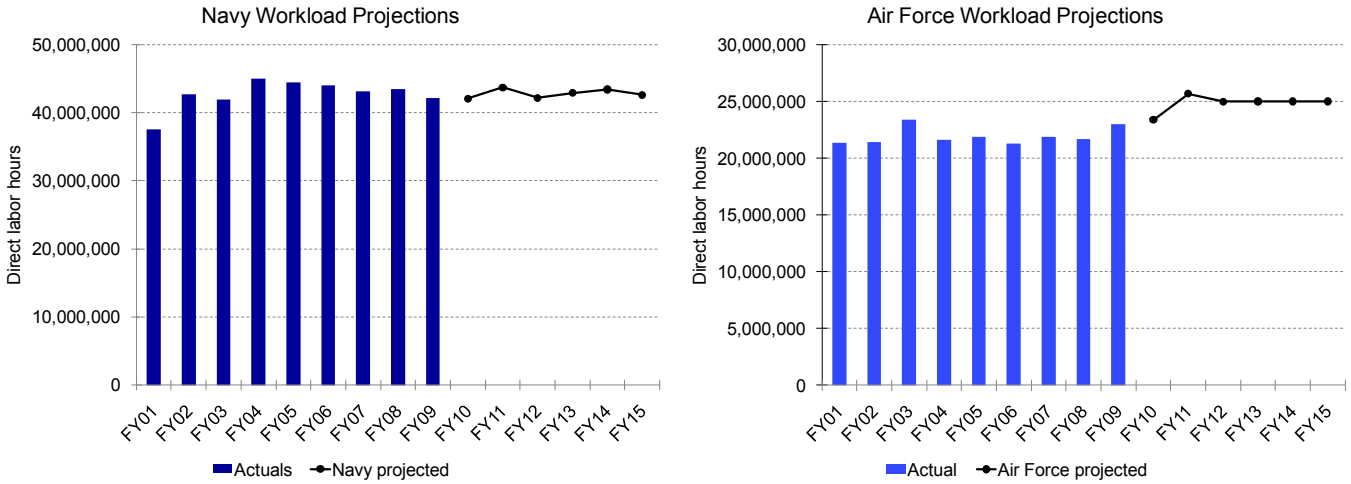
combatants and submarines), both historic and projected, remain steady through the entire period of FY01 to FY15; however, the Navy experienced a reduction in surface support ships by FY08.

Figure 2-6. Department of the Navy Historical and Planned Ship and Aircraft Inventories



These steady or slightly declining inventories correspond to the steady maintenance workloads expected to occur at the Air Force's and Navy's major depots (see Figure 2-7).

Figure 2-7. Navy and Air Force Organic Depot Workload Projections



Consideration of Force Structure Reductions and Their Potential Impacts

Several dramatic force structure cuts have been proposed. For example, the Sustainable Defense Task Force proposed the following:[11]

- Reduce the size of the Navy from 287 battle force ships and 10 naval air wings to 230 ships and 8 air wings; retire 2 carriers; and reduce the strategic submarine force by half (to 7) and attack submarines from 53 to 37.
- Retire 3 Air Force tactical fighter wings.
- Roll back the number of Army brigade combat teams from 45 to approximately 40.
- Retire 4 of the Marine Corps' 27 infantry battalions.

The potential impact of these hypothetical force structure reductions would be felt unevenly across the depot maintenance community. For example, reducing the Navy's attack submarine fleet by one-third could generate excess capacity on the order of 6 million DLHs. Similarly, a large reduction in the strategic submarine fleet could call into question the need for one of the two dedicated maintenance facilities formerly known as Trident refit facilities.

[11] Sustainable Defense Task Force, *Debts, Deficits, and Defense: A Way Forward*, June 11, 2010, page 19.

The reduction of two aircraft carriers would obviate a major requirement for the associated surface battle group components. For example, this reduction might include two guided missile cruisers, between two and six destroyers or frigates, and one fast combat support ship. In FY09, the Navy's average depot maintenance cost was $2.9 million per destroyer and $5.2 million per cruiser.[12] The disproportionate reductions would occur in the private sector, where most Navy surface ship depot maintenance is performed.

Eliminating two carrier air wings would reduce the Navy's aircraft inventory by as many as 120 aircraft—88 F/A-18s, 12 EA-6Bs, 12 E-2C, and 16 SH-60s. The proposed F/A-18 reduction would equate to just over 13 percent of the inventory. Fleet Readiness Centers Southwest (FRCSW) and Southeast (FRCSE) repair most of those aircraft. Such reductions could call into question the future viability of one of the Navy's CONUS fleet readiness centers (FRCs).

NEWLY ACQUIRED SYSTEMS SLOW TO ENTER CORE WORKLOAD

Whenever new weapons systems are introduced into the operating force to replace older systems, the result is an associated delay in core support. For example, the Navy's depot maintenance strategic plan[13] lays out the timeline of aircraft retirements and initial operational capability (IOC) dates (see Figure 2-8). This timeline clearly shows 4-year gaps between IOC and inclusion in core workload.

Figure 2-8. Acquisition Sequence for Department of Navy Aircraft

Aircracft	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
MH-60R	Opn'l				Core											
V-22							Core									
UH-1Y				Opn'l				Core								
AH-1Z							Opn'l				Core					
CH-53K											Opn'l				Core	
EA-6B					retiring											
F/A-18G					Opn'l				Core							
F/A-18E/F	Core															
AV-8B						retiring										
F-35B (Marine)											Opn'l				Core	
F-35C (Navy)								Opn'l				Core				
BAMS (UAS)										Opn'l				Core?		

Following the publication of this strategic plan, the Secretary of Defense announced a restructuring of the Joint Strike Fighter program, which adds an additional year for development; pushing back the dates of initial operation another year.[14] The bottom line: Even when the decision is to bring the new system into core, the 4-year interval between IOC and induction can further depress near-term organic workloads as older weapon systems are retired or replaced.

[12] Based on Navy submissions to the Depot Maintenance Cost System averaged across the fleet.

[13] Department of Navy, *Depot Maintenance Strategic Plan*, December 2007, Section 2.4.1.

[14] Department of Defense News Release No. 084-10, attachment: "Summary of the DoD Fiscal Budget Proposal," February 1, 2010, p. 5.

Army and Marine Corps

Figure 2-9 shows the Army and Marine Corps projections of their depot workloads (these same projections are shown in Figure 1-3). The biggest drivers of ground force depot maintenance are the number of major combat units in the force and how they are employed. Figure 2-10 displays the number of Army brigade combat teams and the Marine Corps' major ground combat units.

Figure 2-9. Army and Marine Corps Organic Depot Workload Projections

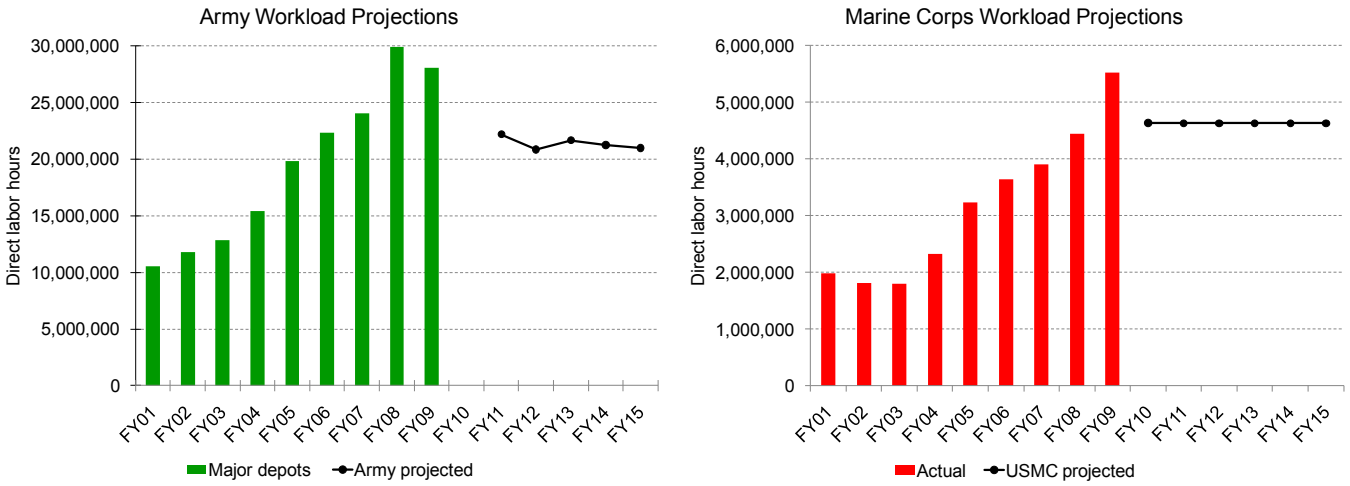
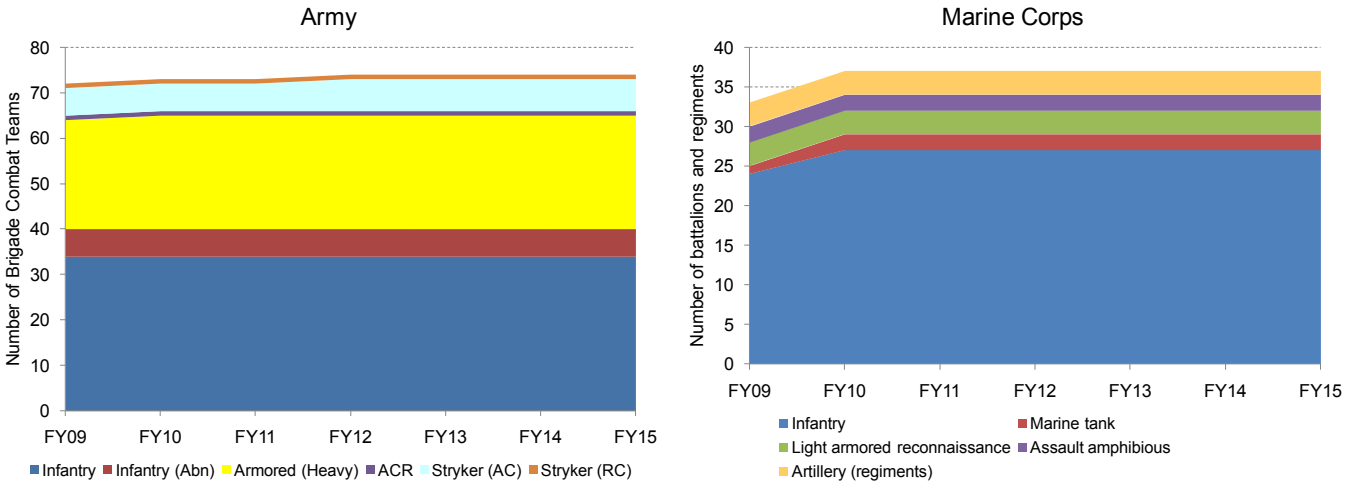


Figure 2-10. Army and Marine Corps Major Unit Counts, FY09–15



Source: *FY2011 President's Budget Future Years Defense Program*, Table 4-1.

Because the Army force structure is expected to be flat through FY15, the usage of that ground force drives demand for depot maintenance. When we examined likely future workloads, it was apparent the Army and Marine Corps would be the most heavily affected by the end of combat operations in Iraq and Afghanistan.

We, therefore, developed two analytical methods—a "boots on ground" analysis and a return to near-FY01 levels—that yielded upper and lower bounds on possible levels of organic depot maintenance work for the five Army depots and two Marine Corps depots out to FY15.

BOOTS ON THE GROUND

We modeled the DLHs at organic depots as a function of the number of deployed soldiers and marines (the number of "boots on ground," or BOG) in Iraq and Afghanistan. We obtained the results shown in Table 2-3 when we investigated the relationship between Army organic DLHs from FY01 to FY09 as a function of a 2-year lagged total of deployed Army forces. In other words, the workload shows up at the depot 2 years after the Army forces are employed in theater. In this analysis, we classified Anniston Army Depot , Letterkenny Army Depot , and Red River Army Depot as ground depots; Corpus Christi Army Depot as an aviation depot; and Tobyhanna Army Depot as a communications-electronics depot. Our analysis revealed that every deployed soldier added 18.8 hours (i.e., the coefficient of lagged BOG in the table) of maintenance work per depot per year in the subsequent 2-year period. We also observed that work (measured in DLHs) performed at Army locations other than the five major organic depots siphoned work away from the depots.

Table 2-3. Organic Army DLHs as a Function of Boots on the Ground

Variable	Coefficient	Standard error	T statistic
Intercept	4,310,616	488,447	8.83
Lagged BOG	18.8	2.7	6.99
Ground dummy variable	−1,794,740	474,957	−3.78
Aviation dummy variable	−1,094,636	581,702	−1.88
Non-major organic DLHs	−0.257	0.093	−2.78

Note: R-squared = 62 percent.

Table 2-4 presents the results of a similar analysis for the Marine Corps. In this analysis, we found that (all other things held constant) the Maintenance Center Albany (MCA) expended 546,012 more DLHs per year than Maintenance Center Barstow (MCB). In addition, every deployed marine added 36.6 hours of maintenance work per depot per year in the subsequent 2-year period.

Table 2-4. Organic Marine Corps DLHs as a Function of Boots on the Ground

Variable	Coefficient	Standard error	T statistic
Intercept	794,418	175,877	4.52
Lagged BOG	36.6	7.0	5.25
MCA dummy variable	546,012	204,648	2.67

Note: R-squared = 70 percent.

According to the Congressional Research Service:

> In February and March 2009, the Obama Administration announced its plans to increase troop levels in Afghanistan and decrease troop levels in Iraq. In Afghanistan, 30,000 more troops are deploying this year, while in Iraq, troops will gradually decline to 35,000 to 50,000 by August 31, 2011, with all troops to be out of Iraq by December 31, 2011.[15]

Following this announcement, President Obama, in December 2009, decided to increase the number of American troops in Afghanistan by some 40 percent (or another 30,000 soldiers). The president also stated that the United States would begin the transfer of its forces out of Afghanistan beginning in July of 2011.[16]

The U.S. military has gone on record as supporting this increase and subsequent withdrawal. According to General Stanley McChrystal:

> And by the summer of 2011, it will be clear to the Afghan people that the insurgency will not win, giving them the chance to side with their government. From that point forward, while we begin to reduce U.S. combat force levels, we will remain partnered with the Afghan security forces in a supporting role to consolidate and solidify their gains.[17]

Using a conservative set of assumptions regarding future U.S. military involvement in Iraq and Afghanistan, we forecasted future forces deployed in support of OIF and OEF (Table 2-5 and Table 2-6, respectively).

Table 2-5. Future Forces Deployed in Support of OIF

Date	Total	Army	Navy	Air Force	Marine Corps
September 2010	106,502	72,559	13,175	13,175	6,044
September 2011	52,164	35,539	6,453	6,453	387
September 2012	5,434	3,702	672	672	387
September 2013	5,434	3,702	672	672	387
September 2014	5,434	3,702	672	672	387
September 2015	5,434	3,702	672	672	387

Note: The residuals in FY12 to FY15 reflect troops outside Iraq and Afghanistan, but still within Southwest Asia.

[15] Congressional Research Service, *Troop Levels in the Afghan and Iraq Wars, FY2001–FY2012: Cost and Other Potential Issues,* R40682, Amy Belasco, July 2, 2009, summary page.

[16] The White House, Office of the Press Secretary, Remarks by the President in Address to the Nation on the Way Forward in Afghanistan and Pakistan, December 1, 2009.

[17] Prepared statement before the House Armed Services Committee of General Stanley A. McChrystal, U.S. Army (Ret) when he was serving as the Commander of the North Atlantic Treaty Organization (NATO) International Security Assistance Force in Afghanistan, December 8, 2009.

Table 2-6. Future Forces Deployed in Support of OEF

Month/year	Total	Army	Navy	Air Force	Marine Corps
September 2010	96,400	68,744	3,200	8,100	16,357
September 2011	96,400	63,087	3,200	8,100	22,013
September 2012	96,400	63,087	3,200	8,100	22,013
September 2013	64,267	42,058	2,133	5,400	14,675
September 2014	32,133	21,029	1,067	2,700	7,338
September 2015	0	0	0	0	0

Combining the results of our analysis (Figure 2-3 and Figure 2-4) with the forecasts of future deployment levels of Army and Marine Corps forces yields the projected major organic depot maintenance workloads shown in Table 2-7.

Table 2-7. Upper Bound Projected Organic DLHs (in millions)

Depot	FY10	FY11	FY12	FY13	FY14	FY15
ANAD	5.9	6.7	6.9	6.2	5.7	5.4
CCAD	5.9	6.1	5.9	5.1	4.5	4.1
LEAD	3.5	3.6	3.3	2.8	2.3	2.0
RRAD	6.1	6.0	5.3	4.1	3.3	2.7
TYAD	7.0	7.2	7.0	6.2	5.6	5.2
Army total	28.4	29.7	28.3	24.3	21.3	19.4
MCA	2.5	2.2	2.2	2.2	2.2	1.9
MCB	1.9	1.6	1.6	1.6	1.6	1.3
Marine Corps total	4.4	3.8	3.8	3.8	3.8	3.2

Note: DLHs for the three Army ground depots were distributed with workload shares that transitioned from their actual wartime proportions in FY09 to their historic peacetime proportions by FY17 (taking into account the 2-year lag). Additionally, columns may not add because of rounding.

RETURN TO NEAR-FY01 LEVELS

As overseas operations draw down, there is a likelihood that the nation will shift resources from defense to other pressing needs. Our second analytical approach, therefore, assumed a rapid return to near-FY01 levels of organic depot maintenance spending. As shown in Table 2-8, we assumed baseline spending for Army organic depot maintenance will grow from $1.2 billion in FY10 to $2.9 billion in FY15. Conversely, we expect Army organic depot maintenance spending from OCO funding to decline from $4.5 billion in FY10 to zero in FY15, which corresponds to the anticipated drawdown of U.S. combat forces from Iraq and Afghanistan.

Table 2-8. Army Organic Depot Maintenance Spending (billions of then-year dollars)

Funding	FY10	FY11	FY12	FY13	FY14	FY15
Baseline	$1.2	$1.4	$1.9	$2.4	$2.8	$2.9
OCO	$4.5	$3.6	$2.7	$1.8	$0.9	$0.0
Total	$5.7	$5.0	$4.6	$4.2	$3.7	$2.9

When we converted the then-year dollars into constant FY10 dollars, we obtained the results shown in Table 2-9.

Table 2-9. Army Organic Depot Maintenance Spending (billions of constant FY10 dollars)

Funding	FY10	FY11	FY12	FY13	FY14	FY15
Baseline	$1.20	$1.36	$1.80	$2.21	$2.51	$2.53
OCO	$4.50	$3.50	$2.56	$1.66	$0.81	$0.00
Total	$5.70	$4.86	$4.35	$3.87	$3.32	$2.53

Note: In making this conversion, we used the Operations and Maintenance Total Obligation Authority deflator as prescribed in the June 2009 *Green Book*, p. 42.

We next used the levels of Army organic depot maintenance spending (in constant dollars) to project future DLHs, with actual DLH figures for FY09 as the starting point for the projection. We first estimated Army and Marine Corps totals,[18] and then distributed these totals to the five Army depots and two Marine Corps organic depots. Table 2-10 shows the results.

Table 2-10. Lower Bound Projected DLHs (in millions)

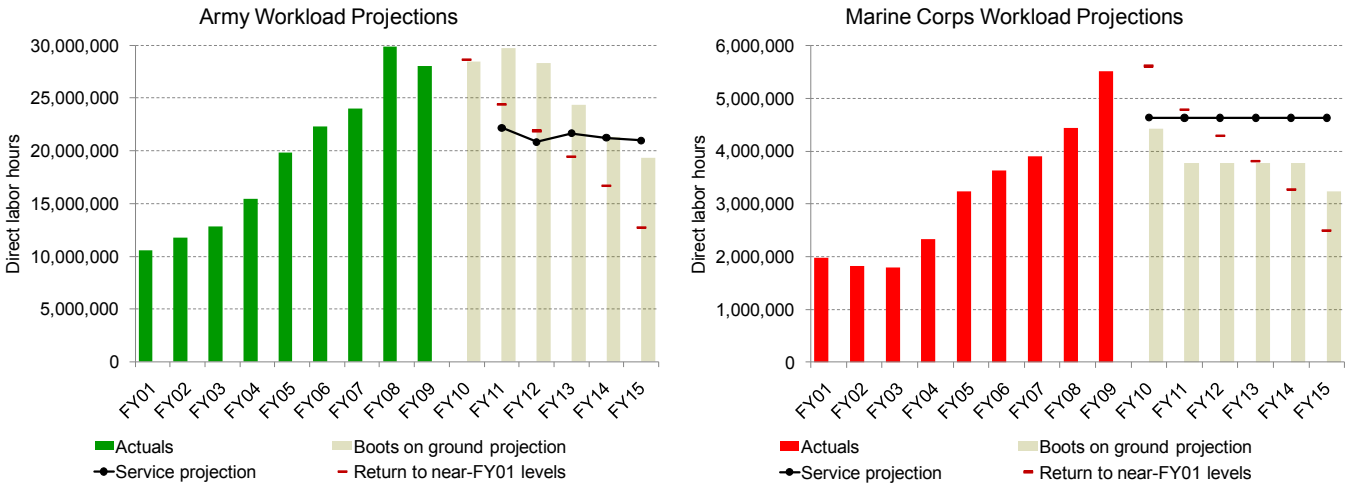
Depot	FY10	FY11	FY12	FY13	FY14	FY15
ANAD	6.1	5.4	5.0	4.6	4.1	3.3
CCAD	5.9	5.3	5.1	4.7	4.3	3.4
LEAD	3.6	2.9	2.4	2.0	1.5	1.1
RRAD	6.3	4.7	3.7	2.8	1.9	1.1
TYAD	6.7	6.1	5.7	5.4	4.8	3.8
Army total	28.6	24.4	21.9	19.4	16.7	12.7
MCA	3.2	2.6	2.2	1.9	1.6	1.1
MCB	2.4	2.2	2.1	1.9	1.7	1.4
Marine Corps total	5.6	4.8	4.3	3.8	3.3	2.5

Note: We distributed Army total DLHs among the five Army depots and Marine Corps total DLHs between two Marine Corps depots according to workload shares that transitioned from their actual wartime proportions in FY09 to their historic peacetime proportions by FY15. Additionally, columns may not add because of rounding.

[18] As ground services engaged in the same operations, we assume Army and Marine Corps organic depot maintenance funding will follow similar patterns.

Figure 2-11 shows our upper and lower bound forecasted DLHs in comparison to DLH forecasts from the Army and Marine Corps. We note that, by FY15, both our upper and lower forecasts lie below the service projections for future workload at the organic maintenance depots.

Figure 2-11. Alternative Organic Workload Projections



CAPACITY UTILIZATION

DoD's 17 major organic depots can be categorized by military service and commodity area as shown in Table 2-11.

Table 2-11. Major Organic Depots by Military Service and Commodity Area

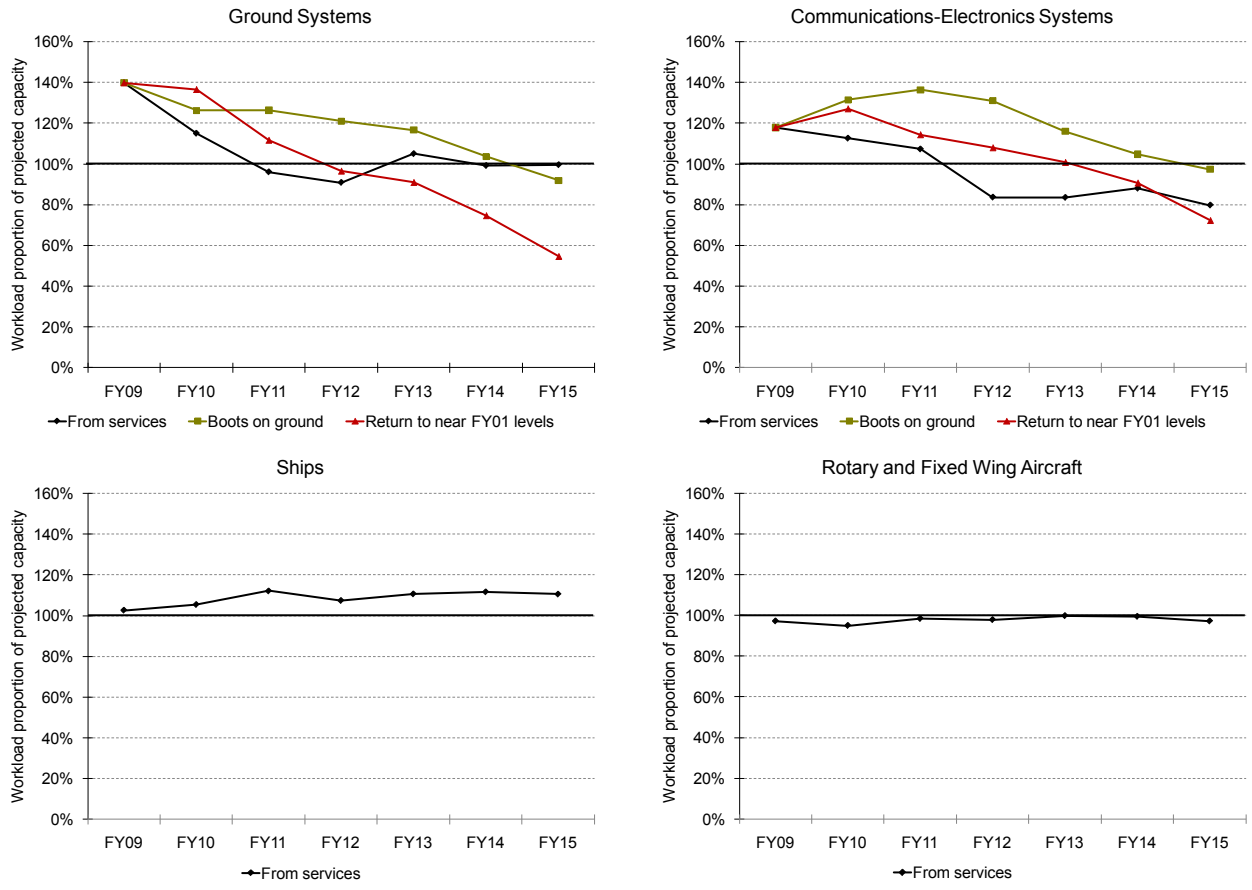
Commodity area	Army	Navy	Air Force	Marine Corps
Ground systems	ANAD LEAD RRAD			MCA MCB
Communications–electronics	TYAD			
Aviation systems	CCAD	FRCE FRCSE FRCSW	Ogden ALC Oklahoma City ALC Warner Robins ALC	
Ships		Norfolk NSY Pearl Harbor NSY Portsmouth NSY Puget Sound NSY		

Note: FRCE = Fleet Readiness Center East; NSY = naval shipyard, ALC = air logistics center.

The capacity of DoD's organic depot maintenance is measured in accordance with the provisions of DoD 4151.18-H, *Depot Maintenance Capacity Utilization Measurement Handbook*. The stated objective of the handbook is to provide methods for calculating comparable maintenance capacity data. DLHs are the basic unit of measurement, enabling evaluation of capacity and utilization data for organizations, activities, and shops producing varying output mixes. A single shift, 40-hour workweek is the standard for computing baseline capacity for DoD depot maintenance activities.[19] A maintenance activity can only increase or decrease capacity by increasing or decreasing the number of workstations.

The military services provided their forecasts of baseline capacity at the depot level of detail out to FY15. We compared those forecasts to workload forecasts over the same period, which yielded the capacity utilization rates shown in Figure 2-12.

Figure 2-12. Projected Organic Workloads as a Proportion of Projected Organic Capacities, FY09–15



[19] A baseline capacity index indicates the capacity, expressed in DLHs, that a product shop or activity can effectively employ annually on a single shift, 40-hour week basis, while producing the product mix that the shop or activity is designed to accommodate. This approach builds in available shifts to accommodate workload surges. Individual shop-level baseline capacity indexes are calculated and then combined to determine the baseline capacity index of the various production shop categories and an entire depot maintenance activity.

The ground and communications-electronics systems comparisons (comprising most Army and both Marine Corps depots) include two extra lines that show capacity utilizations that correspond to our BOG and "return to near-FY01 levels" workload forecasts. Capacity utilization ratios below 100 percent generally indicate excess capacity; although there appears to be some excess capacity in FY14 and FY15 for communications-electronics, there could be considerable excess capacity for ground systems by FY15 if workloads return to near-FY01 levels. Aircraft and ship capacity utilizations generally remain near 100 percent.

WORKLOAD CONCLUSIONS

With the current drawdown in Iraq and planned drawdown in Afghanistan, workload associated with combat operations for ground forces will decline substantially between now and FY15. This will mean workload below service projections by 2015 at the five organic maintenance depots that support ground systems.

Inventories of major systems are generally flat through FY15, but as newer, more reliable systems within these inventories replace older items, the newer systems will enter the organic depots slowly as core workloads.

Given the current national security and fiscal environment, we anticipate a long-term push for deriving additional efficiencies from DoD's depot maintenance program. Moreover, when combined with some prior difficulties in justifying levels of depot funding, we expect that lower budget allocations may further depress depot maintenance workloads.

Depot maintenance performed by non-major depot entities is not assigned by the same processes used to workload the major depots. They rely then on "entrepreneurial" methods to take on additional work to preserve their viability. Typically, a non-major depot develops a maintenance capability and then sells its services, potentially putting it in competition with the major depots. While at first glance this would seem to be a good practice, it sub-optimizes the total DoD maintenance industrial base, can produce unplanned capability and capacity, and can be a disincentive to cooperation.

The DoD maintenance industrial base should be viewed as a whole. If the DoD determines that these non-major depot entities should continue to perform depot-level maintenance, then it should assign workloads in a manner similar to that of the major depots to ensure they contribute rationally to overall organic capability and capacity.

Chapter 3
Workforce

The provision and management of the DoD depot maintenance workforce has been a subject of concern for many years.[1] It is DoD's policy and priority to retain a highly skilled workforce at its depot maintenance facilities to provide the capabilities needed to support production workloads and core capability requirements. In this chapter, we review the composition of the workforce, analyze the current environment, and translate projected workloads to the future workforce.

COMPOSITION AND RECENT CHANGES

In this section, we depict the workforce as it was at the end of FY09 and as it changed from FY01 through FY09. The primary data for this analysis were extracted from the personnel database maintained by the Defense Manpower Data Center (DMDC). The numbers cited include federal civilian permanent and temporary employees at the end of the respective fiscal years for the 17 major depots.[2] They do not include management and support personnel at headquarters activities, such as Air Force Materiel Command, Army Materiel Command, and the naval system commands, nor the intermediate commands, such as the Army's life-cycle management commands. The numbers cited also do not include contractor employees, except as noted for Figure 3-5 and the Marine Corps vignette.

Workload requirements largely drive the size and composition of the organic depot workforce. Depot maintenance employees are employed based on the available workload and the funding for depot maintenance and repair.[3] DoD policy requires a periodic review and adjustment of maintenance programs, with direct linkage to depot maintenance workloads and manpower levels.[4]

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[1] GAO, *Defense Logistics: Actions Needed to Overcome Capability Gaps in the Public Depot System*, GAO-02-105, October 2001; and GAO, *DOD Civilian Personnel: Improved Strategic Planning Needed to Help Ensure Viability of DoD's Civilian Industrial Workforce*, GAO-03-472, April 2003.

[2] There is a single unit identification code (UIC) for Puget Sound Naval Shipyard. This UIC was changed in FY04 (beginning October 1, 2003) to reflect the inclusion of two adjoining maintenance facilities: Bangor and Everett. These facilities perform intermediate-level work. As a consequence, the depot-level workforce at Puget Sound Naval Shipyard is overstated in the DMDC data set from FY04 on.

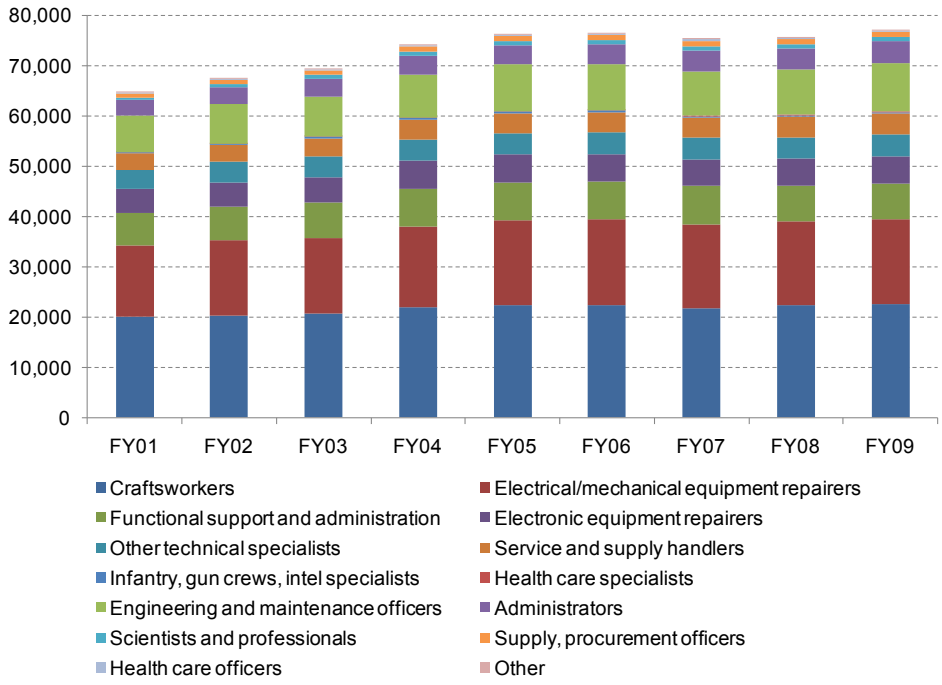
[3] 10 U.S.C. §2472, *Prohibition on management of depot employees by end strength*, specifies that the civilian depot maintenance workforce may not be managed on the basis of any constraint or limitation in terms of man-years, end strength, full-time equivalent positions, or maximum number of employees.

[4] DoD 4151.18-H, *The Depot Maintenance Capacity and Utilization Measurement Handbook*, March 10, 2007; and Deputy Secretary of Defense, Memorandum for Secretaries of the Military Departments, Subject: "Depot Maintenance Production Work Force," October 12, 2001.

That policy guidance, when coupled with the requirements for core depot maintenance capabilities, establishes a framework for the management and sizing of the workforce. The framework, as well as the need for efficiency, requires the workforce to be flexible enough to adjust to funding levels, operational requirements (i.e., funded workload requirements), and changes in other factors, such as needed skills and employee retirements and attrition.

At the end of FY09, DoD's organic depot maintenance workforce comprised some 77,050 maintainers, management, production support, and administrative personnel. That workforce was up from 64,732 in FY01, but it had remained relatively stable since FY04. The workforce includes individuals from more than 200 job series (or skill categories). Figure 3-1 depicts the workforce populations by major workforce segments. Although the size of the overall depot workforce has increased since FY01, the relative skill set within the total has essentially remained constant.

Figure 3-1. Depot Maintenance Workforce Skills



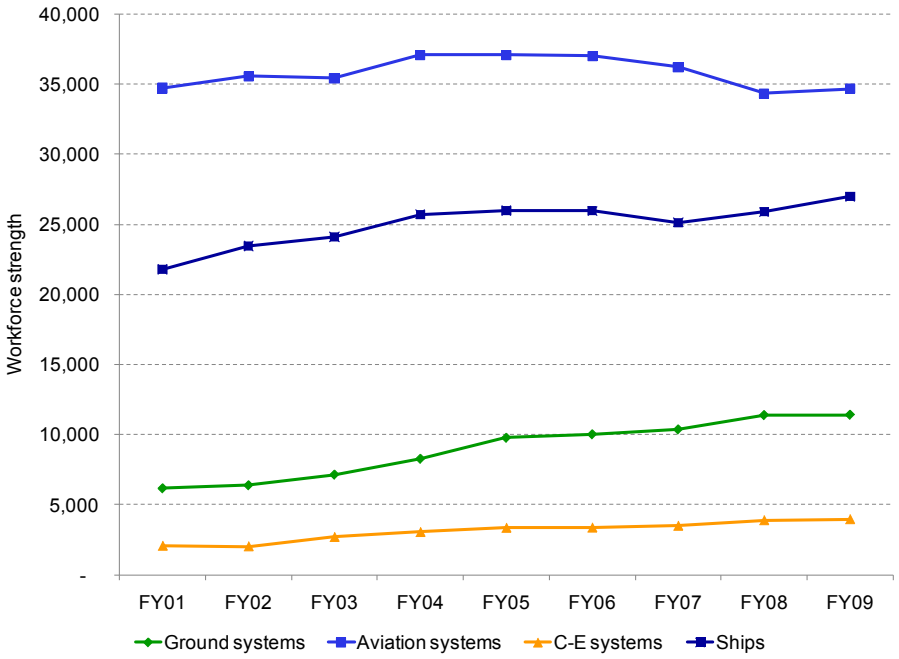
From FY01 to FY09, the depot maintenance workforce increased by 19 percent. Significant growth within the Army and Navy workforces spurred the overall DoD growth, as Table 3-1 shows. The Army workforce, in particular, grew by more than 77 percent.

Table 3-1. Depot Maintenance Workforce by Activity Group

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Air Force	21,376	21,984	22,311	22,928	23,335	23,703	23,287	21,243	21,760
Army	9,692	9,711	11,275	12,815	14,603	14,969	15,487	16,959	17,157
Marine Corps	1,447	1,483	1,628	1,808	1,904	1,980	2,041	2,231	2,169
Navy air	10,432	10,794	10,037	10,858	10,371	9,741	9,284	9,200	8,990
Navy sea	21,785	23,451	24,108	25,714	25,970	25,956	25,131	25,893	26,974
Total	64,732	67,423	69,359	74,123	76,183	76,349	75,230	75,526	77,050

Another way to view the workforce population is by major depot maintenance functional category. For this analysis, we categorized each of the 17 depots by one of four major functions: aviation systems (7 facilities), communications and electronics (1 facility), ground systems (5 facilities), and ships (4 facilities). Using this framework, we found the communications and electronics, ground systems, and ships workforces increased during the FY01–09 period, while the aviation systems workforce increased in the mid-years, but ended slightly lower in FY09 than its FY01 total (see Figure 3-2). The ground systems workforce increased by more than 5,246 employees, or about 85 percent.

Figure 3-2. Depot Maintenance Workforce by Commodity



The depot maintenance workforce can also be portrayed with respect to the relative populations of blue-collar (wage-grade schedule) and white-collar (general schedule or National Security Personnel System) employees. Table 3-2 depicts the FY01 to FY09 depot maintenance workforce from this perspective.

Table 3-2. Composition of Depot Maintenance Workforce

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Blue-collar									
Maintainers	33,819	34,629	34,953	37,511	38,294	38,325	37,745	38,410	38,653
Management, production support, and administrative	8,342	8,633	9,057	9,688	10,120	10,203	9,685	9,797	10,052
Blue-collar total	42,161	43,262	44,010	47,199	48,414	48,528	47,430	48,207	48,705
White-collar									
Maintainers	7,012	7,395	7,535	7,927	8,124	8,034	7,971	7,940	8,285
Management, production support, and administrative	15,559	16,766	17,814	18,997	19,645	19,787	19,829	19,379	20,060
White-collar total	22,571	24,161	25,349	26,924	27,769	27,821	27,800	27,319	28,345

In FY09, the depot maintenance workforce consisted of 63 percent blue-collar workers and 37 percent white-collar workers, nearly the same percentages as in FY01. As Table 3-2 shows, the population identified as maintainers (by skill) can be either white-collar or blue-collar workers. In FY09, maintainers were 82 percent blue-collar and 18 percent white-collar, which is consistent with the composition in FY01.

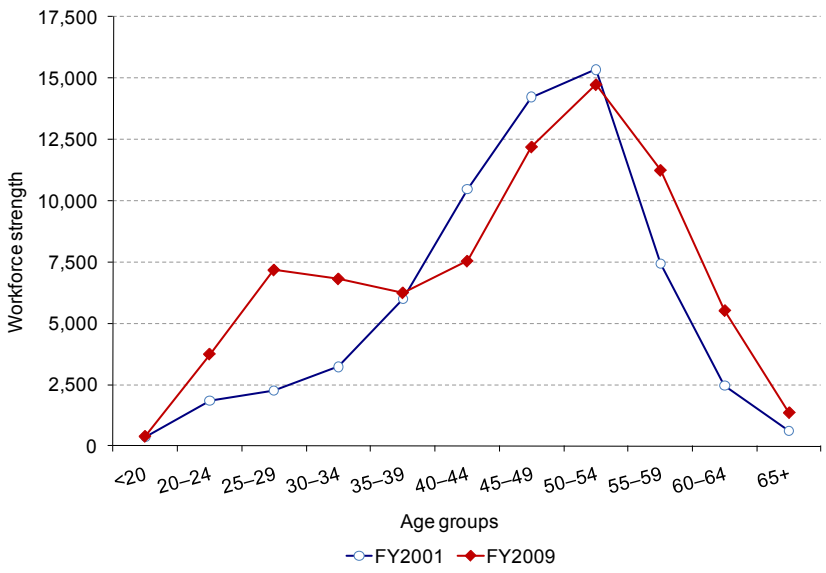
During the FY01–09 period, the number of maintainers in the workforce increased by 16 percent, while the number of workers characterized as management, production support, and administrative grew by 27 percent.

DoD has long expressed concern about the aging of its maintenance workforce. In 2001, the GAO noted the aging depot maintenance workforce presented significant human capital challenges for succession planning, given the average age of depot workers at the time was 46 years.[5] Indeed, the average age in FY01 was 46.6 years, but the average age in FY09 decreased slightly to 45.5 years.

Figure 3-3 shows the composition by age group of the FY01 and FY09 workforces. The number of workers under the age of 30 increased by 6,872 during the period, and that younger cohort comprised nearly 15 percent of the FY09 workforce (versus 7 percent in FY01). Workers over the age of 55 represented more than 23 percent of the FY09 workforce (versus roughly 16 percent in FY01).

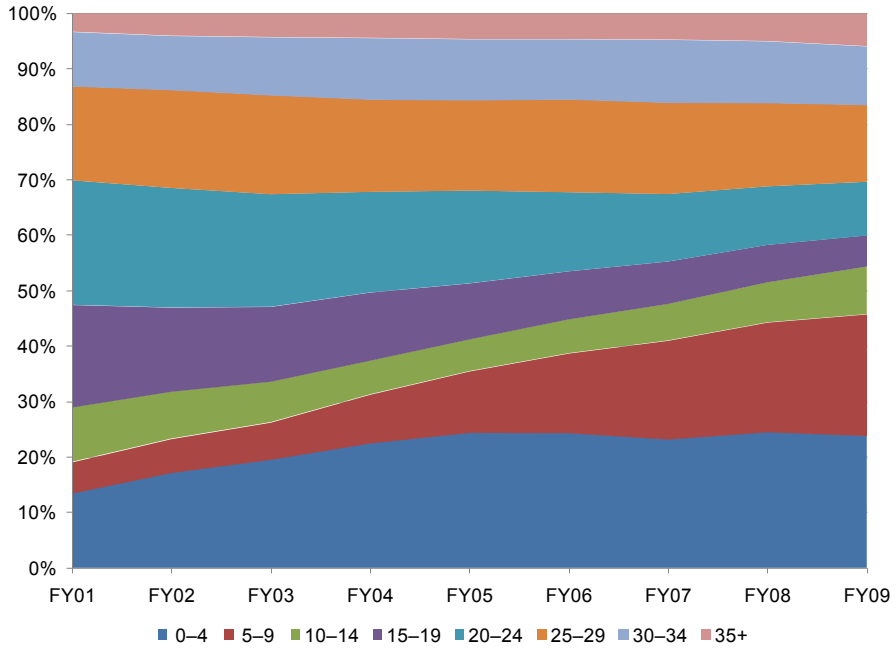
[5] GAO, *Defense Logistics: Actions Needed to Overcome Capability Gaps in the Public Depot System*, Report GAO-02-105, October 2001, pp. 28–29.

Figure 3-3. Depot Maintenance Workforce by Age Group



The concern with age largely centers on retirement eligibility. The number of retirement-eligible workers in the depot maintenance workforce is often cited as a factor that could affect workforce composition and workload production capability. Figure 3-4 depicts the changes in years of service, by fiscal year, for the depot maintenance workforces. The substantial growth in the portion of the workforce with fewer than 10 years of service is obvious, as is the shrinkage of the portion with between 15 and 24 years of service. These results indicate the organic depots are working to refresh their workforces as requirements arise.

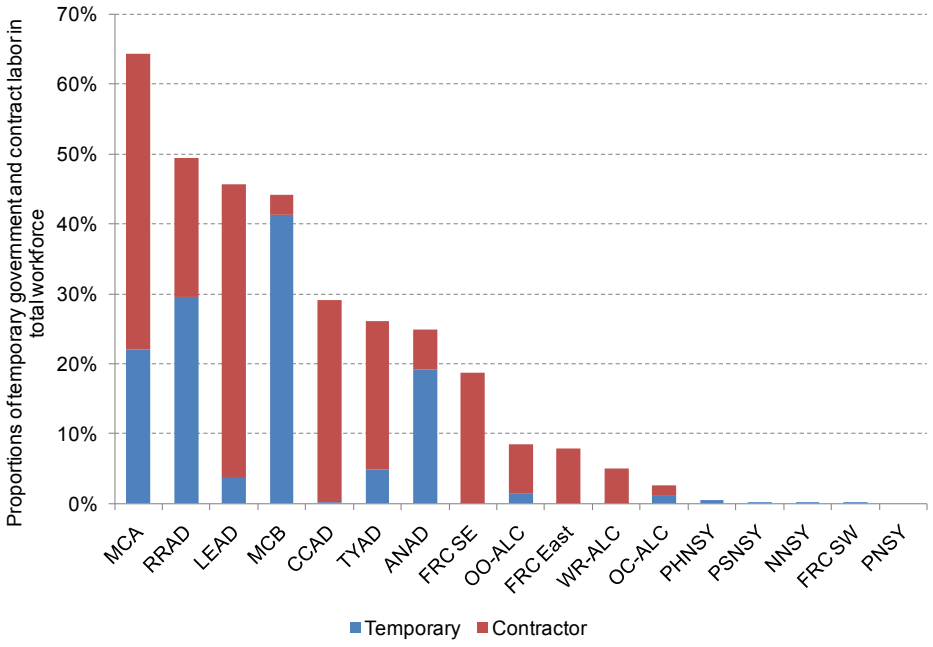
Figure 3-4. Depot Maintenance Workforce by Years of Service



While overall government employment at the depots increased by 19 percent from FY01 to FY09, particularly large workload increases occurred at some sites, such as Red River Army Depot, where the number of government employees grew by 143 percent. At other sites, workloads were generally more consistent, resulting in relatively steady workforces.

As we depicted in Chapter 2, the depots supporting DoD's ground forces experienced a large increase in workload from FY01 to FY09. Army and Marine Corps depot commanders used existing workforce-shaping tools to meet these increased demands (see the vignette describing the Marine Corps experience). Overtime, hiring permanent and temporary government employees, and adding contractor labor allowed the depots to meet those demands. However, the depots employed different methods for responding to the increases in workloads (see Figure 3-5, which plots the percentages of total employees that were temporary government workers or contractors in FY09). In 7 of the 17 organic depots, 20 percent or more of the workforce consisted of temporary government employees or contractors. All seven of these depots were either Army or Marine Corps facilities. Given the ground-centric nature of OIF and OEF, this response seems prudent. Moreover, the facilities that experienced the strongest growth in workload anticipate reducing their workforces as combat operations in Iraq and Afghanistan drawdown. Such reductions are typically accomplished by reducing temporary government and contract employees.

Figure 3-5. Proportions of Temporary Government Workers and Contractors at the Organic Depots, FY09

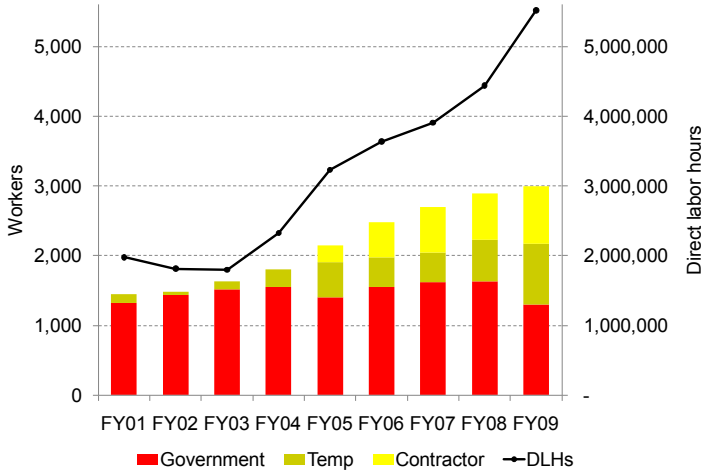


Enhancing Workforce Management: Marine Corps Vignette

Depot commanders have a variety of workforce management tools to accommodate varying workload levels. These tools include hiring permanent and temporary government employees, utilizing contract labor, and adding overtime hours. The Marine Corps provides a good illustration of the use of these tools.

During FY01–09, workload at the two Marine Corps depots, MCA and MCB, more than doubled, but without a commensurate growth in workforce. In FY01, MCA and MCB had a total of 1,326 career government employees and 121 temporary government employees. By FY09, the workforce had changed to 1,294 government employees, 875 temporary government employees, and 805 contract employees (see figure below).

Marine Corps Maintenance Center Employees



The managers of these depots employed great flexibility to realign their workforce promptly to meet the changing requirements of the Fleet Marine Force and other customers. We note the dramatic increase in the effective output of each employee, probably the result of the judicious use of overtime. The managers also controlled the growth in permanent government employees in favor of temporary government workers and contractors to accommodate a large portion of the increase in overall workload. If future levels of workload at both sites are reduced as overseas combat missions decline, transition to lower levels of future workload (while still disruptive to those affected) could be managed more easily and be less costly to the government.

Workforce Operations

10 U.S.C. §2472, prohibits the management of depot employees by end strength. In general, it specifies that civilian employees within DoD who perform or are involved in the performance of depot-level maintenance and repair workloads may not be managed on the basis of any constraint or limitation in terms of man-years, end strength, full-time equivalent positions, or maximum number of employees. Depot maintenance employees are managed to the available maintenance workload and the funding made available for such depot-maintenance and repair.[6]

[6] 10 U.S.C. §2472, *Prohibition on management of depot employees by end strength*.

To reinforce DoD's position on managing manpower, the Deputy Secretary of Defense, in an October 2001 memorandum to the secretaries of the military departments, stated

> the adequacy of the depot maintenance production work force is essential to weapon system readiness. Changing operational tempo and weapon systems requirements result in depot maintenance workload fluctuations. To remain cost efficient, the level (and by implication, the skills) of depot maintenance workers must be adjusted as needed to match available work load. [7]

To provide the flexibility required by this ever-changing environment, the organic depots have used a combination of permanent and temporary employees (both single- and multiskilled), overtime, and contractor personnel as workload demand dictates. Whenever a workload was beyond the abilities of the organic depots, extensive use of commercial sources of repair were used to enhance overall capability (possibly constrained by 50/50 limitations).

In addition, 10 U.S.C. §2464 establishes a requirement to maintain a core depot maintenance capability that is government-owned and government-operated (including government personnel) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to mobilizations, national defense contingency situations, and other emergency requirements.[8] The requirements established by this statute mandate the organic depots be assigned sufficient workloads of the appropriate technologies, both legacy and new, to ensure the proper levels of trained and qualified personnel to meet national defense needs.

Trends throughout the 1990s appear to have embraced a management preference for outsourcing logistics support, including sustainment maintenance. As a consequence, program management offices are now under pressure to use OEMs or prime contractors as the selected source of support. Clearly, source-of-support decisions have a direct impact on emerging organic depot maintenance workloads and types of skills that will be required at these facilities.

Workforce Skills and Development

The requirements outlined above form the basis for establishing DoD's organic depot personnel levels, skills, and capabilities. The ability of the organic depots to meet the requirements of such a diversified tasking depends on a number of factors, such as the depots' ability to forecast both peacetime and contingency operations, maintain technological currency, provide training for new employees, and develop capabilities to support technical requirements of new and existing weapon systems.

[7] Deputy Secretary of Defense, Memorandum for Secretaries of the Military Departments, Subject: "Depot Maintenance Production Work Force," October 12, 2001.

[8] 10 U.S.C. §2464, *Core logistics capability*.

The depots must also ensure efficient operations. Meeting these needs requires a depot maintenance workforce that has the flexibility to adjust rapidly (both upwards and downwards) in direct relationship with funding levels and operational requirements and to accommodate changes in needed skills, employee retirement and attrition levels, and application of new processes and technologies to meet varying failure rates and equipment conditions.

In day-to-day production and the planning for support of long-range and contingency operations, the organic depots require a diversified workforce of more than 200 job series (skills). All of DoD's maintenance depots provide extensive technical training for their workforces to ensure the required skills availability for current and planned future workloads. These training capabilities are a combination of in-house technical classroom training, on-the-job training, and formal education provided by private educational activities, military technical training, and contract training organizations.

The military services manage the size and complexity of their depot workforces within the bounds of both workload projections (funded and approved) and actual requirements generations. While operating within the general rules established, whether statute or DoD policy, each military service has developed a unique workforce skills process that is geared to the types and volumes of its particular workloads. Unfortunately, the drivers of workforce needs sometimes do not fully match up with available skill sets. In execution, workloads are driven by the OPTEMPOs of weapon systems, overhaul schedules, component failures, ever-changing technological developments, equipment modifications to support mission changes, and unplanned operational unit needs.

TRANSLATING FUTURE WORKLOADS TO FUTURE WORKFORCES

In Chapter 2, we explored a range of possible future workloads for the depots supporting the ground forces. To translate workload projections to workforce projections, we had to determine how they varied in relation to each other.

Table 3-3 shows the effect of workload on workforce at the 17 major organic depots. We compared workload measured in thousands of DLHs against DMDC headcounts of permanent and temporary government workers for FY01–09. The last column indicates for each depot whether there was a statistically significant relationship between workload and workforce (with a "yes" indicating confidence that we could use this relationship as a model for estimating future workforce levels for a given level of workload by individual depot).

Table 3-3. Workforce as a Function of Workload at Major Organic Depots

Depot	Intercept term	Slope term	Slope statistically significant?[a]
ANAD	1,261	0.50	Yes
CCAD	1,702	0.41	Yes
LEAD	783	0.23	Yes
RRAD	1,363	0.27	Yes
TYAD	983	0.41	Yes
Norfolk NSY	5,185	0.24	No
Pearl Harbor NSY	2,097	0.55	Yes
Portsmouth NSY	1,390	0.50	Yes
Puget Sound NSY	5,618	0.31	No[b]
FRCE	2,766	0.23	No
FRCSE	2,408	0.24	No
FRCSW	4,076	−0.27	No
Ogden ALC	4,995	0.31	No
Oklahoma City ALC	3,992	0.61	Yes
Warner Robins ALC	3,326	0.49	Yes
MCA	642	0.18	Yes
MCB	554	0.25	Yes

[a] Statistical significance taken at the 5 percent level, with a one-tailed test and 8 degrees of freedom.

[b] Slope at Puget Sound NSY is not statistically significant even when the intermediate-level workforce is excluded from the regression.

Figure 3-6 and Figure 3-7 show the aggregate results for the Army and Marine Corps, respectively. The slope of the regression line indicates the extent to which workload changes were the result of changes in the numbers of government employees. For example, the Marine Corps results show it relied more heavily on contractors and overtime to accommodate the increase in workload during the period than did the Army because the Marine Corps' regression slope term is smaller (0.20 versus 0.39).

Figure 3-6. Workload to Workforce Results, Army FY01–09

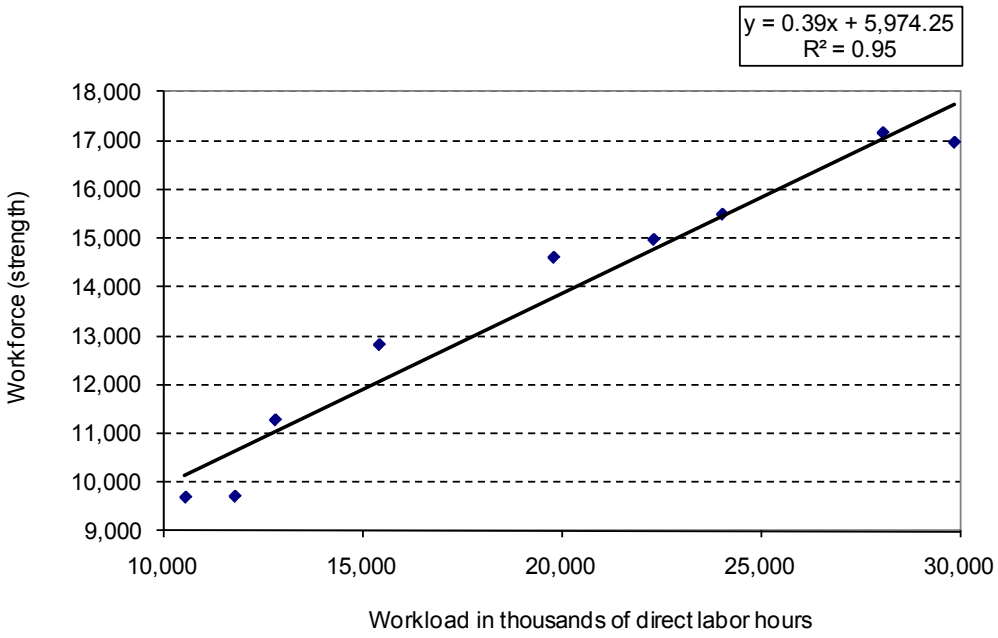
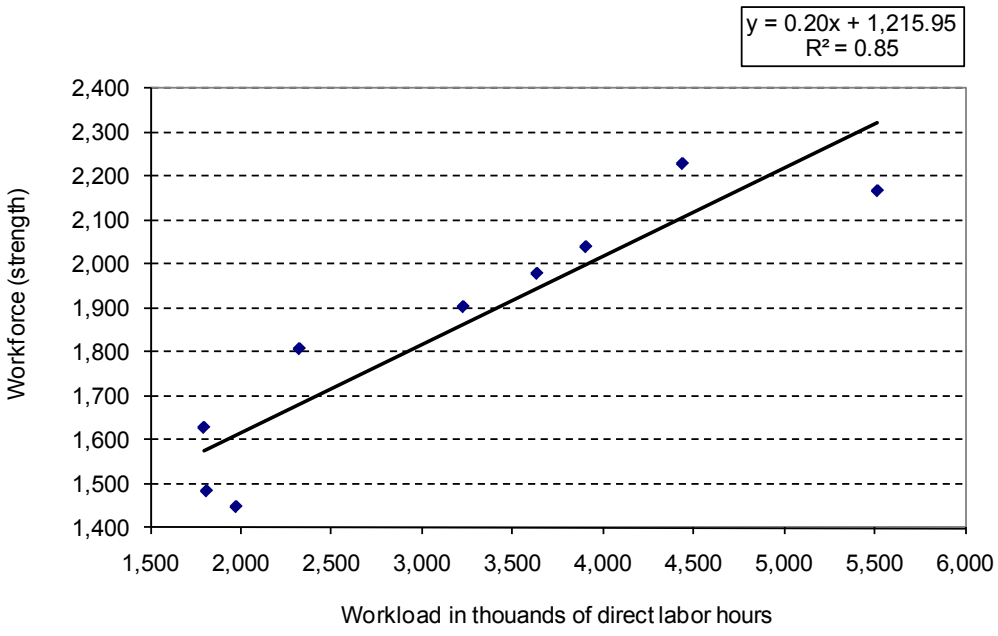


Figure 3-7. Workload to Workforce Results: Marine Corps, FY01–09



Combining the results in Table 3-3 with the upper and lower projected workloads at the five major Army and two major Marine Corps organic depots yields forecasts of average annual changes in the workforces at these locations during the period FY09 to FY15. The results of this analysis are shown in Table 3-4.

Table 3-4. Projected Average Annual Changes, FY09–15

Depot	Workload	Workforce
ANAD	−1% to −7%	−1% to −6%
CCAD	−4% to −6%	−2% to −3%
LEAD	−8% to −12%	−4% to −7%
RRAD	−10% to −14%	−6% to −8%
TYAD	−3% to −6%	−4% to −6%
MCA	−7% to −11%	−2% to −4%
MCB	−7% to −7%	−3% to −3%

Note: Range of projected workloads based on boots on ground for lesser rate of reduction and return to near-FY01 levels for greater rate of reduction.

Table 3-5 shows the components for recent attrition rates observed in DoD's organic depot workforce in FY09. We note the non-retirement-eligible segment comprises 83 percent, while the retirement-eligible segment comprises the remaining 17 percent. The two segments differ in their individual attrition rates. Non-retirement-eligible personnel leave at a rate of 4.7 percent per year, while retirement-eligible personnel attrite at 17.2 percent per year. Combining these two populations and their respective attrition rates yields an aggregate annual attrition rate of approximately 7 percent (3.9 percent + 2.9 percent) over the observation period.

Table 3-5. Recent Annual Attrition Rates at the Organic Depots

	Non-retirement-eligible	Retirement-eligible
Share of total (A)	83%	17%
Attrition rate (B)	4.7%	17.2%
Contribution to aggregate attrition rate (A × B)	3.9%	2.9%

Source: Defense Manpower Data Center, Civilian Master File Extracts for FY08 and FY09.

Turning back to Table 3-4, we note only Red River Army Depot and, possibly, Letterkenny Army Depot would likely have difficulty drawing down their workforces other than through normal attrition.

WORKFORCE CONCLUSIONS

The depots supporting the Army and Marine Corps are most likely to see significant *workload* reductions in the coming years as forces return from Iraq and Afghanistan. Our analysis indicates that, after making reductions in overtime and on-site contractor personnel, the depots should be able to manage further reductions effectively. As long as the required annual reductions in *workforces* at these depots do not exceed 7 percent, normal attrition should be sufficient to avoid layoffs of government employees. The organic depots should retain a nucleus of permanent employees and address future workload surges with the existing management tools of overtime and temporary government and contractor employees.

Chapter 4
Acquisition and Sustainment

The size of DoD's materiel maintenance program, estimated at $80 billion in FY09, and the competing interests of the private and public sectors have resulted in a collection of statutes, policies, and regulations that are sometimes ambiguous and often inconsistent. This chapter explores the statutory and policy framework that governs depot maintenance and recommends improvements to that framework.

DEPOT MAINTENANCE STATUTORY FRAMEWORK

Congress has taken a keen interest in DoD depot maintenance, as evidenced by the number and variety of statutes enacted. Most of the statutes that deal with depot-level maintenance encourage a particular behavior. For example, 10 U.S.C.:

- Section 2464, *Core logistics capabilities*
- Section 2474, *Centers of industrial and technical excellence: designation; public-private partnerships*
- Section 2476, *Minimum capital investment for certain depots*.

Still other provisions within 10 U.S.C. seek to limit certain behaviors:

- Section 2466, *Limitations on the performance of depot-level maintenance of materiel*
- Section 7310, *Overhaul, repair, etc. of vessels in foreign shipyards: restrictions*.

More than a dozen other statutes deal with public-private industrial relationships. These statutes cover a variety of functions, including depot maintenance public-private partnering and the sale of goods and services to private entities. Legal authority is sometimes confusing and depends on the type of facility performing the work (e.g., maintenance depot or arsenal), the type of item produced and its availability in the private sector, the expected end use, the support of core capability requirements, the use of government equipment and facilities, etc. This chapter discusses the statutes that have the greatest impact on the organic depot maintenance structure.

DEFINITION OF DEPOT MAINTENANCE

10 U.S.C. §2460, *Definition of depot-level maintenance and repair,* provides the statutory definition of depot maintenance. It first describes what depot maintenance is:

> (a) In General…the term "depot-level maintenance and repair" means…material maintenance or repair requiring the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies, and the testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair or the location at which the maintenance or repair is performed.

It then goes on to provide guidance on how depot maintenance is to be accounted.

> The term includes
>
> - (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair, and
>
> - (2) interim contractor support or contractor logistics support (or any similar contractor support), to the extent that such support is for the performance of services described in the preceding sentence.
>
> (b) Exceptions—
>
> - (1) The term does not include the procurement of major modifications or upgrades of weapon systems that are designed to improve program performance or the nuclear refueling of an aircraft carrier. A major upgrade program covered by this exception could continue to be performed by private or public sector activities.
>
> - (2) The term also does not include the procurement of parts for safety modifications. However, the term does include the installation of parts for that purpose.

The statutory definition of depot maintenance is, at best, ambiguous and subject to interpretation. Service interpretations of these ambiguities directly impact the development of core capability requirements and sustaining workloads, as well as the military departments' 50/50 calculations.

As an example, the Navy operates 18 Ohio class submarines: 14 strategic ballistic missile submarines and 4 guided-missile submarines. These submarines are chiefly maintained at two installations: Trident Refit Facility, Kings Bay, GA (TRF Kings Bay), and the former Trident Refit Facility, Bangor, WA, now a component of Puget Sound Naval Shipyard and Intermediate Maintenance Facility. By the Navy's interpretation, these submarines do not undergo routine depot maintenance. TRF Kings Bay has the largest covered dry-dock in the western hemisphere, but it is considered by the Navy to be an intermediate-level facility. Therefore, the Navy excludes maintenance on Trident submarines from core capability and 50/50 calculations.

While 10 U.S.C. §2460 states "The term includes (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair…" There apparently is no July 1, 1995, source documentation, and no DoD-wide definition of software maintenance can be found. As a consequence, the naval aviation community is of the opinion that software maintenance is inherent to the weapon system and, in its most recent core submissions to OSD, the Navy shows a total estimated private-sector software workload of merely $1.9 million, no core requirements, and no organic workload. In contrast, the Air Force believes software maintenance is a separate maintenance category. The Air Force's most recent core submission contains an estimated private-sector software workload of $730 million, a core requirement of almost 2.9 million DLHs, and an estimated organic workload of approximately 3.6 million DLHs.

In addition to defining depot maintenance, 10 U.S.C. §2460 provides guidance on accounting for depot maintenance by listing exceptions to the definition. The existing exclusions are confusing. For example, any modification designed to "improve performance" is not considered depot maintenance. The installation of parts for a safety-related modification is depot maintenance, but not the acquisition of those parts. The nuclear refueling of an aircraft carrier is not depot-level maintenance. Less clear, however, is how maintenance work is classified when it is performed in conjunction with refueling.

ACQUISITION–SUSTAINMENT LINKAGE

Planning for depot-level maintenance begins during the pre-systems acquisition phase of the acquisition process. Responsibility for developing those plans is vested in the program manager. DoD policy states:

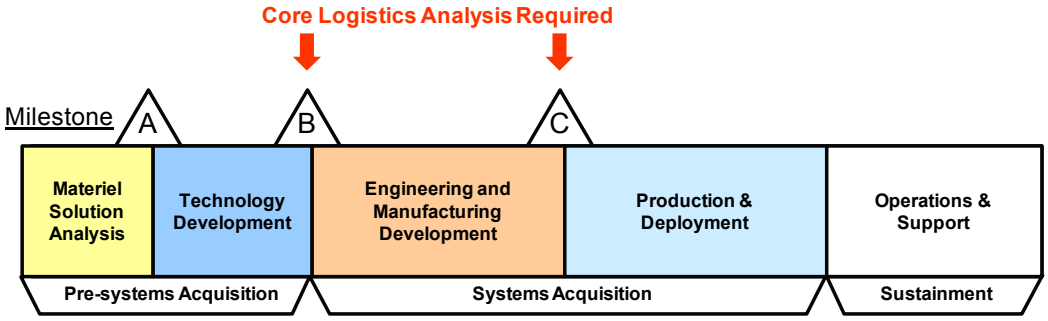
> The program manager (PM) is the designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The PM shall be accountable for credible cost, schedule, and performance reporting to the MDA (Milestone Decision Authority).[1]

The PM must rely on a variety of statutory and policy references when developing depot-level maintenance strategies.

Core requirements and decisions must be made as early as possible in the acquisition process to enable knowledgeable organic and private-sector source-of-repair and investment decisions (see Figure 4-1). This may force decisions to be made at the systems level rather that at the component level, but the potential benefits to be gained by the public and private sectors through early decisions may outweigh the negatives.

[1] DoDD 5000.01, *The Defense Acquisition System*, 12 May 2003, Certified Current as of May 12, 2007.

Figure 4-1. Core Decisions and Acquisition Milestones



For example, the Joint Strike Fighter PM authorized Rolls Royce to construct a lift fan test facility at its Indianapolis facility, with the expectation that the facility would support both new production and depot maintenance on lift fan assemblies. There was no apparent consideration, until later, that this decision would result in a single-source, lifecycle contract support situation for lift fans, which are a core capability for the weapon system.

Centers of Industrial and Technical Excellence

Under the provisions of 10 U.S.C. §2474, *Centers of industrial and technical excellence*, each major organic depot is designated by its respective military department secretaries as a CITE within its core areas of expertise. But this designation does not guarantee the placement of work at a particular depot since program managers are not bound to workload organic depots based on CITE assignments. This situation can create an inefficiency if a depot expends resources to establish the named CITE capability but workload is assigned to a contractor or another organic depot.

Technical Data

Timely access to accurate technical data is required for a ready and controlled source of depot maintenance. Under the current lifecycle management concept, PMs must ensure all data and software required to successfully procure and sustain the system are available throughout the system's life, as well as ensure competitive sourcing of new item procurement and the repair of existing and emerging items can be accomplished.

In 2006, GAO found that DoD's current acquisition policies did not require program managers to assess the long-term needs for technical data rights to support their weapon systems.[2] In 2007, Congress included a provision in the *John Warner National Defense Authorization Act* to require DoD to publish policy directing the PMs to assess the long-term technical data needs for DoD acquisition programs. In response, DoD promulgated acquisition policy that requires "program managers for

[2] GAO, *DoD Should Strengthen Policies for Assessing Technical Data Needs to Support Weapon Systems*, Report GAO-06-839, July 2006, p. 6.

ACAT [acquisition category] I and II programs, regardless of the planned sustainment approach, to assess the long-term technical data needs of their systems and reflect that assessment in a data management strategy."[3] The policy further requires the PM to "assess the data required to design, manufacture, and sustain the system, as well as to support re-competition for production, sustainment, or upgrades."[4]

Despite current policies, effective maintenance planning does not always occur early enough in the acquisition cycle. There are indications of circumstances when organic maintenance depots have not been selected as the source of repair, or otherwise cannot accept depot maintenance workload based, at least in part, on the non-availability of required technical data. These instances occur both early in the acquisition cycle and later in the sustainment phase of the weapon system or equipment life cycle. These issues were discussed in a recent RAND study on Air Force contractor logistics support that found "competition is often impossible because the government lacks the technical data or the data rights needed to allow third parties to maintain the equipment, so only the original equipment manufacturer, which has the technical data, can do the maintenance." [5]

MAINTENANCE REQUIREMENTS

Two statutes have a major effect on the provision of depot maintenance workloads: the core requirement (10 U.S.C. §2464) and the 50/50 distribution of workload (10 U.S.C. §2466). These statutes were designed to ensure the organic depots provide an efficient, ready, and controlled source of technical competence and resources necessary to assure effective and timely responses to mobilizations, national defense contingency situations, and other emergency requirements.[6]

Core Requirements

10 U.S.C. §2464, *Core logistics capabilities*, states:

> It is essential for the national defense that the Department of Defense maintain a 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 resource necessary to ensure effective and timely response to a mobilization, national defense contingency situations, and other emergency requirements.

[3] DoD Instruction 5000.02, *Operation of the Defense Acquisition System*, December 8, 2008, p.79.

[4] Ibid., DoDI 5000.02.

[5] Michael Boito, Cynthia Cook, and John Graser, *Contractor Logistics Support in the U.S. Air Force,* RAND: Santa Monica, CA, 2009, p. xvi.

[6] Briefing by Gregg Fogarty and Vickie Plunkett, "It's the Law," presented October 29, 2009, at the 2009 DoD Maintenance Symposium & Exhibition.

The concept of core was first codified in the mid-1980s. Systems and equipment under special access programs, nuclear aircraft carriers, and commercial items that meet the definition provided in the statute are excluded from core calculations.

10 U.S.C. §2464 defines "ready and controlled" as government-owned and government-operated (including government personnel and GOGO equipment and facilities). For some systems, this model may not be appropriate or cost-effective. For example, B-2 bomber work, which is performed by a commercial workforce in a government facility, may, in practice, be no less ready and controlled than if it were done in a GOGO activity.

One method of "ready and controlled" risk management currently available to the DoD is through the accomplishment of depot maintenance public-private partnerships. For several years, the DoD and Congress have encouraged the defense logistics support community to pursue partnerships with the private sector to combine the best commercial processes and practices with DoD's extensive maintenance capabilities. These public-private partnerships can combine the resources, risks, and rewards of public agencies and private companies and are intended to provide greater efficiency, better access to capital, and improved compliance with a range of government regulations.

There is a need to clarify the meaning of "ready and controlled" as the risk management framework for DoD depot maintenance management. An updated risk management framework must also support a broader set of industrial base "core" considerations that address depot maintenance provision and management choices in support of contingency requirements.

ACQUISITION AND MAINTENANCE POLICIES

Current acquisition guidance provides little emphasis and direction for a core analysis. Acquisition policy in DoDI 5000.02*, Operation of the Defense Acquisition System*, relating to core maintenance capabilities is found only in two tables, which are consolidated legislation tables. This lack of emphasis and direction could be construed to imply a lack of importance. In fact, the GAO found that 48 of 52 major programs failed to identify core requirements within the required timeframe. Twenty of those programs did not identify a core requirement until either the production and deployment phase or the sustainment phase of the acquisition process.[7]

This delay results in core requirements often not being identified early enough in the acquisition process to allow for the establishment of organic core capabilities within the 4 years mandated by 10 U.S.C. §2464 and DoD policy. In effect, this lapse leads the OEM to provide the plant and equipment to perform

[7] GAO, *Depot Maintenance: Actions Needed to Identify and Establish Core Capability at Military Depots*, GAO-09-83, May 14, 2009.

depot maintenance. Once this has occurred, it is not economical for DoD to establish a duplicate public-sector maintenance capability.

In a similar vein, DoDI 4151.20, *Depot Maintenance Core Capabilities Determination Process,* addresses only tasked or fielded systems. It does not cover those systems still in the acquisition process. There also is little, if any, core workload focus on jointly developed systems, such as the Joint Strike Fighter. This lack of guidance results in ad hoc capabilities determinations. For instance, the program executive officer for the JSF developed at least two separate plans to identify core requirements.

Core requirements are not yet used effectively in the Planning, Programming, Budgeting, and Execution System (PPBES) process. With the exception of some Navy aircraft engines, core is not directly used in the planning and budgeting process. The Army briefed a plan (see the Army vignette) to use core capability requirements to justify its planning, programming, and budgeting efforts. The Marine Corps, through an outside consultant, also identified this PPBES shortfall as a procedural issue. Interviews with Air Force representatives revealed they do not use (or have plans to use) core as a justification in the PPBES process.

A Revised Core Determination Process for Strategic Planning: Army Vignette

Core legislation directs the military services to sustain an organic industrial base to meet future contingency operational requirements. In developing its FY12–16 program, the Army revised its method for computing core depot maintenance requirements. That method

- forges stronger links to operational requirements,
- ensures core maintenance requirements are identified in weapon system development and modernization plans,
- prioritizes core workload in depot maintenance budgeting, and
- aligns capital investment to support current and emerging core capabilities.

Because the Army operates and maintains such a wide array of items, it started with an initial trial application, focusing on a handful of major combat systems: M1 tanks, M2 fighting vehicles, M88 recovery vehicles, and OH-58 helicopters. Integrated process teams, with representatives from the Army Staff G-4; Assistant Secretary of the Army for Acquisition, Logistics, and Technology; and Army Materiel Command are working to resolve the core capability and workload shortfall issues for these trial systems.

The key to this review is equating core DLHs to end-item production quantities, and thereby establish the basic depot core workloads at all levels.

The Army's refined budgeting process is a prototype for compiling core requirements to create a floor for the depot base program account, assign the appropriate funding priority to the core requirement, and help to inform capital investment priorities.

As a result of the lack of visibility of core requirements in the budget process, significant portions of DoD's core requirements are supported not through the military services' baseline budgets, but through OCO supplemental funding. If properly utilized, core depot maintenance workload requirements could provide a powerful justification in the competition for available funding.

IMPLEMENTATION OF THE CORE CONCEPT

It is DoD policy that depot maintenance core capability requirements be identified as early as possible in the acquisition life cycle, as cited in DoDD 4151.18:

> The capabilities to support these depot maintenance core requirements shall be established not later than 4 years after Initial Operational Capability for DoD materiel directly supporting the Department's strategic and contingency plans…Workloads required to sustain core capability requirements shall be the primary workloads assigned to DoD depots. Core capabilities and associated workloads shall be adjusted periodically, and reviewed formally on a biennial basis, for force structure changes, introduction of new weapon systems, and changes in battle doctrine to counter emerging threats. All maintenance and repair of weapon systems necessary for strategic and contingency plans need not be performed in public facilities; rather, the capability (in the form of skills, equipment and facilities) to perform maintenance and repair of these systems must be retained in those facilities.[8]

DoD developed a two-part process to satisfy the statutory core requirements:

- Part 1, the military service identifies its depot maintenance core capability requirements in terms of DLHs at the commodity level.
- Part 2, the military service identifies the depot maintenance workloads required to cost effectively sustain core capability requirements, again at the commodity level and expressed in DLHs. The results are forwarded to OSD, where the requirements and sustaining workloads are consolidated and approved.

The OSD-approved core requirements are displayed in Table 4-1. Although the requirements are submitted to OSD in greater detail than the data shown in the table, this is the level of visibility and detail at which core requirements are ultimately approved.[9]

[8] DoDD 4151.18, *Maintenance of Military Materiel*, March 31, 2004.

[9] Core requirements are determined biennially. They are submitted in the even years for requirements in the odd years. Between FY00 and FY04, the requirements determination process was changed and the new process was tested, but no official requirements were approved. After the FY04 submission, the scheduled FY06 submission was delayed to avoid conflict with the 2005 BRAC process.

Table 4-1. OSD-Approved Core Requirements (millions of DLHs)

Military service	FY99	FY01	FY05	FY07	FY09
Army	10.3	10.9	14.5	15.5	17.1
Navy	34.7	35.1	36.2	33.6	33.6
Marine Corps	1.9	1.9	1.5	1.5	1.9
Air Force	21.5	22.4	21.4	19.9	19.9
DoD total	68.4	70.3	73.6	70.5	72.5

The evidence suggests that, in the aggregate, the core concept, as implemented by the military services, works. As Table 4-2 shows, the Army and Marine Corps significantly increased their depot production within a relatively short period, and have sustained those increases.

Table 4-2. Army and Marine Corps Depot Workload (millions of DLHs)

Military service	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Army	10.6	11.8	12.8	15.4	19.8	22.3	24.0	29.9	28.2
Marine Corps	2.0	1.8	1.8	2.3	3.2	3.6	3.9	4.4	5.5

EXISTING CORE CAPABILITIES DETERMINATION PROCESS

Although the data suggest the core concept works, that view obscures some fundamental issues, namely workload shortfalls and calculation issues.

Workload Shortfalls

Major findings from an analysis of FY07 and FY09 service submissions to OSD include shortfalls in the workloads necessary to sustain core capabilities. These shortfalls are shown in Table 4-3.

Table 4-3. Workload Shortfalls (in DLHs)

Military service	FY07		FY09	
	OSD-approved core requirement	Sustaining workload shortfall	OSD-approved core requirement	Sustaining workload shortfall
Army	15,493,688	−930,354	17,090,943	−732,800
Navy	33,642,563	−275,100	37,210,581	−404,943
Air Force	19,857,131	−1,704,000	19,872,473	−3,410,000
Marine Corps	1,466,385	−204,536	1,951,527	0
Total	70,459,767	−3,113,990	76,125,524	−4,547,743

The Navy cited confusion between system commands and an inability to obtain funds to establish organic capability as a rationale for its shortfalls. The Marine Corps indicated it had a plan to correct its shortfalls with OCO supplemental funding requests. For the FY07 submission, it is unclear whether OSD pursued this matter with the Army. It is also unclear why there were Army shortfalls. We found data that indicate the Army was funding some level of baseline maintenance with OCO supplemental appropriations.

The shortfalls in workloads required to sustain core capability requirements are an apparent violation of 10 U.S.C. §2464; however, there is no visibility into and no repercussions associated with a violation beyond OSD.

Calculation Issues

Our analysis of the services' FY09 data submissions revealed the following:

- Rather than basing requirements only on wartime scenarios developed by the Joint Staff, the Army created an alternative method that includes a workload scaling factor (peacetime/wartime workload) to generate estimates of potential core workloads at the system and organic depot levels.

- The Air Force reduced its core requirement between Parts 1 and 2 of the process without explanation. The core submission shows minor workload shortfalls in communications and electronics and dynamic aircraft components, but the Air Force hopes to correct these shortfalls in execution The Air Force has also used alternative methods to compute its shortfalls, which were inconsistent with the method prescribed in DoDI 4151.20.

- The Navy reported workload shortfalls in aircraft component, aircraft engines, ships, and communications and electronics. The Navy cited confusion between systems commands and an inability to obtain funds to establish organic capability.

- The Marine Corps reduced its requirements by a standard factor to adjust for redundancy. According to Marine Corps officials, this reduction was based on unsubstantiated guidance provided by a memorandum many years ago.

CAPABILITIES AND WORKLOADS NOT IDENTIFIED AS CORE

Core requirements and sustaining workloads are portrayed in terms of a commodity work breakdown structure (WBS), such as 1. aircraft, 1.1 airframes, and 1.1.4 fighter/attack, with the requirements and sustaining workloads expressed in DLHs. To arrive at this end state, the military services'

> …starting point is the OSD-promulgated planning guidance, to define the overall DoD force structure required to execute the Joint Chiefs of Staff-developed contingency scenarios. Next, applicable weapons systems are identified, and any systems that are being excluded are documented citing the authority for that exclusion from the core process.[10]

Core or Not?—B-2 Airframe Depot Maintenance: Air Force Vignette

The core statute directs DoD to be capable of repairing all Joint Chiefs of Staff–tasked systems, but the military services have the flexibility to make substantive tradeoffs in putting this seemingly straightforward directive into actual practice. Cost, practicality, feasibility, and timing are some of the considerations that factor into the military's maintenance decisions.

Depot maintenance of the B-2 bomber highlights some of these considerations. In the broadest sense, the Air Force has an organic core capability to work on bomber airframes because B-1 and B-52 depot maintenance is directed to the 76th Maintenance Wing, located at the Oklahoma City ALC; however, all depot-level work on the Air Force's other bomber, the B-2, is performed by a commercial provider.

B-2 airframe depot maintenance is performed by the OEM in a government-owned, contractor-operated facility. The B-2 program originated as a special access program, so transferring this work to core would have meant unpopular choices, such as recreating and buying tooling and equipment (duplicating cost) or extensively training and transferring a government workforce to the government plant location (inefficiency). The scope of work is an important consideration as well. The entire B-2 fleet consists of only 19 aircraft, substantially fewer than the 120 or so B-52s and B-1s in the Air Force's inventory. In this situation, should the Air Force create a specialized public maintenance capability for such a low-density item? It may make sense for the Air Force to appear to be inefficient in the short-term if it has long-term plans to develop an organic capability to work on composite, low observable airframes if it expects to acquire more of those kinds of aircraft in the future.

The unique aspects of a particular item or type of work can uncover gray areas in thinking about core capability and put decision makers in a difficult position. What should a military service do when the physical factors of production (plant and tooling) are owned by the government, but human and intellectual capital (workers and technical data) are not? Although the Air Force may not be meeting the letter of the core law, some judge this arrangement as coming close to its spirit.

Multiple weapon systems are categorized into the appropriate commodity groupings. None of the data submitted to OSD as part of the core process actually identifies core capabilities. The current process asks the military services to determine capability requirements, and then uses workload as a surrogate for capability. In addition, the practice of OSD evaluating core requirements and sustaining workloads at the WBS level permits the use of "like" workloads to satisfy core

[10] DoDI 4151.20, *Depot Maintenance Core Capabilities Determination Process*, January 5, 2007.

capability requirements. The theory is that peacetime work on similar systems would provide the military services with sufficient skilled personnel, facilities and equipment, processes, and technology to allow for a quick transfer to another weapon system in a contingency (see Air Force vignette).The GAO expressed its concern about this practice as far back as October 2001.[11]

The concept of like workloads works at some, but not all, levels; it is clear that not all capabilities are interchangeable. For instance, in the latest core submission to OSD, the Air Force calculates a bomber airframe core capability requirement of just over 223,000 DLHs and projects organic workloads of 571,000 DLHs, which is more than enough to satisfy the core sustainment requirement. The Air Force bomber WBS consists of three different aircraft: B-1s, B-2s, and B-52s. Despite the obvious differences in skills, facilities, and equipment necessary to repair and maintain the B-2's low-observable technologies, there is no projected organic B-2 airframe work. The Air Force is not alone. The GAO has pointed out that the Navy would have a difficult time shifting its workforce from maintaining primarily nuclear ships to the repair of conventional ships.[12]

The military services identify the depot maintenance workloads required to cost effectively satisfy the core capability requirements, again at the commodity level in DLHs. The results are forwarded to OSD, where the requirements and sustaining workloads are consolidated and approved.

As currently constructed and used, core is viewed more as a reporting requirement than a management tool. More than one senior military official stated that considerable attention was paid to the requirements to comply with 10 U.S.C. §2466, the so-called 50/50 requirement, because the results were reported to Congress, and they anticipated adverse actions for failure to comply. In contrast, core requirements received no visibility above OSD.

Distribution of Workload (50/50)

The second statute that affects the provision of depot maintenance is 10 U.S.C. §2466*, Limitations on the performance of depot-level maintenance of materiel.*[13] Unlike core capabilities, the 50/50 statute makes no mention of what "needs" to be accomplished in organic depots, but establishes limits on the amount of depot maintenance funding that may be spent in the private sector.

First codified in 1992, the 50/50 rule currently prohibits the military departments and defense agencies from contracting out to the private sector more than 50 percent of their depot maintenance work (based on the funds appropriated). The value of the work performed at a depot by non-government employees pursuant to a

[11] GAO, *Defense Logistics, Actions Needed to Overcome Capability Gaps in the Public Depot System*, October 2001.

[12] Ibid.

[13] Because of the percentage limitation imposed currently, this statute is commonly referred to as the "50/50 law."

public-private partnership formed under the authority of 10 U.S.C. §2474, *Centers of industrial and technical excellence: designation: public-private partnerships,* may be excluded when applying the percentage limitation.

COMMERCIAL SUPPORT OF DEPOT MAINTENANCE

Consistent with Quadrennial Defense Review guidance, the services have attempted to implement contractor logistics support (CLS) and performance-based logistics (PBL) based on business case analyses. Early applications of PBL uncovered a number of financial and contractual challenges to full implementation within DoD.

Many CLS contracts involve multiple line items associated with repairable parts, maintenance, technical services, and consumable parts. Each line item may be funded by specific appropriations, with limited or no flexibility across the contract. In essence, the DoD is buying a collection of traditional budget elements on a single contract; but, instead of paying for independent outputs, it is purchasing levels of performance at the weapon system level.

PBL strategies are programmed and resourced differently and vary depending on each service's unique approach. Within O&M appropriations, PBL agreements can include funds from various O&M activities, such as depot maintenance, supplies, and depot-level repairables. And, because National Guard and reserve components have individual O&M appropriations, the number of funding areas multiplies when the PBL agreement supports both National Guard or reserve components and the active component. In the execution year, the program manager may need to collect separate funding documents from many resource sponsors to finance the PBL agreements.

Current DoD CLS and PBL requirements determination often resides outside traditional budget shops. In effect, the program manager must finance PBL agreements through several functional activities within various appropriations rather than financing to the weapon system performance level. Consequently, overall visibility of contractor-performed depot maintenance is lacking.

GAO reviewed the implementation of performance-based logistics arrangements for 15 weapon system programs and recommended DoD

- reaffirm its guidance that program offices update their business case analyses following implementation of a PBL arrangement and
- direct program offices to improve their monitoring of PBL arrangements by verifying the reliability of contractor cost and performance data.[14]

[14] GAO, *DOD Needs to Demonstrate That Performance-Based Logistics Contracts Are Achieving Expected Benefits*, Report GAO-05-966, September 2005, p. 12.

A subsequent GAO review evaluated the extent to which DoD has used business case analyses to make PBL decisions and the impact they have on weapon support costs. GAO recommended DoD

- revise DoD's acquisition directive to require development of a business case analysis to support the decision-making process regarding weapon system support alternatives, including PBL;
- revise PBL business case analysis guidance to more clearly define what should be included in a business case analysis and to establish specific criteria and methods for evaluating PBL support arrangements, including evaluation at the subsystem and component levels;
- revise PBL business case analysis guidance to more clearly define when business case analyses should be updated during the weapon system life cycle;
- require that each service revise guidance to implement internal controls to ensure that program offices prepare and update business case analyses that are comprehensive and sound; and
- require program offices to collect and report cost data for PBL arrangements in a consistent, standardized format, with sufficient detail to support traditional cost analysis and effective program management.[15]

ORGANIC SHARES OF DEPOT MAINTENANCE

Table 4-4 displays the organic shares of depot maintenance as reported by OSD to Congress in its annual reports. With the lone exception of the Air Force in 2001, none of the military departments has reported exceeding the statutory limitation in recent fiscal years.

Table 4-4. Organic Shares of Depot Maintenance

Workload distribution	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Department of the Navy									
Total funds	7,935.0	9,699.8	11,405.6	10,126.6	10,890.4	10,558.3	10,426.7	11,389.5	11,903.3
Federal work	4,342.3	5,258.4	6,234.7	5,085.2	5,936.0	6,067.9	5,852.7	6,342.8	6,405.8
Non-federal work non-exempt	3,592.7	4,206.0	5,079.6	4,675.3	4,709.1	4,302.4	4,562.1	5,024.7	5,497.5
Non-federal work exempt	—	235.5	91.3	366.1	245.3	188.0	11.9	22.0	0.0
Public portion	54.7%	54.2%	54.7%	50.2%	54.5%	57.5%	56.1%	55.7%	53.8%
Private portion non-exempt	45.3%	43.4%	44.5%	46.2%	43.2%	40.7%	43.8%	44.1%	46.2%
Private portion exempt		2.4%	0.8%	3.6%	2.3%	1.8%	0.1%	0.2%	0.0%

[15] GAO, *Improved Analysis and Cost Data Needed to Evaluate the Cost-effectiveness of Performance Based Logistics*, Report GAO-09-41, December 2008, p. 54.

Table 4-4. Organic Shares of Depot Maintenance

Workload distribution	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Department of the Army									
Total funds	2,307.2	2,737.4	3,448.0	5,278.4	5,796.1	8,138.0	9,255.6	9,390.3	8,483.3
Federal work	1,205.3	1,357.3	1,932.1	2,902.1	2,907.8	4,388.0	5,139.8	5,166.9	5,125.9
Non-federal work non-exempt	1,101.9	1,304.3	1,272.7	2,376.3	2,860.8	3,750.0	4,115.8	4,223.4	3,355.4
Non-federal work exempt	—	75.8	243.2	0.0	27.6	0.0	0.0	0.0	0.0
Public portion	52.2%	49.6%	56.0%	55.0%	50.2%	53.9%	55.5%	55.0%	60.4%
Private portion non-exempt	47.8%	47.6%	36.9%	45.0%	49.4%	46.1%	44.5%	45.0%	39.6%
Private portion exempt	—	2.8%	7.1%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
Department of the Air Force									
Total funds	6,965.1	8,299.3	9,613.8	9,759.7	9,706.4	10,003.7	10,107.3	10,326.0	11,946.3
Federal work	3,322.3	4,482.4	5,003.8	5,329.2	5,106.2	5,444.2	5,311.0	5,341.9	6,116.2
Non-federal work non-exempt	3,642.7	3,778.9	4,583.3	4,417.2	4,592.0	4,547.1	4,745.9	4,918.2	5,736.9
Non-federal work exempt	—	38.0	26.6	13.3	8.2	12.4	50.5	65.9	113.9
Public portion	47.7%	54.0%	52.0%	54.6%	52.6%	54.4%	52.5%	51.7%	51.2%
Private portion non-exempt	52.3%	45.5%	47.7%	45.3%	47.3%	45.5%	47.0%	47.6%	48.0%
Private portion exempt	—	0.5%	0.3%	0.1%	0.1%	0.1%	0.5%	0.6%	1.0%

Note: Entries, other than percentages, are in millions of then-year dollars.

ACCURACY

DoD has taken several steps to improve the accuracy of the annual 50/50 reports:

- Issued improved guidance and instructions; 11 pages of detailed instructions accompanied OSD's FY08 data call.
- Required a third-party review by military service audit agencies, where possible.
- Emphasized prompt and proper training of military service personnel responsible for developing the annual report.
- Used a 2 percent "trigger" for increased oversight.[16]

[16] If a DoD Component's spending projections show data within 2 percent of the 50 percent limitation on contracting for depot-level maintenance and repair in a fiscal year, it should submit a plan to OSD within 30 days that identifies the actions that will be taken to ensure continued compliance.

Although DoD has taken significant actions to improve the report, some computational accuracy issues still remain. In a most recent audit, the GAO stated,

> …we could not validate compliance due to weaknesses in DoD's financial management systems and the processes used to collect and report 50/50 data. On the basis of our evaluation of selected 50/50 data, DoD's April 2006 report provides an approximation of the depot maintenance funding allocation between the public and private sectors for fiscal year 2005. [17]

The report points out that DoD has had long-standing financial management weaknesses that affect its ability to produce auditable financial information and provide accurate and timely information that management and Congress can use to make informed decisions. In addition, GAO previously reported this issue in its High Risk series of reports.

COMPUTATION ISSUES

Fundamental to accurate 50/50 computations is determining the amount of "…funds made available in a fiscal year…for depot maintenance and repair workload."[18] In previous work, we found that existing budget exhibits failed to identify the same picture presented in the 50/50 report.[19] No existing budget exhibit summarizes total depot maintenance funding; however, some standard exhibits provide partial identification: the OP-32 lists O&M purchases by their use, while OP-30 summarizes O&M appropriations-funded depot maintenance. In addition, no budget exhibit summarizes depot maintenance funded by either procurement or research and development accounts. Depot maintenance can also be financed by the U.S. Transportation Command and the Military Sealift Command using Defense Working Capital Fund authority, but these depot maintenance costs are not identified separately in budget exhibits submitted to Congress. Depot maintenance is occasionally mentioned in narrative justification material submitted to Congress, although it is generally incidental to the program element being described.

Computational issues relating to interim logistics support (ILS) and contractor logistics support arrangements, PBL contracts, inter-service workloads, and modifications contribute to the inaccuracies. As in the example of Trident class submarines cited earlier, 50/50 reporting accuracy is also impacted by the interpretation of the definition of depot maintenance in the determinations of what should be included in the computations.

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[17] GAO, *Depot Maintenance-Actions Needed to Provide More Consistent Funding Allocation Data to Congress*, GAO-07-126, November 2006.

[18] 10 U.S.C. §2466, *Limitations on the performance of depot-level maintenance of materiel*.

[19] LMI, *Future Capability of DoD Maintenance Depots, Interim Report*, Report LG901M1, December 2009, pp. 2-23–2-24.

Because of the nature of ILS, CLS, and PBL contracts (where the contractor is paid for performance or readiness rates), the amount of money expended for depot-level maintenance is not readily identifiable, unless specifically called for in the contract. In those instances, the estimated amounts are determined by the military services through the use of algorithms.[20]

GAO also found a loss of visibility over workloads that were sent by one military service to another for repair, or inter-servicing. The "owning military service" loses visibility, and the GAO found instances in which that workload was later contracted to the private sector.[21]

10 U.S.C. §2460, which provides the legal definition for depot maintenance, exempts the procurement of major modifications or upgrades of weapon systems that are designed to improve program performance or the nuclear refueling of an aircraft carrier. In contrast, OSD guidance for the military services is as follows:

> …Inclusion of the installation of both performance and safety modifications is a matter of DoD policy, since it is difficult to segregate installation costs for safety modifications from installation of other modifications.[22]

Although there was some discussion of changing this long-standing policy within DoD, Congress objected and made its priorities known in report language accompanying the *National Defense Authorization Act for Fiscal Year 2010*. Discussions with DoD officials indicate no changes are contemplated.

The errors noted by GAO in its last audit amounted to approximately one-half of 1 percent of the private-sector share of the Army's depot-level workload. Shortly after the last audit was published in November 2006, Congress, at GAO's request, deleted the requirement for GAO to audit the depot-level workload allocation report. Defense officials believe this action was directly related to the accuracy of the report.

[20] Deputy Under Secretary of Defense for Logistics and Materiel Readiness Memorandum, "Distribution of DoD Depot Maintenance Workloads," November 2, 2007.

[21] Ibid.

[22] Ibid.

In addition, GAO has repeatedly questioned the accuracy of the out-year projections. Its audit of DoD's April 2005 50/50 report stated the following:

> …Reported projections do not represent reasonable estimates of public- and private-sector depot maintenance funding allocations for fiscal years 2005 through 2006 because some data errors and omissions in DoD's prior-year report are carried into the projected years. It is difficult to project out-year data due to factors such as changing depot maintenance requirements, the ongoing consolidation of maintenance facilities, and the trend toward more contractor logistics support for new and existing weapon systems. [23]

DoD has taken the position that accurate projections are extremely difficult due to the changing nature of maintenance, congressional "adds," timing and amounts of supplemental funding, changes in operational schedules, and emergent requirements. Compounding these difficulties are the ongoing wars, which necessitate a dynamic support environment. DoD officials believe the realization of these difficulties were the rationale behind reducing the projection requirement from current year plus four to current year plus one.[24] In addition, the military services are reticent to publically assume approval of yet unpublished supplemental requests.

Within 90 days of the President's budget submission, the Secretary of Defense is required to submit to Congress a report identifying, for each of the military services (other than the U.S. Coast Guard) and each DoD agency, the percentage of funds that was expended during the preceding fiscal year and the percentage projected to be expended during the current and ensuing fiscal year for performance of depot-level maintenance and repair workloads by the public and private sectors.

ACQUISITION AND SUSTAINMENT CONCLUSIONS

An update to current depot maintenance–related legislation could better support depot maintenance capability determination, accountability, and management.

The different military service interpretations of the definition of depot maintenance directly affect the development of core capability requirements and sustaining workloads, as well as the 50/50 calculations. In addition, the definition of depot-level software maintenance is ambiguous.

Core requirements often are not identified early enough in the acquisition process to allow for the establishment of organic core capabilities within the 4 years mandated by DoD policy. This lapse places the burden on the OEM to provide the plant and equipment to perform depot maintenance. Once this has occurred, it is not economical for DoD to establish a duplicate public-sector maintenance capability.

[23] GAO, *Depot Maintenance Persistent Deficiencies Limit Accuracy and Usefulness of DoD's Funding Allocation Data Reported to Congress*, GAO-06-88, November 2005.

[24] Ibid.

With some improvements, the core determination process could be used as a foundation for a powerful business process, used to justify requirements, budgets and the development of new capabilities. At present, core is viewed primarily as a reporting requirement. We identified sufficient shortcomings in the existing core determination process to justify revision.

Because 50/50 data are reported to Congress, the 50/50 rule influences the behavior of the military services. In contrast, core data (which do not leave OSD) reflect growing shortfalls in sustaining core workload.

According to representatives from the military departments, the military services take proactive steps to ensure the 50/50 percentage limitations are not violated; they anticipate adverse actions for failure to comply. Of course, these proactive steps sometimes result in organic workload assignments that are not required to retain a skill base or capability (although they may contribute to efficiency). In contrast, core workload receives limited visibility outside OSD, and the military services view it more as a reporting requirement than a management tool.

All of the depot management personnel we interviewed affirmed the need to maintain a floor, or minimum level of work, for the depots; however, a floor on spending without a tie to the types of work gives credence to the detractors' claim that 50/50 is there only to maintain levels of government employment at the organic maintenance depots.

RECOMMENDATIONS

To correct some of the above shortcomings, we recommend actions to revise the statutory framework for depot maintenance, link acquisition processes with sustainment requirements, and strengthen the core determination process.

Congress and DoD should work together to update, align, and revise the statutory framework for of depot maintenance.

- *Revise the statutory definition of depot maintenance*. Drop exclusions from the statutory definition of depot maintenance. The tendency to combine matters of definition and policy with reporting requirements over time has confused the initial intended linkages, especially for senior managers not routinely involved with depot maintenance. If specific depot maintenance actions are to be excluded for purposes of a specific report, such as 50/50, or from the development of core requirements, then those exceptions/exclusions should be added to the statutes that mandate the reporting requirements.

- *Require better information*. If a tasked weapon system will, by definition, never undergo depot maintenance, DoD should notify Congress no later than exiting Milestone B of the acquisition process. DoD should

also identify and report all current tasked weapon systems that do not undergo depot maintenance.

- *Adopt a comprehensive definition of depot-level software maintenance*. In lieu of the phrase, "the term includes (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair…," DoD should adopt a single, consistent definition, or set of definitions, for use by all military services. The International Organization for Standardization has standard set of definitions[25] that provide a good starting point. For consistency with the private sector, the DoD definition should deviate from the ISO definitions only when absolutely necessary.

DoD should structure the revised core determination process so that it is visible and readily understood. The process should be routinely and consistently applied and, to the extent possible, repeatable. DoD should also develop and publish guidance on how to identify and plan for the establishment of core capability.

- *Designate completion of a strategic core logistics analysis as a specific exit criterion for Milestone A review*. The analysis will identify whether there will be core requirements associated with the item or system being acquired. DoD should then make the identification of core requirements and sustaining workloads an exit criterion for Milestone B. It should further assign a specific review authority to confirm the process was properly applied and completed prior to exit approval.

- *Clarify the meaning of "ready and controlled" as the risk management framework for DoD depot maintenance management.* 10 U.S.C. §2464 currently defines "ready and controlled" as government-owned and -operated (including government personnel and GOGO equipment and facilities). For some systems, this model may not be appropriate or cost-effective. An updated "ready and controlled" risk management framework must support a broader set of industrial base *core* considerations that address depot maintenance provision and management choices in support of contingency requirements.

- *Improve the core capabilities determination process* to

  - address joint systems and systems in acquisition;

  - provide additional guidance on the use of Joint Staff scenarios;

  - ensure the capability to maintain all tasked weapon systems and, in so doing, account for the capacity of all organic depot maintenance providers;

[25] ISO/IEC 14764:2006, *Software Engineering—Software Lifecycle Processes—Maintenance.*

- emphasize facility requirements, funding responsibilities, and necessity to obtain technical data as part of the initial acquisition;
- ensure redundancies are organic only and identify where they exist; and
- identify where like workloads are used to sustain a core requirement and clearly identify them to OSD for a positive understanding of reasonability.

- *Use core capability requirements as a basis for capital investments and baseline maintenance budgets*.
  - Identify core-related capital investments in appropriate accounts, especially the development of new depot capabilities.
  - Mandate the identification of core requirements and sustaining workloads in military service and DoD budget exhibits.

Congress, as part of a revised core determinations process, should mandate the biennial reporting of core requirements and sustaining workloads to include the identification of like workloads, workload shortfalls, and unfunded requirements.

- *Align core and 50/50 in a single statute*. To maintain a meaningful workload floor, the military services should be required to first satisfy organic workloads accounted for in 50/50 reporting with tasked systems only. This practice will ensure only essential and enduring work is assigned to the depots.

- *Require all contracts that include sustainment as part of the statement of work to provide an annual estimate of the amount of funding expended on depot-level maintenance*. The program manager or administrative contracting officer should validate the estimates based on the original business case or "should cost" analysis, and certify reasonableness. This action would increase the accuracy of 50/50 reporting.

Chapter 5
Financial Visibility

Congress, OSD, and the military services lack a shared understanding of the financial resources required to satisfy operational readiness and secure a ready and controlled source of depot maintenance. In this chapter, we present several actions that Congress, OSD, and the military should take to better identify and justify the financial resources needed to generate required depot maintenance outputs and to sustain a viable organic depot infrastructure. We lay out actions that will strengthen both the justification for these resources and the advocacy platform.

BACKGROUND

The *Government Performance Results Act* (GPRA) tasks federal agencies to prepare annual performance plans that cover all program activities set forth in their budgets. These performance plans must include outcome-related goals and objectives for the major functions and operations. Federal agencies must also

- establish goals to define the level of performance to be achieved by a program activity;
- express such goals in objective, quantifiable, and measurable forms;
- describe the operational processes, skills, and technology and the human, capital, information, or other resources required to meet performance goals;
- establish indicators to be used in measuring or assessing the relevant outputs, performance levels, and outcomes of each program activity;
- provide a basis for comparing actual program results with the established performance goals; and
- describe how the measured values will be verified and validated.

The *National Defense Authorization Act for Fiscal Year 2010*, Section 805, *Lifecycle management and product support*, tasked the Secretary of Defense to ensure PSMs are consistently planning, developing, fielding, and managing the product support and sustainment of DoD's major weapon systems (including depot maintenance).

The PSMs have numerous responsibilities, including the following:

- Develop and implement a comprehensive product support strategy for weapon systems.
- Ensure the achievement of desired product support outcomes through the implementation of effective product support strategies (which include depot maintenance).
- Adjust performance requirements and resource allocations across product support integrators and providers to optimize the implementation of product support strategies.
- Periodically review product support arrangements between the product support integrators and providers to ensure those arrangements are consistent with the overall product support strategy.

DoD has not explicitly recognized the attributes and limitations of the governance models[1] currently in use for weapon system sustainment, nor has it identified how the organic depots' contribution to product support performance can be linked to individual product support strategies and materiel readiness outcomes.

As one of many providers, depot managers often consider other critical processes within the larger organic support structure (supply, transportation, systems engineering) as being beyond their control; they do not see themselves as participating partners. Leaders in these other critical areas feel they, too, are limited in their ability to ensure decisions that affect individual product support strategies are consistent with corporate strategies.

Without this alignment to strategy, depot managers cannot set and pursue balanced and shared performance targets to meet the outcomes expected by the operational forces they support. These depot managers are also less likely to be engaged in governance bodies, more likely to focus on output (rather than outcome), and are less likely to be engaged in process improvement or share information with individual PSMs.

The DoD weapon system sustainment community historically has faced difficulty in both communicating its requirements and obtaining the resources required to fully address the near-term and longer-term equipment maintenance required. A partial explanation for this difficulty lays in the way Congress, DoD, and the military service weapon system sustainment communities support these requirements.

Nearly two decades ago, GAO noted that DoD's maintenance expenditure reports were incomplete and inaccurate, and some depot maintenance activities, such as interim contractor support, were not included in reported data. GAO also

[1] A governance model is a generalized depiction of the formal and informal organizations and processes used to manage the achievement of some goal.

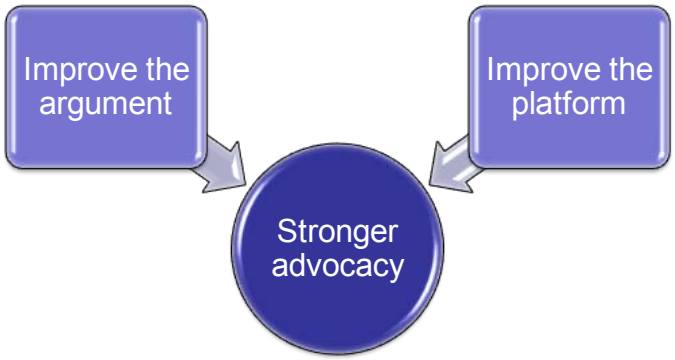
noted inconsistencies in how the military services collected and aggregated data for DoD's report to Congress on the public-private mix for depot-level maintenance.[2]

Our attempts to collect and analyze data about depot programs and funding lead us to the belief that today's financial data reports have not improved significantly. The resources required for maintenance performance are segmented into several independent budget exhibits of various levels of detail or are listed in congressionally directed reports. Current exhibits and oversight reports do little to consistently address connections to either materiel readiness or the viability of a ready and controlled source of depot maintenance. The result is a lack of shared understanding and weakened advocacy. As a consequence, in the competition for resources, depot maintenance fares poorly. DoD depots need a stronger advocate.

DEPOT ADVOCACY

Advocacy is the pursuit of influencing outcomes—in this case public policy and resource allocation decisions. Figure 5-1 presents the two elements where efforts to improve advocacy must occur.

Figure 5-1. Components of Stronger Advocacy



With respect to properly resourcing the depot maintenance portfolio, the elements can be described as follows:

- *An effective argument*—a resourcing strategy that presents and communicates the value of each dollar spent in terms of its effect on required materiel readiness outcomes and the viability of the depots.
- *A platform from which to advocate*—expressed in terms of an informed and aligned community of interest (COI) to be influenced or to act on behalf of the desired influence.

[2] Donna Heivilin, Director, Defense Management and NASA Issues, National Security and International Affairs Division, GAO, written statement, Readiness Subcommittee on Armed Services, U.S. House of Representatives, April 12, 1994.

Strengthening the Argument

In the case of organic depot maintenance, DoD serves as both the consumer and the provider. These two distinct perspectives must be balanced and funded. As a consequence, the process of strengthening the argument for depot maintenance resourcing needs to address both of perspectives.

Two areas are vital to strengthening the advocacy argument:

- *The effect on readiness outcomes*—a clearer connection between total depot requirements and the near- and long-term materiel readiness demands of the combatant commanders.
- *The effect on provider viability*—clearer descriptions of the effect changes in the volume, nature, and importance of operational requirements have on the current and future viability of the depot provider (capabilities, workforce, capital equipment, and investment scheme).

Improving these connections and descriptions—and creating a common framework and terminology—will result in a more consistent understanding among all advocates and strengthen the argument.

Connection between Readiness and Depot Maintenance Requirements

Metrics help managers and stakeholders assess the size, scope, and cost of the current depot process, but the depots continue to focus on production and efficiency goals. The current management structure limits depots to output-based metrics rather than outcome-based metrics. Outcome-based metrics require synchronization of all logistics support elements based upon military service requirements.

For years, DoD senior officials and managers have struggled to identify meaningful logistics metrics (including metrics for depot maintenance) and to implement those metrics consistently across the military services. Objections to the adoption of standard metrics have ranged from operational differences to simple management inertia, even though DoDD 4151.18 states that "…programs shall also establish and evaluate performance metrics that promote continuous improvement in maintenance, ensuring responsiveness and best value to operating forces."[3] In 2007, the *DoD Maintenance Strategic Plan* established a goal to align maintenance operations metrics with operational force outcomes. That plan also stated that "objective and quantifiable metrics are essential to developing weapon system sustainment infrastructure that provides required materiel readiness at least cost."[4]

In accordance with the Joint Capabilities Integration and Development System process, all acquisition category (ACAT) I programs are required to develop a

[3] DoD Directive 4151.18, *Maintenance of Military Materiel*, March 31, 2004, p. 6.

[4] See http://www.acq.osd.mil/log/mpp/plans.html, "DoD Maintenance Strategic Plan," as of September 2010.

sustainment key performance parameter (KPP). "KPPs are those attributes or characteristics that are considered critical or essential to the development of an effective military capability…"[5] The sustainment (or availability) KPP has two components: materiel availability and operational availability.

- Materiel availability is "a measure of the percentage of the total inventory of a system operationally capable (ready for tasking) of performing an assigned mission at a given time, based on materiel condition."[6]

- Operational availability "indicates the percentage of time that a system or group of systems within a unit are operationally capable of performing an assigned mission."[7]

Although not yet required for all levels of equipment, these components of availability are useful for relating the various products of depot maintenance to the specific sustainment elements they support. Moreover, we noted the following:

- Depot maintenance of a weapon system includes the inspection, repair, modification, and overhaul of its end items, including remove-and-replace operations for failed depot-level repairables (DLRs) and engines.

- Resupplying the depot maintenance effort includes the procurement, transportation, maintenance, modification, repair, and overhaul of critical subsystems, including consumable parts, DLRs, and engines.

OSD directed the military services to address depot maintenance requirements (at least those identified in the OP-30) and to perform risk assessments for specific levels of performance within military service–selected capability areas. Examples of those areas include strike-wings, the Marine Expeditionary Force, brigade combat teams, and carrier and carrier airwings.

Depot maintenance outputs are required to ensure an acceptable percentage of the total inventory of a system is operationally capable and in the hands of the user; however, the acceptable percentage depends on the performance level specifically desired within a capability area. For example, the required materiel availability, and depot work required to achieve it, will differ if the desired performance level for carrier strike groups deployed decreases from six to five.[8]

[5] Chairman Joint Chiefs of Staff Manual (CJCSM) 3170.01D, *Manual for the Operation of the Joint Capabilities Integration and Development System*, July 31, 2009, p. B-1.

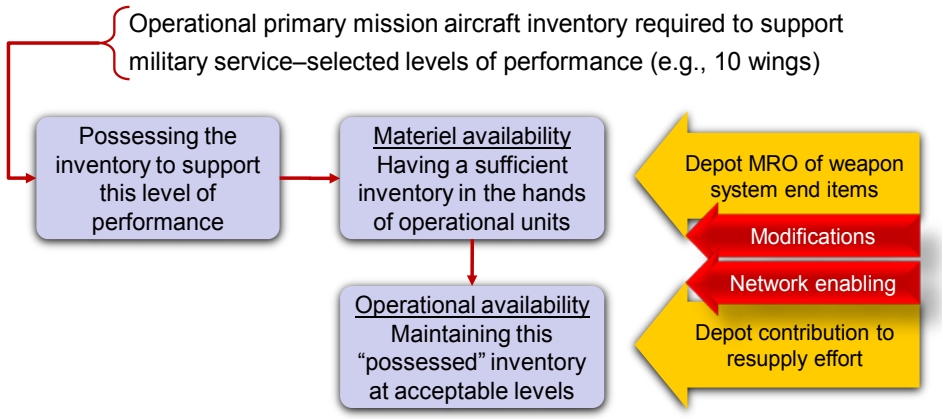
[6] Ibid., CJCSM 3170.01D, p. B-3.

[7] Ibid., CJCSM 3170.01D, p. B-3.

[8] "Performance level" is the number of deployed carrier strike groups; we do not mean to imply that the reduced number of strike groups must somehow accomplish what the formerly greater number of strike groups had been expected to achieve.

Figure 5-2 presents an overview of how the depot maintenance products can be linked to performance in a combatant commander's required capability and the individual components of the availability KPP.

Figure 5-2. Linking Depot Maintenance Products to Operational Performance



This strengthened argument—stating depot requirements in terms of minimum performance acceptable to combatant commanders—can be contrasted to the legacy approach that states requirements in terms of what is required to achieve a long-standing and static mission capability rate.

The depots' contributions to resupply efforts will affect both their own efforts and the operational availability of the inventory within organizational units. The depots performance in the maintenance, modification, repair, and overhaul of critical subsystems, DLRs, and engines determines, in part, the level of non-operational time associated with an "awaiting supply" status. This contribution, the level of performance required of the depots, or their past performance in similar work, do not appear in the OP-30 exhibits (at least not for all military services). As a result, the opportunity to interject this depot-to-availability connection is lost (see Navy vignette for a counter example).

Equipment upgrades and modifications, which are funded primarily through procurement appropriations, represent both depot workload and increased (and presumably required) capability to combatant commanders. In past years, this work has accounted for a minor portion of the revenue for the depots. In many cases, modifications were performed in conjunction with the depot maintenance required to achieve the acceptable level of materiel availability. Again, this contribution, the level of performance required of the depots, and the depots' past performance in similar work, do not appear in all OP-30 exhibits.

Linking Resources to Operational Outcomes: Navy Vignette

The Navy responds to demands for forces by resourcing a strategy that balances current and long-term readiness requirements by considering three elements:

(1) the cost to own—maintaining ships and aircraft to ensure expected service life is met;

(2) the cost to train—producing the proficiency to safely operate ships and aircraft; and

(3) the cost to operate—based on a fleet response plan (FRP) that provides deployed and surge-ready units and battle groups to support combatant commander demands.

In 2001, the Navy moved responsibility for all three elements under one resource sponsor, Fleet Readiness and Logistics (N4). This alignment, which is unique among the military services, allows for the balancing of the costs to train and operate (flying hour and ship operations accounts) with the cost to own (aviation and ship depot accounts). This balance facilitates the optimization of achieving the FRP operational availability schedule for a given year (stated in such terms as the number of carrier strike groups deployed, deployable within 30 days, and deployable within 90 days).

The FRP is an operational framework with four phases: maintenance; basic; integrated; and sustainment. The number of required serviceable ships and airframes is based on meeting the readiness entitlement during each FRP phase.

Readiness models estimate the cost of each FRP phase using pricing factors that are specific to field and depot maintenance actions (flying hours, ship operations, and ship and aviation depot repairs). Combining the readiness output provided by each phase of the FRP with the cost of that phase creates the link between desired readiness output and budget levels. For example, Navy ships and aircraft are capital-intensive forces that, when properly maintained, last for decades and meet their associated expected service life (ESL). The Navy recognizes that scheduled maintenance of these ships and aircraft and the associated training and certification of their crews between deployments are key elements of the costs to own and operate the fleet. Readiness models can accurately reflect the cost to own, train, and operate Navy forces and fleets and to reach ESL of its ships and aircraft.

The depots have a major role to play in delivering weapon systems that fit into today's equivalent of the 1980s' "Big 5."[9] Today's "Big 2" are network connectivity and shared data. Delivering capability in these areas is more than just a *software* fix. It typically involves system engineering, integration, and hardware modification elements coordinated and performed by the depots. Again, much of this contribution is not readily visible.

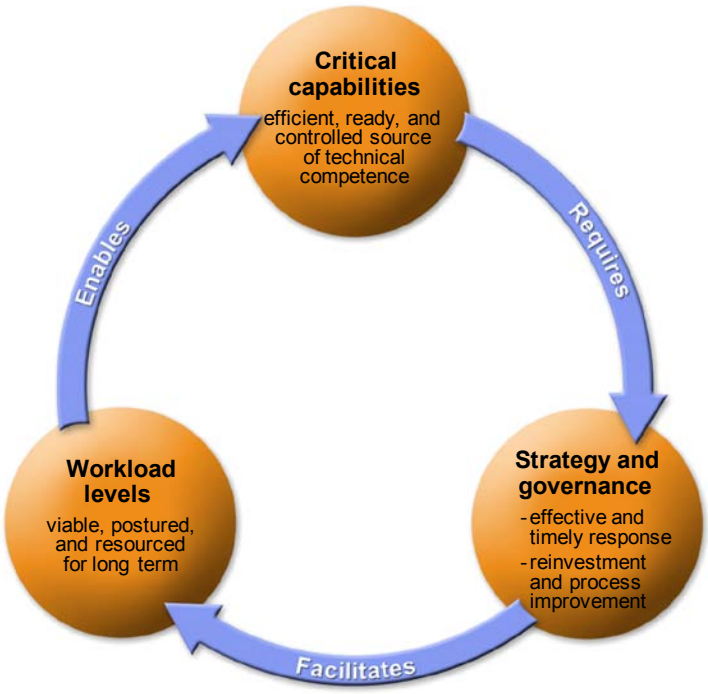
One of the more difficult things to advocate for within the Planning, Programming, Budgeting, and Execution System (PPBES) process is a capability that delivers benefits outside the Future Years Defense Program. Because much of depots' products and services are geared toward ensuring weapon systems achieve their programmed life-cycle; the depots' focus has typically been on the high-priority work needed for the most pressing mission requirements. The lifecycle engineering organizational structures, processes, and apparent effectiveness all vary widely among the military services. DoD needs to develop a more consistent and scientific argument for the longer-term lifecycle impact of its depot functions. DoD also needs to present the risks associated with not resourcing this longer-term effort.

[9] In the 1980s, the Army's "Big 5" acquisition programs were the M1 Abrams tank, M2 Bradley fighting vehicle, Blackhawk and Apache helicopters, and Patriot missile.

CONNECTIONS AMONG CAPABILITIES, STRATEGY, AND WORKLOAD

Congress has provided legislative guidance that focuses on DoD's ability to maintain critical depot capabilities, provide the governance and strategy required to make depots effective and timely, and secure an appropriate level of work to keep the organic depot enterprise relevant and viable for the long term. Figure 5-3 illustrates the interdependence of depot maintenance capabilities; strategy and governance; and workload.

Figure 5-3. Critical Relationships Affecting Depot Maintenance

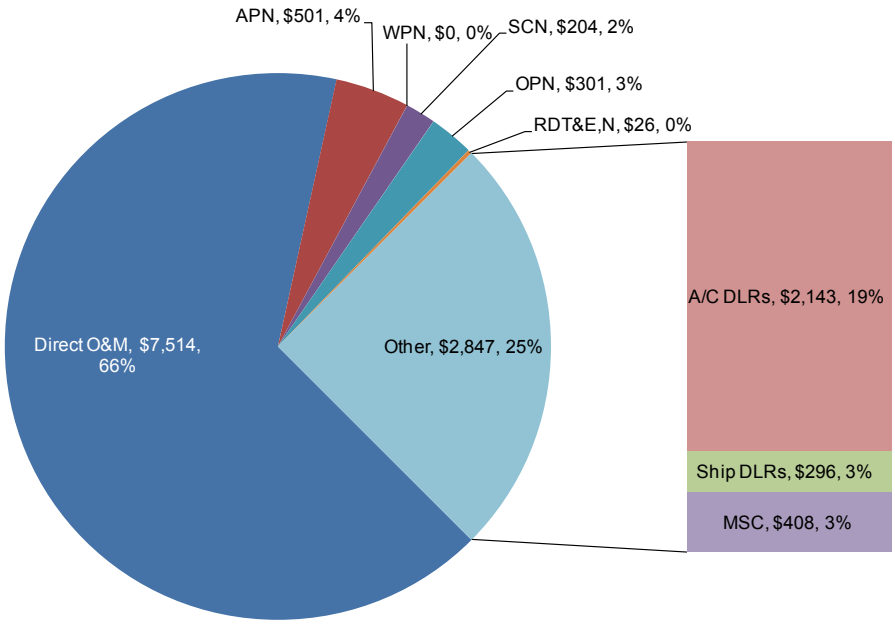


This summary is presented against a backdrop of generally accepted business terms and focus areas because each DoD depot, with the exception of naval shipyards (which are mission-funded), functions as an entity that reports a net operating result (either gain or loss). The linkage among the three key elements in Figure 5-3 is also fundamental to maintenance accomplishment, regardless of the performing sector.

There is no consolidated budget exhibit, budget narrative, financial statement, or presentation across the military services and at OSD that summarizes how these linkages are being achieved or whether achievement is influenced by changes in the volume, nature, or relative importance of consumer demands. In effect, DoD has no consolidated business or operating plan that presents a concise accounting for its $80 billion materiel maintenance enterprise, or the $32 billion depot maintenance subset.

To illustrate, Figure 5-4 presents the results of an analysis of the most recent 50/50 source data provided by the Navy. It shows the many appropriations that serve as the sources depot support. The Operations and Maintenance appropriations listed as "direct" are for products and services purchased directly (e.g., ship overhaul). Those listed as "indirect" are for products and services purchased from the depots by the first-tier supplier in response to demand (in this case, DLRs purchased from the Navy Supply System's supply working capital fund for which repair was later purchased from the depot). The OP-30 submission roughly corresponds to the direct O&M, or 66 percent of the total depot support. The other elements, such as procurement of modifications for equipment and weapons, are resourced by other sponsors and not specifically identified as depot-related.

Figure 5-4. Sources of Depot Maintenance Support



Current year $ in millions

Note: APN = Aircraft Procurement, Navy; WPN = Weapons Procurement, Navy; SCN = Ship Construction, Navy; OPN = Other Procurement, Navy; MSC = Military Sealift Command; RDT&E,N = Research, Development, Test, and Evaluation.

This situation is not unique to the Navy. In fact, determining the Navy's mix was probably the least complex of all the military services because 91 percent of the total is under one resource sponsor, which is not the case for the other military services, where several O&M elements are sponsored outside the traditional logistician domain. In addition, some military services have had a significant portion of their depot maintenance requirement purchased from procurement accounts. In some years (using the Army as an example), procurement-driven funding has exceeded 20 percent.

This simply illustrates the complexity of looking at the contribution of the depots to materiel availability. It also illustrates the influence of the appropriation structure and congressional oversight of that structure. Without question, all of the funds and their individual source appropriations contribute to the demand for products and services (for materiel availability). However, each is reviewed independently by each of the appropriations, and following specified structures within the military services, OSD's Cost Analysis and Program Evaluation, comptroller organizations, and Congress.

Strengthening the Platform

OSD, through its sponsorship of the Maintenance Executive Steering Committee (MESC), a self-chartered group of service and OSD one- and two-star maintenance leaders, created a foundation for more effective advocacy in resourcing DoD's depot maintenance portfolio. However, significant variability in definitions of depot maintenance, terminology, requirements and assessment methods, and financial presentations continues to cloud effective advocacy. As a consequence, DoD needs to create a strategic framework that strengthens advocacy by enabling a consolidated picture that presents the following:

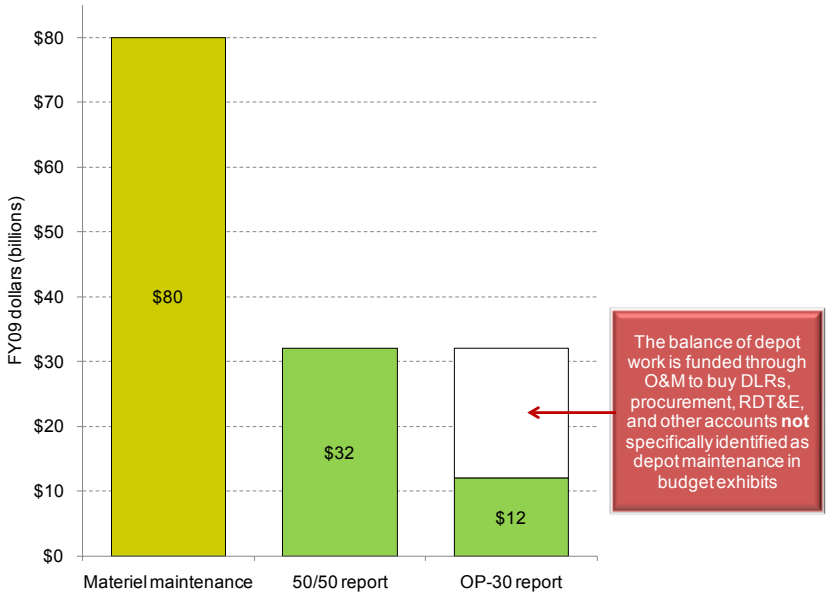
- A clear and complete explanation of all products and services provided (depot-level maintenance is not a product, but a level of maintenance within several product lines. The balance of work on products is accomplished at the field level.)
- Realistic demand or requirement projections that include all of the individual sources of this demand, such as resupply, modifications, and sustaining engineering
- Specific and measurable objectives that consolidate the impact of products and services on materiel availability and readiness
- A rationalization of core capabilities (both capabilities and efficient workloads associated with these capabilities)
- Required assistance or an interface with other organizations or agencies
- Technology requirements or risks
- Identification of issues requiring longer term attention or resolution
- Characterization of risks associated with fluctuations in the volume, nature, relative importance, or technology requirements of future demand
- Identification of risks and solutions regarding core capabilities shortfalls.

Such a framework would strengthen the argument for resourcing or investing in the depots and serve to align the COI with a more shared understanding.

COST OF MAINTENANCE AND COST OF DEPOT MAINTENANCE

Arguably the most detrimental factor to the development of a shared understanding within the COI is the cost of maintenance and, more specifically, the cost of depot maintenance. Differences in accounting, reporting exclusions, and interpretations all contribute to the confusion about what funds are being spent for what outcome. Figure 5-5 shows the FY09 estimates of the total cost of field and depot maintenance, depot expenditures reported in the 50/50 report, and depot funding submitted in the OP-30 O&M budget exhibits. As can be seen, only 38 percent of depot maintenance funding ($12 billion out of $32 billion) can be readily identified in current budget exhibits.

Figure 5-5. Maintenance Cost Estimates: FY09



The resulting confusion of what is included, in which report, and for what military service thwarts a shared understanding within the COI. As we showed in Figure 5-4, even within a particular military service, the resources required for depot maintenance are segmented into several independent budget exhibits or reports. Moreover, the achievement of materiel availability and operational availability standards is the shared responsibility of both field and depot levels of maintenance.

REQUIREMENTS METHODS AND VALIDATION—BEST PRACTICES

The total requirement to accomplish depot maintenance is the summation of demand, or requirements from all of the product lines, including resupply, and sustaining engineering. The strength of the resourcing argument is often directly related to the validity of the processes for predicting future requirements and the associated processes.

The argument is further strengthened by the ability to accurately project risk if the requirements are not accomplished. Requirements determination methods should and do vary by each of the product lines. Predicting DLR demand is different than predicting demand for scheduled equipment overhaul, and clearly different from predicting future war-related reset. As noted previously, the methods being used within the military services vary widely as do their perceived validity. This inconsistency in requirements acceptance detracts from the overall DoD argument for depot maintenance resources.

FINANCIAL FLEXIBILITY

During the program and budget formulation process, the military services have the ability and responsibility to recalculate proposed program funding to ensure they can properly support force levels approved by the Joint Chiefs of Staff and the Secretary of Defense. DoD program and budget guidance rarely includes specific guidance regarding depot maintenance funding.

The flexibility to realign funds is limited once an appropriations bill is passed by Congress and signed by the President. In general, reprogramming in excess of $15 million (cumulative for the year) in or out of an O&M budget activity or special interest item (like depot maintenance) requires the prior approval of Congress. The services may, however, realign funds within a budget activity and line item subactivity group, like O&M depot maintenance.

Congress has expressed concern over this realignment of funds and DoD's use of a "re-baselining" process without the approval of Congress. The House Committee on Appropriations stated:

> While the waging of war certainly has increased the need for flexibility in executing the Departments' resources, the Committee fears that the Department has come to rely on reprogramming and transfer authority in lieu of a thoughtful and deliberate budget formulation and fiscal management process.[10]

The committee report further recommended a provision that

> prohibits the Department from executing any reprogramming or transfer of funds for any purpose other than originally appropriated until the aforementioned[11] report is submitted to the Committees of Appropriations of the Senate and House of Representatives.

[10] *Department of Defense Appropriations Bill, 2008, Report of the Committee on Appropriations* [to accompany H.R. 3222], House Report 110-279, July 30, 2007, p. 10.

[11] Refers to a DD 1414 report that displays the President's budget, adjustments made by Congress, adjustments made due to enacted rescissions, and the fiscal year–enacted level by appropriation and program line item. The DD 1414 constitutes the baseline for reprogramming requests.

We were unable to document any specific instances in which the existing budgetary guidelines precluded a service from making best-value decisions. Of course, there were complaints over the scrutiny and the time required for reprogramming actions.

CONCLUSIONS

Adopting an outcome-oriented approach to weapon system sustainment requires a better understanding of the complex relationships among inputs, outputs, and the organizations that affect the outcomes for materiel readiness. Despite the mandate for performance-based support strategies, many activities within organic depot maintenance continue to operate under an output-based standard of performance. They operate without the following:

- Performance levels with measurable metrics that are set in some type of performance based agreement
- Collection, communication, and use of data to measure performance to plan
- Clear links between outcome-based metrics and financial resources
- Incentives to ensure performance objectives are met and continuously improved.

DoD needs to differentiate the products of depot maintenance and how they contribute to materiel and operational availability. It also needs to capture all of the products and services currently omitted from historical presentations, reporting methods, and forums. It needs to quantify the risks associated with not funding these requirements, including the risks to both near- and long-term materiel availability.

Finally, DoD management must better understand how an outcome-focused strategy could positively influence missions, functions, goals, and tasking statements of individual depot organizations that contribute within a community of providers. This understanding can be achieved, in part, if DoD had a better grasp of how organizations that support multiple weapon system outcomes can balance these demands and track performance to plan.

RECOMMENDATIONS

We recommend the following actions to correct the financial visibility shortcomings of DoD's depots:

- Congress, through DoD, should drive a more complete accounting, requiring an integrated presentation of all products and services being purchased from the depot provider (procurement, modernization, and sustainment elements)—with no exclusions.

- DoD should force a more complete accounting of the contributions of all depot maintenance providers in the performance of the major product lines influencing the elements of materiel availability.

- DoD should initiate action to catalog, verify, validate, and accredit requirements determination methods for each of the major depot product lines being resourced. This effort should identify best practices within the military services in the requirements determination and risk presentation processes.

- DoD should present depot requirements in an operational context, linking inputs to the depots' ability to achieve outputs that meet the combatant commanders' needs. Rather than presenting the core workload requirements in the traditional way (e.g., to maintain engine maintenance core capability, we need to achieve 2,341 DLHs), present the same information but with specifics. For example:

  > To maintain engine maintenance core capability and proficiency on the F100, we need 2,341 DLHs to overhaul ten F100 engines during the fiscal year.

Chapter 6
Improving the Execution of DoD Depot Maintenance

The DoD's organic depot maintenance capability is a significant and vital portion of our military's sustainment infrastructure. In an era of declining resources, it continues to attract comments that its performance could be improved. In this chapter, we discuss ways to improve the *execution* of organic depot maintenance.

Is Organizational Change Needed?

The organic depot maintenance enterprise is large, incorporating 17 major facilities, 77,000 civilian employees, and annual operating expenses in excess of $16 billion. While the depots' performance, in terms of output, is generally satisfactory, there is a persistent question as to whether the overall organizational management structure of these activities is sufficiently flexible, responsive, and cost effective, particularly when considering the anticipated future defense environment and diminishing resource availability.

By law and mission, the military services have the responsibility for planning and executing maintenance programs to meet their operational needs, and to provide the resources to satisfy those requirements. They make the difficult tradeoffs in resource allocation in order to maximize readiness capability and reduce operational risk. OSD prescribes the basic policy-driven direction of the maintenance program. This course is based upon the priorities of the Administration, Congress, and the national security and fiscal environments. Resources are made available through the planning, programming, and budgeting process to support execution of maintenance requirements, while OSD monitors the development and execution of the maintenance program to ensure it follows guidance and policy.

Today, two ad hoc groups at the DoD level facilitate this process: the Maintenance Executive Steering Committee and the Joint Group on Depot Maintenance (JG-DM).[1] The MESC advises the Deputy Assistant Secretary of Defense (Maintenance Policy and Programs) on initiatives for improving the efficiency, effectiveness, and overall performance of worldwide maintenance management and operations. It serves as an informal mechanism for the coordinated review of maintenance policies, systems, programs, and activities, and for jointly planning, monitoring, and evaluating DoD's maintenance program. It also functions as a forum for

[1] See http://www.jdmag.wpafb.af.mil/jgdmcharter.htm, "Charter and Strategic Plan," as of September 2010.

the exchange of information between the Deputy Assistant Secretary of Defense and other officials responsible for the conduct of DoD maintenance operations.

The JG-DM, which is chartered by the Joint Logistics Commanders, provides a joint leadership forum and a corporate perspective for depot maintenance management throughout DoD. Its goal is to ensure DoD's depot maintenance resources, regardless of military service or agency affiliation, are utilized in such a way that they provide the best possible support to the combat forces of the United States. The JG-DM comprises flag-level officers from the military service commands responsible for the depot maintenance function. It is supported by a staff (with representatives from all of the military services) that is organized under the Joint Depot Maintenance Activities Group located at Wright-Patterson Air Force Base in Ohio.

Collectively, OSD, MESC, and JG-DM include all senior executives and flag and general officers responsible for oversight of maintenance within DoD. Although this oversight process appears to work relatively well, OSD and the MESC do not accomplish the task of managing depot maintenance workload execution; nor are they expected to do so. The execution responsibility is accomplished by assigned organizations within the military services.

One central question has been asked periodically since the early 1970s (see Appendix B): Is the current military service–oriented depot organizational structure the most effective and efficient approach for managing DoD's depot maintenance execution in the future? Although the origins of that question have changed over the years, the fundamental goals of those asking the question and seeking an organizational realignment have remained unchanged:

- Optimize use of available depot maintenance capability across all organic depots in peacetime.
- Attain maximum utilization of existing depot capacity and execute expanded capabilities across the depots to meet mobilization and surge requirements.
- Respond consistently to reductions in overall maintenance resource availability.
- Achieve the optimum level of overhead costs relative to total organic costs.
- Minimize unnecessary duplication of systems, facilities, and production capabilities across organizational military service boundaries.
- Achieve the most efficient and effective application of new technologies and modernized automated systems across all depots.

Despite the importance of these goals, they have never been fully addressed, and certainly have not been resolved, in DoD's various organizational deliberations (such as strategic plans, BRAC decisions, or quadrennial defense reviews). Moreover, in the next decade it is highly likely we will see major changes in national security strategies, availability of resources, operational scenarios, and technological challenges that will dictate a fresh look at organizational options to achieve the above goals. The following are among the imperatives that will likely have a direct impact on the future viability of organic maintenance depots:

- *Balancing workload.* The changing resource availability, end-item inventory mix, and reduced OPTEMPOs will have different workload effects for the depots. DoD must posture the entire depot enterprise to meet these challenges consistently and efficiently to preserve the core organic depot industrial base. Conversely, the future depot enterprise should be postured to apply and account for the full range of depot capabilities to meet mobilization and surge requirements in a more balanced, responsive, and consistent manner.

- *Facilitating skills upgrades and technology modernization.* Weapons and equipment modernization or changes in technology may require different training and skill mixes at the depots. The response to these challenges must be consistent and effective across all depots. Implementation of modern computer, software, and information systems must be accelerated significantly with less cost and minimal redundant initiatives.

- *Maintaining a viable organic industrial base.* The DoD maintenance depot enterprise will need to be postured organizationally to respond quickly and effectively to unanticipated requirements, minimize divisive internal competition within depot organizations, maximize the size and capabilities of the organic workforce, and ensure a reputation for the rapid and scalable application of "cutting-edge" technologies.

- *Responding to changing resources.* DoD will likely experience significant resource reductions because of economic pressures and termination or reduction of current conflicts. The depot community must be capable of adjusting to potential resource shortfalls without undue reliance on contingency operations funding.

- *Supporting joint operations and long-term force projection.* Joint operational commanders will require more timely and consistent responses to their maintenance requirements, including single sources for multiple needs of expeditionary forces. Depots must be capable of providing long-term support for overseas in-theater depot sites and on-site multidiscipline teams to meet emerging repair requirements at forward locations.

We believe the question of improving the execution of depot maintenance should be approached from the perspective of whether a new organizational construct

should be established with overall management responsibility for the execution of day-to-day organic maintenance workload across all depots. Other related DoD-wide questions of organizational responsibility pertinent to the development of DoD maintenance policy, planning and computing repair requirements, programming and budgeting for maintenance resources, and the extent of maintenance contracting are important, but peripheral, to this central organizational issue.

CHARACTERISTICS OF EFFECTIVE ORGANIZATIONS FOR MAINTENANCE DEPOTS

Certain characteristics inherent in an effective depot management organization remain constant, regardless of the organizational structure. We discuss two: customer support and up-to-date objectives and process.

Improving Customer Support

In government, and DoD in particular, modifying organizational structures is a common management approach when attempting to improve performance or to reduce costs. Unfortunately, structural changes are often made with little advance knowledge of their effects on organizational effectiveness in terms of improved output, increased quality, or enhanced cost efficiencies. For DoD maintenance depots, the fundamental benchmark for measuring success of any major change, including organizational restructuring, should be the ultimate effect it will have on the support provided by the services to the combatant commanders.

We advocate that all proposed depot management organizational changes be assessed, in large measure, on their effects on the planning, training, and operational needs of customers. DoD policy directs the use of "performance metrics that promote continuous improvement in maintenance, ensuring responsiveness and best value to operating forces." [2] In fact, DoD uses several high-level, lifecycle sustainment outcome metrics for assessing maintenance performance and efficiency. These include materiel availability, materiel reliability, ownership cost, and mean down time. At a minimum, proposed organizational changes should be evaluated, even if only subjectively, on their probable impact on these outcome-oriented measures. If proposed changes do not degrade support to customers, then they could be further evaluated on their contribution to greater efficiency or reduced cost. Organizational changes should also be assessed on their likely contribution to facilitating a future DoD-wide, coordinated effort to accelerate implementation of improved and comprehensive metrics

[2] DoDD 4151.18, *Maintenance of Military Materiel*, March 31, 2004, p. 6.

Upgrading Depot Objectives and Processes

During the past 30 or 40 years, DoD's depot maintenance enterprise has been the subject of numerous proposed integration initiatives. The failure to implement most of these initiatives was based partly on the perception of military service managers and others that loss of direct military service execution control of depot maintenance would degrade the levels of service. There also was a fear that these reorganization proposals would reduce, eliminate, bypass, or otherwise subvert the equally important connectivity of depot maintenance with other key processes, such as acquisition, engineering, and secondary item management. In the past, concerns regarding the possible adverse effect on essential functional interfaces were based on the premise that such interfaces were highly dependent on physical collocation and common command authority for these key, interrelated functions.

Today, the idea of matrix-type organizations and integrated process teaming across organizational lines is universally accepted as both feasible and often desirable. In this context, a further look at opportunities to accomplish greater organizational integration, while fully preserving essential process interfaces, appears warranted. Any such reassessment should be accomplished, at least initially, within certain guidelines:

- Essential individual, processes, systems, and organizational interfaces must be preserved.
- Existing information systems, systems interconnectivity, and data exchanges (including access to data repositories) must be retained and replaced only through capability-enhancing upgrades.
- Required access to competent authority for functional decision making must be maintained.

In general, any organizational realignment of the management of the 17 major maintenance depots should focus on an initial transition of overall management construct or command structure, with internal depot reorganizations and major process changes deferred until the new organizational scheme is in place. When such an overall management structure is operative, the ensuing internal realignments, process reengineering, systems changes and modernizations, and facilities assessments would be more easily achieved.

PRECEDENTS FOR AN INTEGRATED MAINTENANCE ORGANIZATION

Significant initiatives to integrate many of DoD's major business processes have occurred within the past two decades. Some of those initiatives are highlighted in the following subsections.

Defense Finance and Accounting Service

In 1991, the Secretary of Defense created the Defense Finance and Accounting Service (DFAS) to standardize, consolidate, and improve accounting and financial functions throughout DoD. The intent was to reduce the cost of DoD's finance and accounting operations, while strengthening its financial management practices. DFAS pays all DoD military and civilian personnel, retirees, and annuitants, as well as major contractors and vendors. It also supports customers outside DoD through electronic government initiatives, including the Executive Office of the President, Environmental Protection Agency, Department of Energy, Department of Veterans Affairs, Department of Health and Human Services, and Broadcasting Board of Governors. Since its inception, DFAS has consolidated more than 300 installation-level finance offices into 9 central sites and reduced the number of systems in use from 330 to 111. DFAS has steadily reduced its operating costs and returned those savings to its customers in the form of decreased bills and improved service.[3]

Defense Communications Agency

In 1991, the Defense Communications Agency underwent a major reorganization and was renamed the Defense Information Systems Agency (DISA) in recognition of its expanded role implementing DoD's Corporate Information Management initiative. DISA's role in DoD information management has continued to expand. In September 1992, the Deputy Secretary of Defense created the Defense Information Infrastructure (DII) and directed DISA to consolidate and manage the military services' and defense agencies' information processing centers into 15 megacenters. The DII provided a full spectrum of decision-support systems, DoD-wide databases, and a variety of standard applications. At the time DII was created, the Defense Information System Network was also formed from 122 military service and defense agency communications and data networks, offering more efficient support to combatant forces. In 2004, the Secretary of Defense signed a delegation of authority letter, giving the director of DISA command authority for directing the operation and defense of the network operations of the Global Information Grid.[4]

Defense Logistics Agency

As early as 1949, DoD recognized the independent military service approach to support and infrastructure management (an approach that had persisted through the first 175 years of the nation's history) had perpetuated unnecessary redundancies, duplication of effort, and less than optimum support to the operational forces. After World War II, a presidential commission headed by former President Herbert Hoover, recommended centralizing management of common military logistics support and introducing uniform financial management practices. Integrated management of supplies and services began in 1952 with the establishment

[3] See http://www.dfas.mil/about/OurHistory.html, "Our History," September 25, 2010.

[4] See http://www.disa.mil/about/history/index.html, "Our History," as of September 30, 2010.

of a joint Army-Navy-Air Force Support Center to control the identification and cataloging of supply items. In the mid-1950s, commodity manager agencies (i.e., single managers) were established to buy, store, and issue supplies; manage inventories; and forecast requirements. The Army managed food and clothing; the Navy managed medical supplies, petroleum, and industrial parts; and the Air Force managed electronic items. In 1961, the Secretary of Defense ordered the single-manager agencies be consolidated into the Defense Supply Agency, which was later was designated as the Defense Logistics Agency. In 1971, in response to a congressional commission recommendation, all aspects of DoD property disposal were transferred to the Defense Reutilization Marketing Service, which was established as a new DLA component.

Today, DLA accomplishes materiel or supply management for nearly all of DoD's 5.2 million consumable items to meet the military services' and combatant commanders' needs for aviation, land, maritime, and troop support materiel. It sources and provides nearly all consumable items the military forces need to operate, from food, fuel, and energy, to uniforms, medical supplies, and construction and barrier equipment. DLA also supplies about 84 percent of the military services' weapon system and equipment spare parts. Prior to about 1970, this responsibility was fragmented among the military services.

In 1990, DLA was assigned management responsibility for all wholesale distribution centers previously managed by the military services. The Defense Distribution Center now operates 25 distribution facilities in 7 countries and 12 states.[5] In 2005, a BRAC recommendation initiated the consolidation into the DLA Distribution Standard System of approximately $1.3 billion of inventories previously managed by the military services' maintenance depots at 13 collocated sites. This integration is projected to eliminate about $297 million of duplicative maintenance-related inventories,[6] and has facilitated the integration of materiel inventories directly supporting depot work centers.

U.S. Transportation Command

In 1987, President Reagan ordered the Secretary of Defense to establish a Unified Transportation Command. The new command's implementation plan outlined its responsibilities, functions, and organization. Christened the U.S. Transportation Command (USTRANSCOM), its mission was to "provide global air, sea and land transportation to meet national security needs." It had three transportation component commands: the Air Force's Military Airlift Command (replaced by the Air Mobility Command in 1992); the Navy's Military Sealift Command; and the Army's Military Traffic Management Command (renamed Military Surface Deployment and Distribution Command in 2004).

[5] See http://www.dla.mil/ataglance.aspx, "About DLA," September 24, 2010.

[6] LMI, *Independent Assessment of BRAC 2005 Supply, Storage, And Distribution Decision*, Report DL503T3, July 2006, p. iii.

In 1990, based on the extended buildup to the Desert Storm deployment to the Persian Gulf, senior DoD officials concluded that USTRANSCOM and its component commands needed to operate in peacetime as they would in wartime. Consequently, in 1992, the Secretary of Defense gave USTRANSCOM a new charter: "to provide air, land and sea transportation for the Department of Defense both in time of peace and time of war." In 2003, the Secretary of Defense designated the commander of USTRANSCOM as DoD's distribution process owner, and as such to serve "as the single entity to direct and supervise execution of the strategic distribution system" to "improve the overall efficiency and interoperability of distribution related activities—deployment, sustainment, and redeployment support during peace and war." This assignment gave full recognition that a unified, integrated organization could accomplish all of the organizational and process responsibilities needed to provide the highest quality logistics support to the operating forces, and still address the wide range of disparate management requirements of the military services.[7]

POTENTIAL BENEFITS FROM IMPROVED ORGANIZATIONAL INTEGRATION

Although DoD in the past several decades has clearly achieved significant organizational integration for key support functions common to the military services, there has been virtually no change in the overall depot command construct since the last major assessments of DoD's maintenance depot organizational structure in the early 1990s. During this same period, major changes have evolved the defense missions, operating environments, and operational scenarios. All of which have directly affected the depot community.

The future will likely bring even more extreme changes in the external factors affecting the depot enterprise. While some of these changes could be addressed by the existing organizational structure, DoD would be prudent to conduct an updated assessment of the viability of the current structure. Such an assessment could help determine the extent a revised organizational structure would further enable, and possibly accelerate, tangible improvements and benefits to both operational customers and to the day-to-day operations of the depots. These outcomes are essential to ensuring the future viability of the organic depot enterprise.

Balanced Response to Changes in Workload Requirements

Since FY01, depot workload requirements for the Army and Marine Corps have increased substantially, while workload for the Navy and Air Force has remained relatively stable. During this same timeframe, a substantial majority of funding for depot requirements in the Army and Marine Corps has been provided through the

[7] See http://www.transcom.mil/history/history.cfm, "United States Transportation Command: A Short History," April 2005.

OCO funds. In contrast, the Navy and Air Force funded their requirements in the budget baseline.

Military service workload projections, at least for the next 4 to 5 years, show depot workload at or near current levels. These projections may be unrealistic. They are based on a number of factors, such as changes in OPTEMPOs, end-item inventories, and funding availability.

Clearly, workload changes will influence the various military service depots differently. Given the potential implications for readiness, DoD should determine whether the current organizational construct can deal effectively and consistently with the expected changes.

If the existing organizational approach is retained, changes in workload requirements will be addressed in a fragmented way, probably depot by depot. Maintaining the current organic depot capability in terms of technical expertise, capacity, and even the number of personnel and facilities would be difficult, if not impossible. If the military services respond to significant workload requirements and resource reductions on an individual depot basis, it is difficult to envision just how DoD could expect to retain credible, properly sized core capabilities. Conversely, adoption of a more integrated organizational structure could provide greater opportunity to adjust and rebalance changing workloads and resources in a more comprehensive and orderly manner; thus, preserving a viable depot enterprise.

Improved Capacity Utilization

Capacity utilization is closely related to workload management. Excess capacity usually results from reductions in workload, whether expected or unexpected. As we have seen, both the Army and Marine Corps may experience some capacity under-utilization within the next 5 years. The Navy and Air Force could also see lower capacity utilization, but probably not to the same degree. The principal organizational question regarding low capacity utilization should focus on whether to address this problem by depot, by commodity, by military service, or across the entire depot enterprise.

Any assessment of the need for greater integration of organic depot management in the future should address the question of which organizational structure could best deal with capacity under-utilization. DoD cannot deal with under-utilized organic capacity while continuing to increase the outsourcing of depot workload. Efforts to transition more contract workload back to the depots may be appropriate, but they should be pursued across the enterprise, rather than by depot or by military service. Nonetheless, the first step is to ensure opportunities to match workload with capacity are fully explored across all organic depots.

Enhanced Workforce Utilization

In both day-to-day production and support of long-range or contingency operations, the organic depots require a diversified workforce with numerous job series (skills). Meeting these needs requires a depot maintenance workforce that has the flexibility to adjust rapidly to changing funding levels and operational requirements. This flexibility includes accommodating changes in required skills, employee retirement and attrition levels, and new processes and technologies.

To meet recent wartime requirements, the Army and Marine Corps have relied on contract and temporary workers to meet the surge in depot workload. Conversely, few contractor or temporary workers were needed to accomplish the relatively stable workload at Navy and Air Force depots. Cross-organizational support occurs primarily within military service boundaries because each depot continues to manage and utilize its workforce largely within the context of its requirements and resources. Any assessment of alternate organizational structures should include a review of potential opportunities to facilitate improved workforce utilization across military service boundaries (including intermediate and theater echelons) in keeping with the changing scope of depot operations.

Improved Resource Management

Across the military services, issues of data availability and accuracy are compounded by different interpretations of the elements in depot maintenance funding; different organizational funding responsibilities; multiple accounting methods and categories of funding; and divergent methods of program and budget calculation and presentation in budget exhibits, reports, and oversight documentation. Even within a particular military service, the resources required for the integrated management of maintenance performance and expenditures are segmented into several independent and sometimes confusing budget categories, accounting systems, exhibits, and reports. Furthermore, it is not possible to compare the costs of performing similar workloads across the military services.

Logistics functions, including depot maintenance, should be evaluated based on their direct contribution to the planning, training, and operational needs of customers. Performance data should be readily available so the contribution of each element of the maintenance process can be related to the same readiness objectives and operating costs of the weapon system, equipment, and personnel of the combatant system, as defined by the joint combatant commander.

The current fragmented approach to programming and budgeting does not lend itself to a corporate defense of the organic depot enterprise, which could lead to a “survival-of-the-fittest” atmosphere. Under these circumstances, continuation of a dynamic, properly sized, and viable core depot capability would be highly unlikely. The vulnerability caused by even greater migration of organic workload to contract sources could also lead to the military services’ inability to maintain the legally mandated 50/50 ratio of organic to private-sector sources.

Keeping this ratio in place through artificially contrived allocation of resources would further dilute the desirability and capability of the organic depots.

OBJECTIONS TO FURTHER INTEGRATION

All past proposals for greater integration of depot management across the military services have raised several opposing arguments. The military services have not readily supported organizational change they perceive could reduce their control over organizations, processes, and resources. Although past issues have taken a number of forms, any future initiative to move toward further integration of the execution of depot maintenance must clearly address previously raised objections. Those objections are summarized below:

- A single manager organization would not be responsive to unique military service requirements.
- Further organizational integration would be detrimental to the military services' weapon system management concepts.
- A single integrated manager would disconnect the relationships among the military services' depots, their acquisition program managers, and the design and engineering communities.
- Further integration would add another layer of bureaucracy.
- Greater integration would not result in immediate savings.

ALTERNATIVE ORGANIZATIONAL OPTIONS

Although there are many variations for organizational integration, we discuss five of the most prevalent options below.

Enhanced Status Quo

With an enhanced status quo, each military service would continue to own and operate its maintenance depots consistent with current doctrine and assigned missions. A more empowered "corporate board" built on the existing MESC could help mitigate the long-term lack of significant progress in addressing issues that cause inefficiencies in depot maintenance management, such as workload imbalances, capacity under-utilization, duplication of effort and expenditures, and lack of consistent, reliable, and useable corporate management information. Of course, significant progress under a corporate board arrangement could be achieved only if such an entity was assigned commensurate directive authority, permanent staff support, and related funding control to enforce needed changes. In DoD, such authority would not normally be given to a "board" organization because those organizations are considered "advisory" and do not necessarily operate as part of an established chain of command.

Commodity Executive Agents

The Secretary of Defense could designate a single manager (either a military department or subordinate organization) to be responsible for the management of specified commodities or common service activities across the DoD enterprise. Normally, a structure based on the division of maintenance responsibilities along the lines of air, ground, sea, communications and electronics, missiles, or other categories would serve as the basis for a commodity-oriented organizational structure. Such an organization was proposed in the 1990 Defense Management Review and again in a 1993 briefing by the Director, J-4, Joint Staff, as part of a larger plan to develop a single joint logistics command.[8] While this organizational structure would ensure movement toward greater integration, it would not include a mechanism to fully address the problems of corporate planning, workload imbalances, capacity utilization, and duplication of effort and resources for system modernization, technology insertion, and funding allocation across the depot enterprise.

From the military services' perspective, this option has not been acceptable because the commodity breakouts were not "clean" across commodity lines, such as fixed and rotary wing aircraft, communications and electronic equipment, and missiles. Under the 1993 proposal, the commodity-oriented structure was a hybrid of separate commodity organizations reporting to a single depot maintenance command, thus maintaining the integration with unique military service organizational connectivity and providing an overarching management authority to address depot issues enterprise-wide.

Commercial Management of Maintenance

One or more contractors could assume personnel, production, and facility maintenance responsibility for DoD's depots. This option could call for one overall contractor, or depots could be contracted separately by commodity groups, such as aircraft or ships. This option would need to overcome several statutory, regulatory, and policy provisions that address the use of contractors and the allocation of maintenance workload between the public and private sectors. For example, DoDD 4151.1 originally directed the military services to plan for not more than 70 percent of their gross mission-essential depot maintenance workload to be conducted in organic depots to ensure a private-sector industrial base. In 1992, 10 U.S.C. §2466 prohibited the military departments and defense agencies from contracting out more than 40 percent of their depot maintenance work to the private sector. In 1997, the limitation was increased to 50 percent.[9] Today, slightly more than 50 percent of the depot workload is accomplished by organic depots.

During the past several years, DoD has been pressured to expand its outsourcing of depot workload. In 1995, the DoD Commission on Roles and Missions of the Armed Services recommended moving to a depot maintenance system that relied

[8] Director, J-4, Joint Staff, "Logistics Alternatives Briefing," April 30, 1993.

[9] *National Defense Authorization Act for Fiscal Year 1998*, November 18, 1997.

principally on the private sector.[10] Although DoD did not accept the commission's recommendation, the option of contracting with private-sector firms to operate organic depots remains a possibility. This option could help resolve some of the workload, capacity use, information systems modernization, and resource imbalance issues associated with the current structure. At the same time, it could contribute to a degradation of organizational responsiveness and flexibility. In addition, it would further abrogate the long-standing mandate of Congress to maintain a core logistics capability that is government-owned and -operated to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to mobilizations, national defense contingency situations, and other emergency requirements.[11] In recent conflicts, this core depot capability has proven essential to the effective support of military operations. Previously, we suggested improvements to strengthen use of the existing core methodology. We believe this strategy, rather than opting for greater use of contract maintenance, would be a more productive and viable way of improving depot management.

Public Corporation

A public corporation could be created to oversee, operate, and staff DoD's maintenance depots. A public corporation is an entity established by Congress to perform a public purpose, provide a market-oriented service, and produce revenues to meet or approximate its expenditures. Interest in the government corporation form of organization and related concepts stems from a "work better, cost less" doctrine that evolved in the 1990s. Examples of government corporations include the National Railroad Passenger Corporation (Amtrak) and the Tennessee Valley Authority. The Defense Commissary Agency, although technically not a public corporation, has adopted many of the performance-based business practices of such an organization.

The potential advantages of a public corporation include the ability to introduce elements of private-sector management into government operations to gain efficiencies, while maintaining control over key industrial capabilities for national defense.[12]

We believe the close relationship of the maintenance depots to the operational customer equates to a greater need to continue the depots direct participation in support of combat needs. Sometimes these operational requirements significantly override the call for greater efficiencies of managing workload, capacity, and resources. And, since maintenance depots rely solely on revenues from appropriated sources, the legal restrictions linked to public corporation funding may prohibit

[10] John P. White, chairman, DoD Commission on the Roles and Missions of the Armed Services, Directions for Defense, Report of the Commission, May 1995, p. 3-6.

[11] 10 U.S.C. §2464.

[12] For additional discussion of public corporations in a DoD setting, see Michael Hix, et al, *Rethinking Governance of the Army's Arsenals and Ammunition Plants,* RAND: Santa Monica, CA, 2003, and LMI, *Applying the Government Corporation and Other Organizational Concepts to DoD's Defense Working Capital Fund,* DR901T1, May 1999.

the application of this organizational approach to organic depots. Although the depots clearly could glean important lessons from well-run corporations, the public corporation construct may not be a good fit, particularly in cases of mobilization, surge, and extended theater support operations.

Agency or Command Organization

The military services' current depot maintenance structure could be consolidated into a single agency or command organization. The distinction between an agency and a command construct would relate primarily to chain of command and the role of the organization in operational deployments. Defense agencies report to one of the principal staff assistants within OSD; a depot maintenance agency would report to the Assistant Secretary of Defense for Logistics and Materiel Readiness. Unified combat commands report to the Secretary of Defense through the Chairman of the Joint Chiefs of Staff. Agencies are normally responsible for non-deployable activities, although they may be designated as combat support activities with some responsibility to support theater or overseas operations. In contrast, commands focus on accomplishing in-theater military operations or other deployable activities, such as disaster relief.

Under this option, the agency or command would own and operate the organic depots with all of the associated management responsibilities. Most resources for this organization would be drawn from existing military service logistics headquarters accomplishing depot planning, source selection, depot workload allocation, industrial fund management, and oversight of depot maintenance execution. These functions would be consolidated in a single organization, which would enable consistent strategic planning for maintenance operations and consolidated workload and resource allocation across all depots. This option would also minimize duplicate capabilities and facilities, promote optimum resource usage, reduce overhead functions, establish common integrated information system requirements, prescribe efficient technology assessment and insertion, and adopt more standard management accounting practices. In keeping with their 10 U.S.C responsibilities, the military services would retain responsibility for developing maintenance requirements in conjunction with operational activities. They also would continue planning, programming, and budgeting for appropriated maintenance resources. The integrated depot organization would develop and manage corresponding industrial fund resources for the execution of depot operation.

CONCLUSIONS

Between now and 2015, DoD's organic depot maintenance system will face substantial workload reductions as a result of reduced operations, anticipated changes in inventory, and expected funding pressures. Although the military services have addressed various parts of sustaining a controlled and ready source of maintenance in an environment of uncertain resources, those efforts will not result in the fundamental, system-wide change so often expected.

The ability of the military services to resolve long-standing issues in the management of maintenance depots has been significantly inhibited by DoD's fragmented organizational structure for depot management. In this environment, the depots continue to produce required output successfully in spite of the organizational disconnects. Further, the depots' transitions from peacetime to wartime support during the last decade consistently exhibited turbulence; nothing happened according to plan and efforts were improvised on the go. While these circumstances cannot be attributed entirely to organizational fragmentation, it is clear that, across the military services, the current organizational structure lacks sufficient management prerogatives, incentives, process controls, and performance tracking mechanisms.

The current structure further hinders performance by the total depot enterprise, effective resource allocation for the full depot workload, and timely accomplishment of major innovations across organizational and functional lines. Under these circumstances, maintenance managers at all levels continue to search for meaningful strategic visions, executable plans, cross-functional alternatives, consistent performance measures, and successful change catalysts. A full and comprehensive reassessment of the current depot management organizational structure is overdue.

We strongly support the premise that reorganization by itself will not produce near-term, order-of-magnitude improvements in performance or resource savings; however, an innovative organizational approach, effectively implemented, could facilitate, accelerate, and institutionalize these needed changes over the long run.

Despite the precedents for increased organizational integration in other DoD support areas, the military services have consistently opposed a similar realignment for their maintenance depots. Over the past 40 years various organizations have proposed a range of organic depot maintenance management consolidation options; none has been implemented. Based on this history, we conclude that OSD cannot implement change of this magnitude on its own.

If Congress and DoD decide to investigate the need for greater organizational integration, we believe getting it right will require a complete and independent assessment of options and a well-crafted implementation process. Such a process requires both leadership commitment and a fully justified and documented plan for determination of the best organizational option.[13] If an option is selected, a comprehensive, incremental implementation plan will be essential to successful

[13] The current climate for change in DoD appears to be conducive to a serious reexamination of the organizational construct for the management of DoD maintenance depots. On September 28, 2010, the Deputy Secretary of Defense testified before the House Armed Services Committee that "…the Department is aggressively seeking new opportunities for streamlining and restructuring of DoD organizations." The Deputy Secretary focused specifically on the need to examine all proposals, regardless of source, to achieve major efficiencies. Improved integration of the execution of organic depot maintenance is not a new idea, but its persistence, despite strong opposition, suggests there is merit in pursuing a more efficient organizational approach to running the organic maintenance industrial base. Such an effort could permit the total organic depot enterprise to survive and thrive intact in the future as an essential element of the nation's combat support capability.

accomplishment. The creation and maturation of a successful integrated organization will likewise require a significant amount of time and sustained effort.

The tactical recommendations in this report should improve various aspects of depot maintenance performance; but, without a definitive expression of commitment to an organic base from both Congress and DoD, these recommendation and the longer-term strategic integration of depot maintenance execution will be hobbled, just like so many attempts that have gone before. Therefore, Congress and DoD must make a strong, concerted commitment to an enduring and effective organic depot capability to ensure the existence of a ready and controlled source of weapon system maintenance.

RECOMMENDATIONS

To give full credibility and commitment to an assessment of management integration options for maintenance depots, Congress should establish an independent commission to accomplish a complete and intensive review of the organizational options presented in this report, as well as other variations or additions. The chairperson should have sufficient reputation and experience to lend prestige and credibility to the commission's recommendations. Membership should be structured in a manner that enables effective and unbiased consideration of the key issues and options.

The commission should be supported by staff resources as determined by the chairperson. The product of the commission should be a final report to the Secretary of Defense with recommendations for the future organizational structure for management of DoD maintenance depots.

If the proposed commission recommends an organizational change, then it should provide an implementation strategy with a realistic timeline that prescribes general steps for implementation of the alternate organizational construct. If the Secretary of Defense accepts the proposed alternative organizational option, then DoD should quickly develop comprehensive implementation planning.

If the depot maintenance stakeholders perceive the idea of a commission as a BRAC effort or too susceptible to political pressure, then Congress should direct a focused series of facilitated forums. These forums should include all relevant stakeholders, including congressional and service staffs, the Joint Staff, and OSD, along with appropriate commercial entities and affected labor unions. The discussions should be designed to enable a careful crafting of solutions for an integrated management of the DoD's organic industrial base.

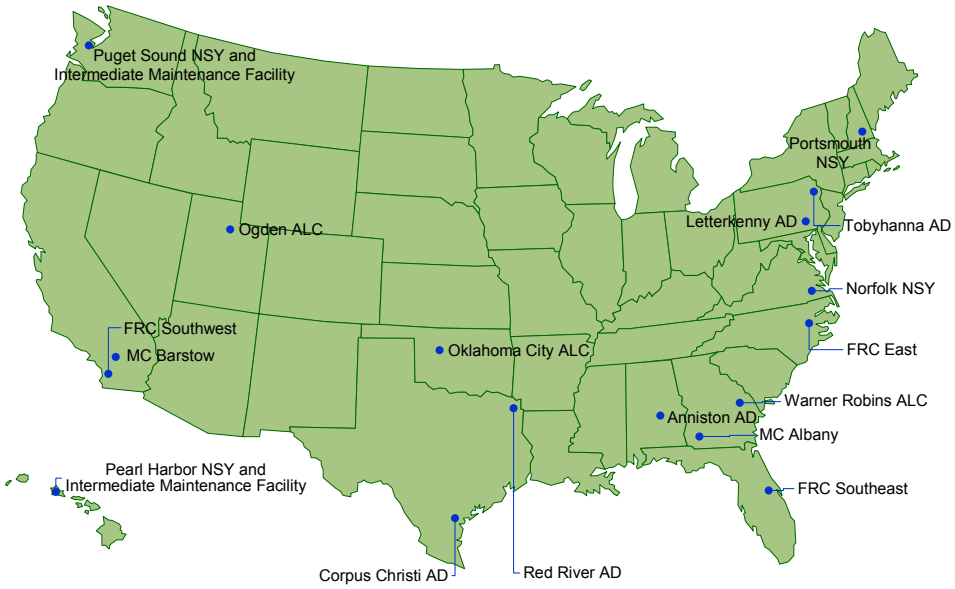
Appendix A
Major Organic Depots

ORGANIC DEPOT MAINTENANCE

In keeping with the statutory responsibility to equip their forces, each military service operates two or more major organic maintenance depots to perform depot-level maintenance and associated activities for its primary weapon systems and equipment.[1]

As of September 10, 2001, and after the depot closings recommended by several rounds of Base Closure and Realignments, five Army depots (ADs), two Marine Corps maintenances centers (MCs), four naval shipyards (NSYs), three Navy fleet readiness centers (FRCs), and three Air Force air logistics centers (ALCs) constitute the sum of DoD's major organic depot maintenance universe (see Figure A-1).

Figure A-1. DoD Organic Major Depot Maintenance Activities



Note: Each of these activities is designated a center of industrial and technical excellence (CITE) within its core competencies.

[1] DoD traditionally considers depot maintenance activities as "major" if they employ 400 or more personnel and perform depot-level maintenance.

MISSIONS OF THE ORGANIC MAINTENANCE DEPOTS

Army Depots

The Army's five major organic maintenance depots operate under the authority of the U.S. Army Materiel Command. These maintenance installations also fall under the direct command and control of one of three lifecycle management commands, and each depot is aligned in accordance with its mission.

- Anniston AD, Anniston, Alabama—Combat vehicles, artillery systems, bridge systems, small arms, and secondary components
- Corpus Christi AD, Corpus Christi, Texas—Helicopters and associated components
- Letterkenny AD, Chambersburg, Pennsylvania—Tactical missiles and ammunition, related ground support and radar equipment, and HMMWVs
- Red River AD, Texarkana, Texas—Light tracked combat vehicles, tactical wheeled vehicles, electronic systems, missile systems, towed and self-propelled artillery, and support equipment
- Tobyhanna AD, Tobyhanna, Pennsylvania—Communications-electronics systems, avionics, related equipment, and missile guidance systems.

See Table A-1 for the direct labor hours expended at each of the five major organic Army depots during the period FY01–09.

Table A-1. Direct Labor Hours at Five Army Depots

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
ANAD	2,698,444	2,833,756	3,266,604	3,993,034	4,978,926	5,747,678	6,605,000	6,887,000	5,786,600
CCAD	2,847,098	3,154,563	3,202,633	3,801,079	3,824,778	4,282,773	4,724,000	5,471,000	5,426,200
LEAD	870,000	946,000	1,227,000	1,537,000	2,266,000	2,559,000	2,795,000	3,175,000	3,754,000
RRAD	951,788	1,339,262	1,282,165	1,785,062	2,788,353	2,294,888	4,394,000	7,597,000	6,941,000
TYAD	3,190,925	3,522,503	3,830,597	4,301,569	5,937,257	7,419,997	5,510,000	6,723,000	6,260,000
Army total	10,558,255	11,796,084	12,808,999	15,417,744	19,795,314	22,304,336	24,028,000	29,853,000	28,167,800

Source: 322 data call and LMI research.

Marine Corps Maintenance Centers

The two Marine Corps maintenance centers (MCs) operate under the authority of Marine Corps Logistics Command. Depot maintenance requirements for Marine Corps aircraft are supported by the Navy.

- MC Albany, Albany, Georgia—Combat and combat support systems (to include amphibious), combat and tactical vehicles, automotive and construction equipment, ordnance and weapons, general purpose equipment, and communications and electronics equipment
- MC Barstow, Barstow, California—Combat and combat support systems (to include amphibious), combat and tactical vehicles, automotive and construction equipment, ordnance and weapons, general purpose equipment, and communications and electronics equipment.

See Table A-2 for the direct labor hours expended at the two Marine Corps maintenance centers during the period FY01–09.

Table A-2. Direct Labor Hours at Two Marine Corps Maintenance Centers

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
MCA	905,000	849,300	939,065	1,276,333	2,005,765	2,292,466	2,469,619	2,815,965	3,231,212
MCB	1,073,000	966,000	860,835	1,050,692	1,224,813	1,346,341	1,437,643	1,624,844	2,286,447
Marine Corps total	1,978,000	1,815,300	1,799,900	2,327,025	3,230,578	3,638,807	3,907,262	4,440,809	5,517,659

Source: 322 data call and LMI research.

Navy Shipyards and Fleet Readiness Centers

The Commander, Fleet Forces Command, and the Commander, Pacific Fleet, as budget submitting officers, "own" the shipyards. The Naval Sea Systems Command (NAVSEA) operates the shipyards and has technical authority for ship maintenance operations. For aviation, the Commander, Fleet Readiness Command (COMFRC),[2] is aligned to the fleet through his or her subordinate relationships with the Commander, Naval Air Forces (CNAF), and Commander, Naval Air Systems Command (NAVAIR). Operationally, COMFRC responds to warfighter requirements through CNAF; technical authority for maintenance resides with NAVAIR.

[2] The 2005 BRAC decisions required the establishment of fleet readiness centers (FRCs), which integrated the former naval air depots (NADEPs) and the continental United States (CONUS) aircraft intermediate maintenance detachments (AIMDs) into a single organization.

NAVAL SHIPYARDS

- Norfolk NSY, Portsmouth, Virginia—Nuclear refueling and defueling, surface combatants, large deck ships, nuclear submarines, and craft
- Pearl Harbor NSY, Pearl Harbor, Hawaii—Nuclear refueling and defueling, nuclear submarines, surface combatants, and watercraft
- Portsmouth NSY, Kittery, Maine—Nuclear refueling and defueling, nuclear submarines, and deep submergence vehicle maintenance
- Puget Sound NSY, Bremerton, Washington—Nuclear refueling and defueling, nuclear submarines (including inactivations), large deck ships, surface combatants, and ship recycling.

See Table A-3 for the direct labor hours expended at the four naval shipyards during the period FY01–09.

Table A-3. Direct Labor Hours at Four Navy Shipyards

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
NNSY	8,538,912	9,802,008	9,651,401	11,170,161	10,297,697	10,524,468	10,671,187	10,557,677	9,293,264
PHNSY	3,133,423	3,236,367	3,404,844	3,839,709	4,102,141	4,147,089	3,642,995	3,912,728	3,715,940
PNSY	3,996,888	4,501,096	4,613,616	5,124,184	5,343,368	5,228,152	5,286,280	5,336,744	5,423,552
PSNSY	10,577,584	12,263,184	11,625,736	13,488,776	11,877,663	12,469,623	11,700,694	11,338,089	11,445,831
NAVSEA total	26,246,807	29,802,655	29,295,597	33,622,830	31,620,869	32,369,332	31,301,156	31,145,238	29,878,587

Source: 322 data call.

FLEET READINESS CENTERS

- FRC East, Cherry Point, North Carolina—Marine Corps and Navy aircraft, jet and turbofan vectored engines, auxiliary power units, propeller systems, and related components
- FRC Southeast, Jacksonville, Florida—Airframes, propulsion, avionics, surveillance, countermeasure systems and associated components, and engineering and manufacturing services associated with aircraft maintenance, repair, and overhaul
- FRC Southwest, San Diego, California—Navy and Marine Corps fixed and rotary wing airframes, propulsion systems, avionics, command and control equipment, early warning and airborne battle management systems, and associated components.

See Table A-4 for the direct labor hours expended at the three Navy FRCs during the period FY01–09.

Table A-4. Direct Labor Hours at Three Navy Fleet Readiness Centers

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
FRC East	3,606,764	3,979,490	4,216,222	3,831,931	4,242,846	3,894,163	3,971,112	3,665,866	3,649,158
FRC SE	3,663,188	4,466,290	4,343,831	3,761,859	4,146,619	3,792,980	3,696,653	4,373,280	3,787,317
FRC SW	4,019,284	4,484,308	4,068,096	3,724,476	4,387,231	3,907,882	4,197,010	4,283,162	4,258,789
NAVAIR total	11,289,236	12,930,088	12,628,149	11,318,266	12,776,696	11,595,025	11,864,775	12,322,308	11,695,264

Source: 322 data call.

Air Force Air Logistics Centers

Air Force Materiel Command has authority over the three air logistics centers. Depot maintenance is performed by the maintenance wing located at each ALC.

- Ogden ALC, Hill AFB, Utah—Combat aircraft, aircraft landing gear, wheels and brakes, composite repair, rocket motors, air munitions, guided bombs, avionics systems, various instruments and electrical accessories, hydraulic and pneudraulic systems, special purpose vehicles, shelters, radome communications systems, gas turbine engines, secondary power support equipment, and other related components (The Aerospace Maintenance and Regeneration Group, which aligned under Ogden Air Logistics Center in 2007, performs maintenance and regeneration.)

- Oklahoma City ALC, Tinker AFB, Oklahoma—Bombers, surveillance and tanker aircraft, aircraft engines, cruise missile engines, hydraulic and pneudraulic systems, pneumatics, oxygen- and other gas-generating equipment, instruments, offensive avionics systems, flight controllers, and aircraft- and engine-related reparable items

- Warner Robins ALC, Robins AFB, Georgia—Major aircraft, airlift systems and helicopters, hydraulic and pneudraulic systems, pneumatics, oxygen- and other gas-generating equipment, instruments and displays, avionics systems, and aircraft-related reparable items.

See Table A-5 for the direct labor hours expended at the three Air Force ALCs during the period FY01–09.

Table A-5. Direct Labor Hours at Three Air Force Air Logistics Centers

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
OO-ALC	5,456,463	5,456,463	6,070,994	6,863,857	7,537,553	7,024,977	7,171,371	7,546,949	7,829,000
OC-ALC	7,210,525	7,092,043	8,430,241	7,419,312	7,018,209	7,295,013	6,900,745	6,512,783	6,933,000
WR-ALC	6,828,803	7,022,182	7,313,956	7,293,482	7,291,938	6,943,765	7,780,854	7,588,423	8,309,000
Air Force total	19,495,791	19,570,688	21,815,191	21,576,651	21,847,700	21,263,755	21,852,970	21,648,155	23,071,000

Source: 322 data call.

Appendix B
Past Recommendations for Depot Maintenance Consolidations

1970—*The Blue Ribbon Defense Panel's Report to the President* recommended logistical services be consolidated and assigned to a unified logistics command.

1973—GAO, *Potential for Greater Consolidation of Maintenance Workloads in the Military Services*, recommended formulation of a consolidation plan and consideration of either establishing a defense-level agency or a single manager.

1975–1978—GAO, multiple reports, called for single managers of weapon system depot maintenance.

1978—GAO, *Aircraft Depot Maintenance: A Single Manager Is Needed to Stop Waste*, recommended establishing a single manager.

1981—Deputy Secretary of Defense tasked the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics to undertake a 90-day review to determine desirability of a single manager for aeronautical depot maintenance, reviewed status quo, and a single manager.

1982—Joint Logistics Commanders, *Depot Maintenance Interservice Program Combat Vehicle Study,* recommended consolidation of combat vehicle depot maintenance in two locations: Marine Corps depot in Barstow, California, and Anniston Army Depot, Alabama.

1983—*Grace Commission Report* recommended consolidation of depot maintenance functions and uniform cost accounting systems.

1986—*The Defense Select Consolidations Act of 1986* required the Secretary of Defense to designate a single manager for administration of depot-level maintenance facilities; proposed bill failed in committee.

1989—Defense Management Resource Decision 908/909 recommended the consolidation of Army, Navy, and Air Force aviation depot maintenance organizations under the Air Force; consolidation of all ship and watercraft depot maintenance organizations under the Navy; and consolidation of all other non-aircraft depot maintenance under the Army. No action was taken on this proposal.

1990—Following Defense Management Review Report *Maintenance Depot Consolidation Study*, Deputy Secretary of Defense issued a policy for strengthening depot maintenance activities that directed the Assistant Secretary of Defense for Production and Logistics to oversee a Defense Depot Maintenance Council; no single managers were assigned.

1992−1993—Joint Chiefs of Staff (JCS) directed the conduct of the Depot Maintenance Consolidation Study, which reviewed existing depot organizational structure, provided alternatives, and recommended the establishment of a unified command for depot maintenance under the authority of the JCS. No action was taken.

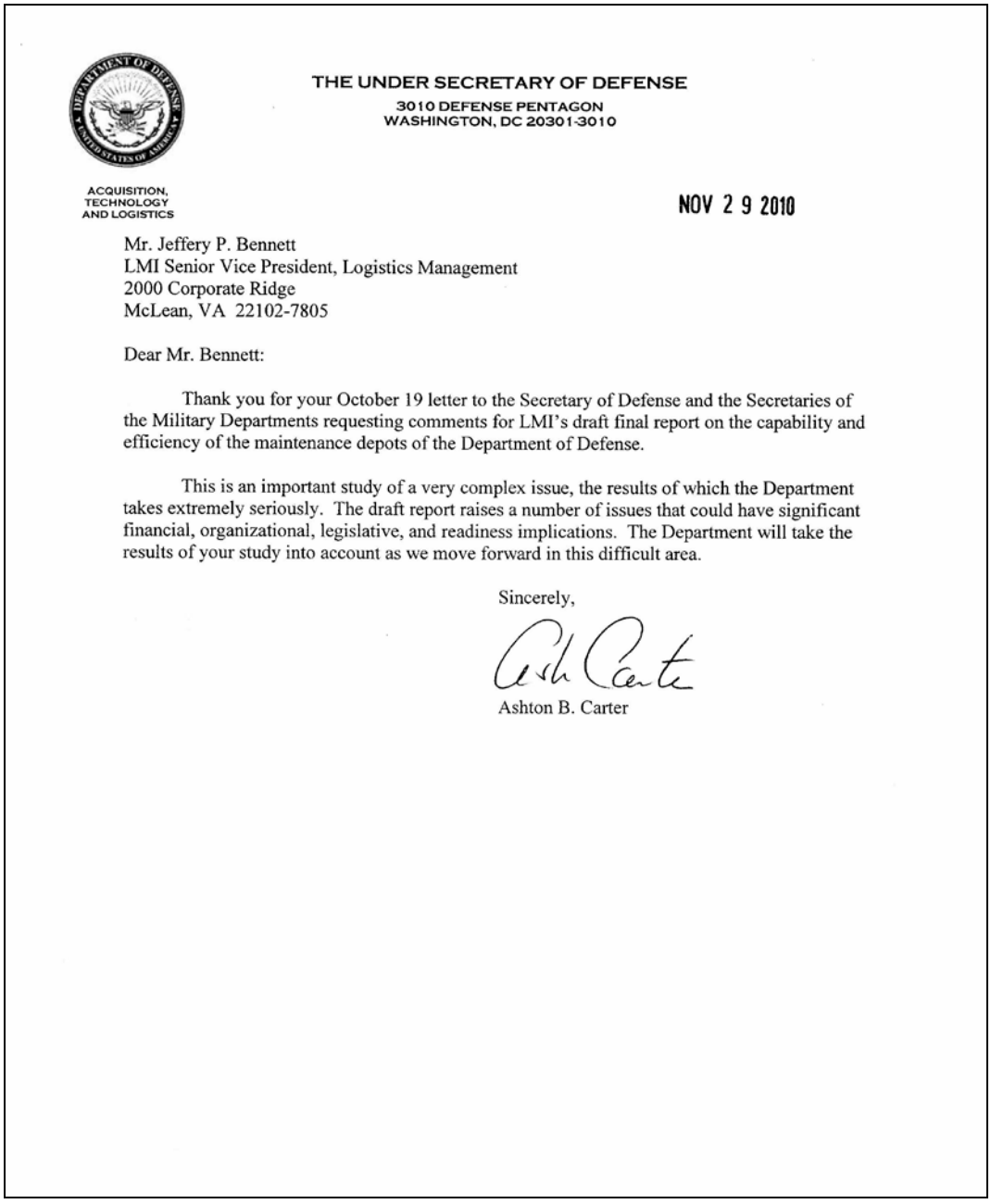
1993—JCS (J-4) proposed the establishment of a joint logistics command, consolidating military service and DLA depot operations into a single joint command.

1995—DoD Quadrennial Defense Review Logistics Working Group prepared position papers proposing both a central logistics command and a depot maintenance command. Neither position was addressed in the final report.

2005—BRAC 2005 recommendations submitted to the Secretary of Defense included concept papers for a Defense Maintenance Agency or Command. Command structure of a similar concept also briefed and discussed in the Industrial Joint Cross Service Group. Informal response from the Secretary of Defense: did not want to establish a new organization while eliminating existing facilities. No further action taken.

Appendix C
Comments Provided by the Office of the Secretary of Defense

The following comments were provided by the Office of the Secretary of Defense.



THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION, TECHNOLOGY AND LOGISTICS

NOV 2 9 2010

Mr. Jeffery P. Bennett
LMI Senior Vice President, Logistics Management
2000 Corporate Ridge
McLean, VA 22102-7805

Dear Mr. Bennett:

Thank you for your October 19 letter to the Secretary of Defense and the Secretaries of the Military Departments requesting comments for LMI's draft final report on the capability and efficiency of the maintenance depots of the Department of Defense.

This is an important study of a very complex issue, the results of which the Department takes extremely seriously. The draft report raises a number of issues that could have significant financial, organizational, legislative, and readiness implications. The Department will take the results of your study into account as we move forward in this difficult area.

Sincerely,

Ashton B. Carter

Appendix D
Abbreviations

10 U.S.C.	Title 10, United States Code
ACAT	acquisition category
ALC	air logistics center
ANAD	Anniston Army Depot
AVCRAD	aviation classification and repair depot
BOG	boots on the ground
BRAC	Base Closure and Realignment Commission
CCAD	Corpus Christi Army Depot
CITE	center of industrial and technical excellence
CJCSM	Chairman of the Joint Chiefs of Staff manual
CLS	contractor logistics support
COI	community of interest
CONUS	continental United States
DFAS	Defense Finance and Accounting Service
DII	Defense Information Infrastructure
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DLH	direct labor hour
DLR	depot-level reparable
DMDC	Defense Manpower Data Center
DoDI	Department of Defense instruction
ESC	Electronic Systems Center
ESL	expected service life
F/A	fighter/attack aircraft
FRC	fleet readiness center
FRCE	Fleet Readiness Center East
FRCSE	Fleet Readiness Center Southeast
FRCSW	Fleet Readiness Center Southwest

FRP	fleet response plan
GAO	Government Accountability Office
GOCO	government-owned, contractor-operated
GOGO	government-owned, government-operated
GPRA	*Government Performance Results Act*
ILS	interim logistics support
IOC	initial operational capability
ISO	International Organization for Standardization
JG-DM	Joint Group on Depot Maintenance
JSF	Joint Strike Fighter
KPP	key performance parameter
LEAD	Letterkenny Army Depot
MCA	Maintenance Center Albany
MCB	Maintenance Center Barstow
MDA	Milestone Decision Authority
MESC	Maintenance Executive Steering Committee
MRAP	mine-resistant, ambush-protected
NATO	North Atlantic Treaty Organization
NSY	naval shipyard
O&M	operations and maintenance
OCO	overseas contingency operations
OEF	Operation Enduring Freedom
OEM	original equipment manufacturer
OIF	Operation Iraqi Freedom
OP-30	Operations and Maintenance, Depot Maintenance Program, budget exhibit
OPTEMPO	operations tempo
OSD	Office of the Secretary of Defense
PBL	performance-based logistics
PM	program manager
PPBES	Planning, Programming, Budgeting, and Execution System
PSM	product support manager
RDT&E	research, development, test, and evaluation

RRAD	Red River Army Depot
TACOM	U.S. Army TACOM Life-Cycle Management Command
TPE	theater-provided equipment
TRF	Trident refit facility
TYAD	Tobyhanna Army Depot
UAS	unmanned aerial system
UIC	unit identification code
USCENTCOM	U.S. Central Command
USTRANSCOM	U.S. Transportation Command
WA	Washington
WBS	work breakdown structure

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Avdellas, Nicholas J; Author
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LMI
2000 Corporate Ridge
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Assistant Deputy Under
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14. ABSTRACT
As the nation moves away from its current war footing, the high levels of organic depot maintenance activity will not be sustained. Potential reductions in the overall defense budget, and a likely elimination or reduction in war-supplemental funding could further reduce depot activity. Several challenges complicate the organic depots' ability to respond to an uncertain future: an ambiguous statutory framework for depot maintenance, acquisition decisions that could be better connected to considerations of the organic depot system, an inconsistent application of the core determination process that could destabilize future capability, and oversight reporting that does not provide timely warning of eroding capability or workload. We recommend several tactical changes to ameliorate the challenges facing the organic depots, including a revision of the statutory framework of depot maintenance, a linking of acquisition and sustainment policies and outcomes with regard to depot maintenance, the strengthening of the core determination process, and an improvement in depot maintenance reporting. While these tactical fixes will be beneficial, they get the depots only so far. The existence of multiple semiautonomous management structures makes it difficult, if not impossible, to address the depots' challenges uniformly and efficiently. With a definitive expression of support from Congress and DoD, tactical and strategic improvements have a much greater chance of success.

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organic depot maintenance; DoD organic maintenance depots; core; 50/50; acquisition/sustainment

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