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**Improving DoD  
Teamwork and Efficiency by  
Maximizing Depot Maintenance  
Interservicing**

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## ABSTRACT

**Title: Improving DoD Teamwork and Efficiency by Maximizing Depot Maintenance Interservicing**

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The DoD is currently placing heavy emphasis on privatizing organic depot maintenance activities. While privatization promises to provide effective depot maintenance support at lower costs for non-core work, I believe the DoD could also achieve major benefits by increasing the amount of Core depot functions that are interserviced. Interservicing also provides effective support at substantially reduced costs through the benefits of greater efficiencies of scale possible through consolidation of similar work. Additionally, interservicing fosters the teamwork and interdependence needed to improve our ability to operate effectively in today's increasingly joint environment. Yet depot maintenance interservicing has not achieved its potential.

This paper describes the advantages of depot maintenance interservicing and advocates maximizing interservicing to enhance teamwork and improve efficiency throughout DoD. It tracks the slow growth of depot interservicing during the 80s and identifies the key role of the Defense Depot Maintenance Council (DDMC) in fostering interservicing. This paper then reviews the many recent studies recommending expanding interservicing and concludes by identifying workload categories which offer major opportunities for improved efficiency through interservicing.

It's our joint responsibility to ensure such opportunities are not missed. This paper shows how the DoD can achieve major savings in depot maintenance support and continue streamlining our depot infrastructure by maximizing interservicing. By doing so we can improve our probability of success in the challenging defense environment of the future.

# **Improving DoD Teamwork and Efficiency by Maximizing Depot Maintenance Interservicing**

*"The current depot management structure in DoD and the Services has not resulted in substantial competition, interservicing, reduction of capacity or duplication of effort". . . "Elimination of unnecessary capacity and duplication has the potential for substantially reducing long-term costs. . . A rough estimate ranges from a low of two to a high of nine billion dollars over the next ten years."*

JCS Consolidation Study Group -- November, 1992

## **Introduction**

Despite the current DoD emphasis focusing almost exclusively on outsourcing depot maintenance functions, I believe significant economic benefits are also possible by consolidating similar Core depot activities through depot maintenance interservicing. While outsourcing depot work promises to reduce the cost of some depot support activities, outsourcing will be limited by the requirement to maintain a Core capability to support mission critical systems in DoD depots. Therefore, the manner in which organic depot services are provided within DoD will continue to affect the overall cost of these important functions.

This paper addresses the important role interservicing can play in minimizing the cost of organic depot maintenance operations. It also recognizes the side benefit interservicing offers of significantly improving the sense of teamwork and interdependence between the Services. Maximizing interservicing can eliminate outdated Service "stovepipe" mindsets regarding how depot maintenance services should be provided. Such mindsets previously dictated that each Service should act independently in providing depot maintenance support for its operational forces. It has become clear over time that such thinking is counterproductive and detracts from our nation's ability to operate jointly and efficiently. Therefore, I believe it would be unwise for the administration, Congress and DoD to concentrate the majority of senior management attention on issues of privatization to the detriment of the many potential benefits possible from expanded depot maintenance interservicing.

In DoD the term depot maintenance interservicing is used to describe the practice of one Service providing support for the weapon systems or components of another. This paper describes the advantages of depot maintenance interservicing and advocates maximizing this practice to enhance DoD teamwork and improve efficiency. In doing so this paper tracks the general status of interservicing during the decades of the 80s and 90s, and identifies the key role of the Defense Depot Maintenance Council in fostering increased interservicing. It also describes the nature of depot maintenance capabilities and quantifies future organic depot maintenance workload projections. Finally this paper reviews several recent attempts at the national level to study and expand interservicing and concludes by identifying several large depot maintenance workload categories which offer major opportunities for improved efficiency through interservicing.

## **Understanding Interservicing**

**Defining the Concept:** The practice of depot maintenance interservicing has gradually become more common during the last 20 years as the DoD established procedures encouraging interservicing. As a result the Services increasingly came to recognize that their maintenance requirements can often be satisfied most efficiently via interservicing.

Interservicing is efficient and effective because depot maintenance requirements are often very similar among the Services. This similarity results because military equipment often share common features in design and function. Examples include various types of fighter and attack aircraft, helicopters, tanks, combat and tactical vehicles, and ground radar and communication systems used by the different branches. In some cases exactly the same basic weapon systems are operated by more than one Service. For example, from the 60s to the early 90s F-4 aircraft were flown by the Navy, Marines, and Air Force. Likewise, M1 tanks and M2 Bradley fighting vehicles are currently operated by both the Army and Marine Corps. In cases like these most aspects of the basic depot maintenance requirements for these systems are identical.

Even when there are substantial differences between weapon systems, very similar subsystem components are often involved. Examples include engines, hydraulic pumps and actuators, gear drives, generators, power supplies and other electronic equipment, to name only a few. Such

situations occur because many times one manufacturer produces different systems based on common components, or different manufacturers select "off the shelf" from relatively standardized subsystem components for similar applications. In any of these cases, similar equipment will usually require common depot maintenance support capabilities including workforce skills, facilities and equipment.

Details of specific interservicing arrangements are formalized in Depot Maintenance Interservice Support Agreements (DMISAs) which are contract-like documents detailing the cost, schedule and quality performance of each particular interservice agreement. DMISAs usually remain in effect for five years and are renewable as long as the parties to the agreement are satisfied with the support provided by the existing agreement.

Historically the Military Departments established independent depot maintenance capabilities for their own systems. However, now they are beginning to recognize that common support capabilities can usually be provided more efficiently by a single Service through interservicing.

**Benefits of Interservicing:** Efficiency is usually improved whenever similar depot maintenance capabilities are consolidated so that they are supported from a single depot. Facilities, equipment and repair / manufacturing processes needed to support modern depot maintenance operations are very costly to establish and usually require significant maintenance themselves. Therefore, much greater efficiency can be achieved by eliminating redundant overhaul and test facilities, and duplicate maintenance equipment at different locations.

Likewise, most depot maintenance production personnel require extensive training and experience to establish the skills needed to perform their specialized tasks. Greater workforce efficiency can usually be achieved when relatively larger pools of direct workers are assembled to perform related tasks. This efficiency results because larger personnel pools allow managers greater flexibility in transferring resources between tasks to accommodate naturally occurring workload variations. Additionally, depot maintenance activities require substantial overhead support personnel to be effective. These support functions include product and industrial engineers, planners, schedulers, materiel support personnel and maintenance managers. Usually fewer overhead personnel are required to perform these functions after consolidation. This reduction results in

additional savings. For all these reasons, interservicing is normally beneficial to all participants because it produces effective depot maintenance support at substantially lower costs.

**An Interservicing Example:** DoD helicopters provide perhaps the best example of successful interservicing. All our Services operate helicopters requiring routine depot maintenance. However, due to consolidation of helicopter depot maintenance in the 70s and 80s, only the Navy and Army currently operate helicopter depots. The Marine Corps and Air Force rely exclusively on interservicing with the Army and Navy for their helicopter depot maintenance support. Helicopter interservicing involves the full range of depot support including overhaul and modifications to the airframes, engines, dynamic drive components, and all helicopter subsystem components. Helicopter interservicing has proven very successful during the past two decades and all parties seem well satisfied with the results.

Although helicopters provide a good current example of successful interservicing today, large scale interservicing of entire commodity groups is actually the exception rather than the rule. The practice of Services relying on each other for depot support has been difficult to establish and is not yet fully mature. While OSD led the drive to increase interservicing, progress has been slow and painful. Additionally, the characteristics of some weapon systems makes them impractical to interservice.

**Workloads Exempt from Interservicing:** Both the Air Force and the Navy have several depot workloads that are simply not subject to interservicing because of their unique nature.

Only the Air Force operates depots with the facilities needed to effectively support large airframe structures (C-5s, C-141s, B-52s, all versions of the C/KC-135 and E-3 fleet) and Intercontinental Ballistic Missiles (Minuteman and Peacekeeper systems). Likewise, only the Navy operates shipyard facilities to support surface ships and submarines. As a result, a substantial portion of the total organic depot maintenance workload simply can not be interserviced.

Analysis of FY94 projections of these workloads for FY99 revealed that the Air Force large aircraft Core workload (a later section outlines the Core concept) was over 5,175,000 hours<sup>1</sup> and ICBM Core work was over 725,000 hours.<sup>2</sup> Together these workloads comprise approximately 22 percent of the total USAF Core depot maintenance requirement. Likewise within the Navy, ship and submarine shipyard Core work was projected to require almost 22,250,000 hours.<sup>3</sup> This equals about 54 percent of the Navy's total projected depot workload in FY99.

## **History of Interservicing:**

**OSD's Attempts to Increase Interservicing:** Recognizing the economic benefits of interservicing, predecessors of the current Deputy Under Secretary of Defense for Logistics (DUSD-L) have for several years led the DoD in advocating increased interservicing. Despite OSD's emphasis throughout the 80s, depot maintenance interservicing increased only slightly. However, in 1984 a formal structure to foster interservicing was established. At that time the Joint Depot Maintenance Analysis Group (JDMAG) was established at Gentile Station, Dayton, Ohio under the control of the Assistant Secretary of Defense for Production and Logistics. The interservicing structure consisted of the JDMAG organization which was specifically chartered to oversee all activities that would enhance interservicing. Accordingly, JDMAG hosted regular meetings of the Services' Materiel Command logistics directors. The purpose of these meetings was to establish formal interservicing procedures and identify interservicing opportunities that could increase the efficiency of depot support. These meetings stimulated dialog between the Services and culminated in formal interservicing agreements. This structure also included a working level group known as the Depot Maintenance Interservicing Working Group who met monthly to develop and refine formal interservicing processes and coordinate interservicing activities.

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<sup>1</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 1c1 (Airframes - Tanker/Bomber/Transports) and 1c2 (Airframes - Command and Control), FY99 projected Core Workload

<sup>2</sup> Ibid, Commodity Group 4a (Missiles - Strategic)

<sup>3</sup> Ibid, Commodity Group 11A (Sea Systems - Ships)

These JDMAG-hosted activities and interservicing procedures were primarily focused on new weapon systems components that were being fielded as a result of weapon system acquisition programs or planned modifications to existing weapon systems. In practice little attention was placed on the components of weapon systems that were already fielded and for which organic depot maintenance capabilities were already established.

During the 80s interservicing gradually rose to about four percent of the total value of organic depot maintenance and then stabilized at that level. Although formal interservicing processes had been adopted, these processes did not always succeed. Many of the procedures were time consuming to implement and subject to relatively easy circumvention by the Services and their weapon system acquisition managers. Additionally, as previously noted, these processes were primarily focused on new weapon system components and largely ignored redundancies that already existing within and between the Services' depots.

This meant that as new weapon systems were acquired, their components and subcomponent parts were researched by all the Services using joint procedures. For example, depot maintenance support responsibilities for new A-10 components that already had an established depot maintenance capability were assigned to that depot. Since the A-10's TF34 engine was common to existing Navy aircraft already in the field, depot maintenance responsibility for this major A-10 component was assigned to the Navy's TF34 engine depot rather than having the Air Force invest the millions of dollars that otherwise would have been required to establish this same capability.

However, components of weapon system that were already fielded were not formally evaluated for consolidation. T56 turboprop engines provide one of many examples of such previously fielded components. These engines are common to both the Air Force and Navy C-130 airlift fleets and the Navy P-3 Orion. Because these types of components were ignored by the Services, JDMAG and OSD, interservicing eventually stalled at about four percent of the total value of the organic depot workload. Many additional interservicing opportunities that could have improved DoD efficiency by eliminating these types of redundancies in depot capabilities were not addressed.

**Services' Resistance to Substantial Interservicing:** During the 80s the Services seemed to share a mindset that regarded interservicing with ambivalence. The 80s was the period of the Reagan military build up when budgets grew rapidly for most military programs, including depot operations and support. In this period the Services focused on expanding both their operational capabilities and the capabilities of their depots. They were not motivated by funding constraints to find ways to squeeze the most possible efficiency from their depot budgets. Therefore they didn't pursue steps to eliminate redundant capabilities. The Services didn't recognize that they were about to win the cold war or that their future funding situation would degrade rapidly in the next decade because of that success.

Historically, each Service had fought hard to retain total control over its own depot workloads. The Services traditionally practiced depot maintenance independence and were reluctant to rely on each other for direct support for their war fighting equipment. They jealously guarded their own capability to support fielded and developing weapon systems despite the success and economic advantages derived from some large interservice support programs such helicopters. As a result, the Services sought to continue maximizing direct control over their depot maintenance operations.

### **The Defense Depot Maintenance Council (DDMC):**

The DDMC is the primary body capable of substantially increasing depot maintenance interservicing. This council was established by direction of the DEPSECDEF in his 30 Jun 90 memo implementing Defense Management Report Decision (DMRD) 908, *Consolidating Depot Maintenance*.<sup>4</sup> Chaired by the DUSD (L), this council includes the Commanding General of the Army Materiel Command; Commander of the Naval Air Systems Command; Marine Corps Deputy Chief of Staff for Installations and Logistics; Commander of the Air Force Materiel Command, and the US Army and Air Force Deputy Chiefs of Staff for Logistics.<sup>5</sup> By their key positions over the Services' logistics

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<sup>4</sup> Deputy Secretary of Defense memo: *Strengthening Depot Maintenance Activities*, 30 Jun 90, pg. 3

<sup>5</sup> DoD 5128.32, *Defense Depot Maintenance Council [Charter]*, 7 Nov 90, as amended by Change 2 (10 Mar, 94)

infrastructures, these are the DoD officials capable of making and implementing interservicing decisions. The charter of the DDMC states:

- “The Defense Depot Maintenance Council (DDMC) Members shall:*
- a. Develop and submit depot maintenance issues for consideration by the DDMC.*
  - b. Conduct studies and analyses of depot maintenance operations as requested by the Chair.*
  - c. Make recommendations to the DUSD (L) on worldwide hardware and software depot maintenance systems and programs.*
  - d. Review and advise the DUSD (L) on near-term and long-range plans for reducing the cost of depot maintenance operations and for improving the management of maintenance information.*
  - e. Periodically review and advise the DUSD (L) on progress made by the Military Departments in implementing the plans for increasing efficiency and reducing the costs of depot maintenance operations approved by the DUSD (L).”<sup>6</sup>*

This charter empowers the DDMC to make and implement decisions that capitalize on the potential benefits of increased depot interservicing. In fact, the last member responsibility (para e. above) relates directly to the council’s responsibility to expand interservicing. In his 30 Jun 90 memo implementing DMRD 908 and establishing the DDMC, the DEPSECDEF directed the preparation of long-range plans for increased efficiencies in depot maintenance operations including:

*“Inter-Departmental Competition for Maintenance Workloads.  
Depot maintenance workloads of the Military Departments shall be performed in the Department of Defense at the depots at which they can be accomplished at the least overall cost, on schedule, and with the needed quality, without regard to whether the depot providing the maintenance service is part of the Military Department that is receiving the service. The objective is to increase to at least 10% over the next five years the amount of depot maintenance work of one Military Department that is performed by a depot of another Military Department, in the interest of efficiency.”<sup>7</sup>*

It appears clear by the direction in this section of the memo that the DEPSECDEF intended to minimize redundancy within and between the Services’ depots by consolidating similar DoD workloads and interservicing depot maintenance to the maximum extent possible.

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<sup>6</sup> DoD 5128.32, *Defense Depot Maintenance Council [Charter]*, 7 Nov 90, as amended by Change 2 (10 Mar, 94)

<sup>7</sup> Deputy Secretary of Defense memo: *Strengthening Depot Maintenance Activities*, 30 Jun 90, pg. 2

## **DoD Depot Maintenance Capabilities:**

The DoD conducts extensive depot maintenance operations through a combination of contractor support and Service controlled depots. This combination of depot maintenance activities provide vital sustainment support by performing required equipment overhauls and major modifications for the Services' weapon systems and their components. The Services will continue operating 18 organic depots performing these activities in the United States after the conclusion of all pending Base Realignment and Closure (BRAC) commission actions. The 1995 BRAC Commission recommended six of the 24 currently existing organic depot maintenance activities be closed to eliminate some of the excess depot maintenance capacity and thereby improve efficiency.<sup>8</sup> As a result of the final BRAC 95 decisions, the Army will continue operating four of the remaining depots, the Navy eight (including shipyards, aviation, and component depot maintenance operations), the Marine Corps two, and the Air Force will continue operating three organic depots and one specialized storage facility for most DoD stored equipment resources.<sup>9</sup>

Many DoD depots employ very large workforces skilled in the many complex tasks associated with depot maintenance. In fact, some of these depots are such large operations that they are among the biggest employers in their state.<sup>10</sup> DoD depots also contain extensive industrial facilities equipped with appropriate work areas, complex equipment and support processes required for these varied and often extremely complex tasks. Because of these factors, depot maintenance activities usually have a very large local economic impact in the areas where they are located due to their size and value.

## **Depot Maintenance Workloads:**

Depot maintenance work is very big business. Within the DoD millions of manhours and billions of dollars are consumed annually performing depot maintenance functions. The Defense Depot

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<sup>8</sup> Base Realignment and Closure Commission, *1995 Report to the President*, (Recommendations adopted by Congress unchanged in September, 1995)

<sup>9</sup> A pre-BRAC 95 listing and description of all DoD depot activities and their capabilities can be found in the Joint Depot Maintenance Analysis Group, Technology Assessment Division, *Depot Profiles 1995*, Apr 95

<sup>10</sup> Ibid

Maintenance Council's FY 95-99 Business Plan projected a FY96 budget of over \$12.6 B for the total depot workload performed in DoD depots. This value represents over 100 M hours of direct organic depot work.<sup>11</sup> These projections include Army requirements for over \$1.7 B (14 M hours) to support its aviation and ground combat equipment, conventional vehicles, missiles and communication / electronics systems requirements. The Navy projected ship and ship system components, marine aviation, and communication / electronics systems overhaul and modifications for this period would require over \$6.4 B (52 M hours). The Marines projected over \$147 M (2.3 M hours) for its ground combat and conventional vehicles, missiles, and communication / electronics systems depot maintenance requirements. And the Air Force projected requirements for over \$4.3 B (34 M hours) to perform aviation, missile, communication / electronics and other systems depot maintenance in its organic depots in FY96. The two charts in Appendix 1 provide a more complete breakdown of the FY94 projections of total organic workload hours by Service and by major commodity group for the years FY94-99.<sup>12</sup> While the comparable hours of commercial contract supported depot maintenance are not available within the DDMC business plan, it does project that about \$3.6 B would be spent in 1996 for contractor-performed depot maintenance work.<sup>13</sup>

**Core Depot Workloads:** Congress established a legal requirement to maintain a Core depot maintenance capability in depots under direct military control to ensure military readiness and combat effectiveness. US Code currently specifies the requirement of the DoD to maintain Core logistics capabilities in the following language:

*"It is essential for the national defense that Department of Defense activities maintain a logistics capability (including personnel, equipment, and facilities) to insure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to mobilization, national defense contingency situations, and other emergency requirements."*<sup>14</sup>

DoD directives translate this Title 10 requirement as:

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<sup>11</sup> Defense Depot Maintenance Council, *Business Plan, Fiscal Years 1995 - 1999*, 11 Jan 95, pgs. 2-6 and 2-12

<sup>12</sup> *Ibid*, pgs. 2-12 and 2-13

<sup>13</sup> *Ibid*, pg. 2-14

<sup>14</sup> Title 10, US Code, March 1995, Chapter 145, Section 2484, pg. 873

*“Core is an integral part of a depot maintenance skill and resource base which shall be maintained within depot activities to meet contingency requirements. A Core maintenance capability shall comprise of only a minimum level of mission-essential capability and may be under the control of a joint component where strategic or mission considerations warrant.”<sup>15</sup>*

Although current legislation sets the minimum level of Core work at 60 percent of the dollars allocated for depot maintenance annually, the Services currently conduct about 70 percent of their total depot work in organic depots. DoD and industry is now challenging this Congressionally mandated level of Core but expect the Depot Coalition in Congress to actively resist attempts to allow a lower level. In preparation for this attempt at legislative relief, DoD recently established a new methodology for determining its required Core depot capability based on the current national military strategy and a risk assessment for work that might be commercially supported. Using this methodology the Services' Core capability requirement would be reduced from their current levels of about 70 percent of the total depot workload to an average of about 50 to 55 percent among the Services.<sup>16</sup> Even if this legislation is passed and the Core workload in DoD depots dropped to the 50 to 55 percent level currently advocated by DoD, there would still be a very substantial amount of work supported annually within DoD depots. Therefore, initiatives to substantially improve the efficiency of DoD depot operations will continue to offer major benefits to the nation.

The majority of current organic depot work is classified as “Core” because it provides the workload to effectively protect the critical capabilities required by Title 10 as currently interpreted by DoD directive. However, slightly less than 20 percent of the total work in the organic depots is not Core.<sup>17</sup> Some of this additional non-Core work supports the requirements of other Services under interservice support agreements. But much of the remainder of this non-Core work is performed in organic depots because it generates no competitive commercial interest due to the old technologies involved, low volumes, or other unusual circumstances.<sup>18</sup>

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<sup>15</sup> DoD Directive 4151.18, *Maintenance of Military Materiel*, 12 Aug 92

<sup>16</sup> Dr. John P. White, Assistant Secretary of Defense, in his presentation: *Improving the Combat Edge*, at the Privatizing Federal Government Operations symposium, 9 Apr 96

<sup>17</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Total DoD Core workload / Total DoD workload

<sup>18</sup> *Ibid*, responses to question 14.h

## Attempts to Increase Interservicing in the 90s:

Numerous studies have been made on opportunities to expand interservicing since the economic benefits of this practice have become evident. The most recent attempts began in early 1990.

**DMRD 908:** The first major initiative to increase interservicing during the 90s grew out of one of the series of FY91 Defense Management Report Decisions (DMRDs) issued by the DoD Comptroller. The initial draft DMRD 908 "*Consolidating Aeronautical Depot Maintenance*" proposed centralizing all DoD aviation depot maintenance operations under a single manager, the Air Force. This DMRD would have substantially increased overall DoD interservicing and was expected to dramatically reduced the cost of aviation depot maintenance for all the Services. The Comptroller projected savings of over \$1.3 B could be achieved between the Army, Navy and Air Force from improved efficiencies gained through interservicing during the period FY92 - 95 under this initiative.<sup>19</sup>

At this same time, DMRD 909 was also released for coordination. This draft DMRD proposed related efficiency improvements for Navy and Army depots. It included initiatives to resize and restructure Navy shipyard facilities and other initiatives to improve utilization of Army depot maintenance facilities. These combined Navy and Army depot maintenance consolidation actions were programmed to reduce the cost of depot activities by over \$800 M between FY91 and FY95.<sup>20</sup> These draft DMRDs produced major resistance in all three affected Services who insisted that they would be incapable of effectively performing their wartime missions without direct control over the management and depot maintenance supporting their aviation weapon systems. The Services were clearly opposed to interservicing all aviation systems and may not have believed such large economic benefits were possible.

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<sup>19</sup> Office of the Comptroller, Department of Defense, *Consolidating Depot Maintenance*, Defense Management Report Decision 908 (undated), pg. 2, Implemented by Deputy Secretary of Defense memo: *Strengthening Depot Maintenance Activities*, 30 Jun 90

<sup>20</sup> Ibid

The DEPSECDEF ultimately deferred decisions on both of these draft DMRDs and directed further study of these concepts. These follow-on studies were finished in May, 1990, and the results led the DEPSECDEF to release his 30 Jun 90 memo: *Strengthening Depot Maintenance Activities*. This memo formally implemented a revised DMRD 908 titled "*Consolidating Depot Maintenance*" affecting all three Military Departments. Under this DMRD the Services were directed to develop plans to improve efficiency in their depot operations by \$3.9 B during the period FY91 - FY95.<sup>21</sup> Savings from these directed efficiencies were "guaranteed" by the DoD Comptroller who incrementally reduced the Services' depot maintenance funding by the \$3.9 B.

The DEPSECDEF's memo also established the DDMC to advise the Assistant Secretary of Defense for Production and Logistics, now DUSD (L), on DoD depot maintenance issues. Details of the memo required the Military Departments to develop plans for near-term efficiency improvements saving \$1.7 B by the end of FY95. These savings were to be achieved through streamlining and reducing the size of each Service's depot infrastructure. Additionally, the memo tasked the departments to prepare long-range plans for increasing depot efficiencies by another \$2.2 B during this period through a combination of other specified actions. One of these actions required the Services to implement inter-departmental competition programs for organic depot maintenance work which would lead to substantially increased interservicing.<sup>22</sup> Ultimately the Services established a goal of raising the amount of interservicing to at least ten percent of the total susceptible annual organic depot workload.<sup>23</sup>

Later that year DMRD 908 was further revised and released as DMRD 908C. This revision required the Services to expand their depot maintenance efficiency programs to save a total of \$6.3 B and extended the period of implementation through FY97.<sup>24</sup> Again, savings were guaranteed by

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<sup>21</sup> Office of the Comptroller, Department of Defense, *Consolidating Depot Maintenance*, Defense Management Report Decision 908 (undated), pg. 2, Implemented by Deputy Secretary of Defense memo: *Strengthening Depot Maintenance Activities*, 30 Jun 90

<sup>22</sup> Deputy Secretary of Defense memo: *Strengthening Depot Maintenance Activities*, 30 Jun 90

<sup>23</sup> Defense Depot Maintenance Council, *Corporate Business Plan, Fiscal Years 1992 - 1997*, Feb 93, pg. 51

<sup>24</sup> Office of the Comptroller, Department of Defense, *Consolidating Depot Maintenance*, Defense Management Report Decision 908C, 28 Dec 90, pg. 2,

the DoD Comptroller who reduced the Services' depot maintenance accounts for FYs 91-97 by the total amount of these allocated savings.

However, some of the initiatives within these DMRDs were not accomplished. For instance, the DUSD (L) halted the depot maintenance competition program in May 94 due to fundamental differences in the Services' cost accounting systems that limited the possibility of fair competition among the Services.<sup>25</sup> Additionally, while some increases in DoD depot maintenance interservicing have occurred since the DDMC was established, the 10 percent goal set by the DEPSECDEF's 30 Jun 90 memo has not been achieved.

At the time of the DEPSECDEF's memo, DoD's Depot Maintenance Interservicing (DMI) program workload level was 6.3 percent of the total FY89 depot maintenance program susceptible to interservicing.<sup>26</sup> Given the DEPSECDEF's objective of raising the DMI level to "at least 10% over the next five years," an overall increase of not less than 3.7 percent would have been expected. Early planning by the Services suggested DoD could save over \$120 M by increasing interservicing to about 9.1 percent over the five-year period of FY91-95.<sup>27</sup> In FY92 the DDMC raised the interservice savings goal to \$133 M over the six-year period FY92-97.<sup>28</sup>

Unfortunately, by early 1996 the latest published DDMC information reflected interservicing data only through FY93.<sup>29</sup> This data indicated interservicing had increased to 7.1 percent in FY91, to 7.6 percent in FY92, and to 8.4 percent in FY93.<sup>30</sup> However, it does not appear likely that the ten percent goal will be reached in the foreseeable future. The next substantial effort to study ways to improve the nation's depot maintenance capabilities was conducted by the Joint Chiefs of Staff Depot Maintenance Consolidation Study Group.

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<sup>25</sup> DEPSECDEF memo: *Depot Maintenance Operations Policy*, 4 May 94

<sup>26</sup> Defense Depot Maintenance Council, *Corporate Business Plan, FYs 91 - 95*, Jun 91, pg. 40

<sup>27</sup> *Ibid, FYs 91 - 95 {revised}*, Dec 91, pg. 40

<sup>27</sup> *Ibid, FYs 92 - 97*, 13 Jan 93, pg. 53

<sup>29</sup> Although interservicing data normally lags the production execution year by about 12 - 18 months due to the complex accounting procedures involved, FY94 data is not currently projected to be available until after this paper is finalized.

<sup>30</sup> Defense Depot Maintenance Council, *Corporate Business Plan, FYs 95 - 99*, 11 Jan 95, pg. 8-2

**JCS Consolidation Study Group (JCSCSG):** This interservicing study group was chartered in Aug 92 by the Chairman of the Joint Chiefs of Staff. It consisted of retired general officers from each of the Services and was directed by Gen. J. J. Went, USMC (retired). Their efforts were facilitated by a support staff made up predominantly of uniformed service personnel from the Joint Staff. They were also supported by a Service Working Group comprised of representatives from each of the individual Services who became the principal source of information considered by the principal study group.<sup>31</sup>

This intense five-month study evaluated the way in which the DoD depot maintenance capabilities were currently organized and considered the extent and value of depot maintenance interservicing. This study was primarily focused on establishing the best possible structure for the management of future DoD depot maintenance. During the study the Services compiled and submitted extensive data on depot maintenance capabilities at each of their organic depots in response to JCSCSG taskings. Included were volumes of financial, workload and personnel data on current capabilities, facilities and workload projections. The study concluded:

*"The current depot management structure in DoD and the Services has not resulted in substantial competition, interservicing, reduction of capacity or duplication of effort. There is nothing to indicate that continuation of the current way of doing business will result in any significant departure from past performance." . . .*

*"Elimination of unnecessary capacity and duplication has the potential for substantially reducing long-term costs. . . The precise value of savings that may be achieved cannot be determined because of all the variables and dynamics involved. A rough estimate ranges from a low of two to a high of nine billion dollars over the next ten years. We are confident, however, that savings will be optimized only if consolidations are maximized and begin as soon as possible with associated workload shifts occurring over the shortest possible period of time."<sup>32</sup>*

This study ultimately recommended consolidation of all DoD depot maintenance management under a JCS-directed unified command for depot maintenance termed the "Joint Depot Maintenance Command" which would be granted full authority to reorganize Service depots.<sup>33</sup> The JCSCSG report stated they believed such an organization would produce the greatest opportunities for

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<sup>31</sup> Joint Chiefs of Staff, *Depot Maintenance Consolidation Study* (Final Report), Jan 93, pg. ES-1

<sup>32</sup> *Ibid*, pg. ES-2

<sup>33</sup> *Ibid*, pg. ES-3

responsiveness, efficiency and matching capacity with future requirements. This report also endorsed using the Base Realignment and Closure (BRAC) process as the only effective way of closing depots that were excess to the nation's projected needs. Despite the very high level of visibility this report received, its recommendations were not adopted by DoD. However, many of its conclusions clearly recognized the fundamental advantages of depot maintenance interservicing.

**BRAC 93:** In response to the recommendations of the JCSCSG, DEPSECDEF Atwood issued a memorandum to the Service Secretaries, Chairman of the JCS, and the Under Secretary of Defense for Acquisition addressing the subject: *Base Closure and Realignment Proposals in Support of Streamlining of Defense Depot Maintenance Activities.*<sup>34</sup> This memorandum directed the Services to increase the efficiency of DoD depots by streamlining the overall DoD depot infrastructure. It also required the Services to prepare integrated proposals based on cross-Service inputs. These proposals were to be presented to the SECDEF for his consideration and possible submission to the 1993 BRAC Commission. The Departments were assigned to lead the development of these proposals: the Army for ground weapon systems and equipment; the Navy for ships, other watercraft and ship systems; and the Air Force for fixed and rotary wing aviation and other aviation systems. The intent of this memorandum was to encourage the Services to maximize consideration of depot maintenance interservicing when developing their BRAC 93 closure recommendations. Unfortunately this direction was issued too late to affect the Services' inputs.

By law the Services' analysis processes depended on certified inputs each installation submitted to formal questionnaires the Military Departments developed and distributed. These questionnaires were based on explicit evaluation criteria established by the individual Services. Prior to the DEPSECDEF's memorandum, none of the Services' evaluation criteria nor their questionnaires addressed interservicing. Since the DEPSECDEF's guidance was distributed during the same month the Departments' inputs were due to DoD, there was insufficient time for the Departments to revise their evaluation criteria, distribute amended questionnaires, and collect and

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<sup>34</sup> DEPSECDEF memorandum: *Base Closure and Realignment Proposals in Support of Streamlining of Defense Depot Maintenance Activities*, 3 Dec 92

analyze modified responses that would have allowed them to meet the DEPSECDEF's request while complying with the BRAC law. As a result, no specific consideration was given to expanding depot maintenance interservicing during DoD's portion of the 93 round of BRAC deliberations.

Although the SECDEF recommendation to the BRAC Commission didn't propose any alternatives that increased interservicing, it did specify several depots that were proposed for realignment or complete closure. Included for realignment were the Army's Letterkenny Army Depot in Pennsylvania, which was proposed to be eliminated as an independent depot and reduced to a depot activity under the command and control of the Tobyhanna Army Depot in Pennsylvania. The SECDEF also proposed a similar realignment for the Army's Tooele Army Depot in Utah, reducing it to a depot activity under the command and control of the Red River Army Depot in Texas.<sup>35</sup> However, no Army depots were recommended for total closure by the SECDEF. DoD's depot closure recommendations for the Navy included the aviation depots at Alameda (California), Norfolk (Virginia), and Pensacola (Florida); and shipyards at Mare Island (California) and Charleston (South Carolina).<sup>36</sup> The DoD also recommended closing the Air Force's Newark Air Force Base in Ohio which housed the Aerospace Guidance and Metrology Center.<sup>37</sup>

The Secretary of Defense acknowledged the lack of interservicing recommendations in his Mar 93 testimony before the BRAC Commission. During this testimony he indicated he would welcome any Commission actions which would increase interservicing of DoD commodities.<sup>38</sup>

The BRAC Commission disagreed with the SECDEF's proposal in one case affecting DoD depots and recommended a different Army depot solution in its final report. The Commission's recommendation rejected the DoD proposal to eliminate the independent Army depot at Letterkenny. Instead it recommended retaining the Letterkenny depot and realigning its workload to allow for the consolidation and interservicing of the majority of DoD tactical missile depot workload there per the Tactical Missile Maintenance Consolidation Plan for Letterkenny Army Depot

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<sup>35</sup> Department of Defense, *1993 Defense Base Closure and Realignment*, 12 Feb 93, pgs. 29 - 31

<sup>36</sup> *Ibid*, pgs 42, 45, 53, 62, and 66

<sup>37</sup> *Ibid*, pg. 107

<sup>38</sup> Defense Base Closure and Realignment Commission, *1993 Report to the President*, 1 Jul 93, pg. 2-1

(LEAD).<sup>39</sup> The final 1993 BRAC Commission recommendations were ultimately adopted by the President and Congress in September, 1993.

Recognizing the overall failure to substantially increase interservicing during the 93 BRAC round, the Commission stated in its report to the President: ..

*“Committed to streamlining depot maintenance workload to achieve maximum efficiencies, the Commission determined the following five commodities should be reviewed for interservicing potential: wheeled vehicles, rotary-wing aircraft, tactical missiles, and ground communication; the fifth, fixed-wing aircraft, was ultimately deferred from further analysis due to a lack of reliable or comparable cost and capacity data.” . . .*

*“The Commission’s recommendations to consolidate depot maintenance workload through interservicing represent only an initial attempt at achieving cost savings. The efficiencies to be realized from interservicing dictate DoD conduct an exhaustive review and present its recommendations/actions during the 1995 round of the base closure process. The Commission strongly supports a joint organization responsible for assigning workloads to the DoD’s maintenance depots. Joint oversight could mandate cost effective interservicing actions circumventing Services’ parochial interests. DoD must create strong incentives for the Services to pursue interservicing. Additionally, any future consideration of interservicing must include a comprehensive review of private-sector capability.”<sup>40</sup>*

Thus the 1993 BRAC round closed with general recommendations to the President to increase interservicing, and specific recommendations on which commodities had the greatest interservicing potential. However, the 93 BRAC round did achieve an actual increase in depot maintenance interservicing by directing DoD-wide consolidation of the tactical missiles commodity group. But this was only a relatively small interservicing increase considering the overall potential identified within the total DoD depot maintenance arena.

Three Navy aviation depots, two naval shipyards and one Air Force specialty depot were closed through the 93 BRAC process. However, with the exception of the relatively small tactical missiles commodity group, none of the millions of hours of annual workload associated with these closures was proposed to be interserviced by either the DoD or the final Commission report that was ultimately adopted. Instead all the transferred work was either redistributed within the closing Service’s remaining depots or allowed to be privatized in place.

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<sup>39</sup> Base Realignment and Closure Commission, *1993 Report to the President*, 1 Jul 93, pgs. 1-6 and 1-7

<sup>40</sup> *Ibid*, pg. 2-1

Despite the high level of senior DoD management concern previously expressed about increasing interservicing, most available interservicing alternatives were neglected throughout the 93 BRAC process. This neglect continued even after the final BRAC decisions were finalized. Even after the final recommendations were adopted DoD officials clearly had latitude within the BRAC language to implement interservicing solutions for the depot workloads being redistributed. Unfortunately, no one elected to pursue these opportunities.

**General Accounting Office (GAO) Study:** During the spring of 1993 the GAO provided testimony to a subcommittee of the US House of Representatives conducting hearings into the effectiveness of the DoD's program for restructuring management and support for the downsizing military. In her 6 May statement Ms. Donna M. Heivilin, Director of Defense Management and NASA Issues Section of GAO's National Security and International Affairs Division, cited continuing significant excess capacity throughout the DoD depot structure and projected unnecessarily high overhead costs would result from maintaining that excess capacity. In her testimony she cited the GAO conclusion that the existing DoD depot management structure was not conducive to making interservicing decisions essential to establishing the most effective and efficient depot maintenance system. She cited the failures of the DoD to achieve interservicing goals during the 93 BRAC round of base closures as illustrating this problem.<sup>41</sup>

This testimony reinforced the idea that increasing interservicing could significantly improve depot maintenance efficiency. It recognized that maximizing interservicing could help eliminate inefficient redundancies in depot maintenance capabilities within and between the Services, lead to more streamlined depot support operations, and ultimately eliminate excess depot maintenance capacity by closing unneeded DoD depots. However, nothing actually changed as a result of this testimony. The Joint Cross-Service Group for Depot Maintenance provided the last real hope for expanding interservicing depot maintenance functions.

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<sup>41</sup> US Government Accounting Office, *Issues in Management and Restructuring to Support a Downsized Military*, (GAO/T-NSIAD-93-13) Testimony of Donna M. Heivilin, Director, Defense Management and NASA Issues, National Security and International Affairs Division before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, 6 May 93, pgs. 1 - 2

**Joint Cross-Service Group - Depot Maintenance (JCSG-DM):**<sup>42</sup> The JCSG-DM was established in the fall of 1993 as one of six DoD groups initially formed by direction of the SECDEF to study ways of maximizing the benefit of interservicing functions common to more than one Service. The JCSG-DM Principal Group was chaired by the DUSD (L) and consisted of high ranking military and civil service logistics experts from the headquarters staff of each of the Services. Their task was to oversee the most comprehensive effort to date to establish processes for collecting and analyzing standardized depot maintenance data from each of the Services to increase depot maintenance interservicing. These processes were expected to lead to recommendations proposing interservicing opportunities which would be made to all the Services and to the SECDEF. JCSG-DM recommendations were to be considered by the Services, OSD, and the 95 BRAC Commission as the final round of BRAC deliberations took place. The Principal Group met approximately once a month to discuss progress and guide the direction of these activities. At the working level a group of depot maintenance experts, known as the Technical and Support Group (T&SG), conducted the daily work of the JCSG-DM.

The T&SG developed an extensive depot maintenance questionnaire during January and February which was then distributed to the Services. Each of the Services tasked their individual depots to answer the questions and provide inputs consistent with established BRAC data certification procedures. The initial certified responses were submitted through the Services to the JCSG-DM in late June; however, substantial inconsistencies were identified in the responses as the data was reviewed. These inconsistencies within and between the Services resulted in a time-consuming process to clarify the intent of the questions so that consistent and standardized data could be certified and submitted by all the Services. This data purification process took until late September before the T&SG had a reasonably reliable and consistent data set it could begin

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<sup>42</sup> Facts addressed in this section derived from the authors' personal experience as a Service representative on the JCSG-DM Technical and Support Group, and validated by coordination of this section with the staff of the DUSD (L) as no formal records were documented of the meetings of the JCSG-DM or the T&SG.

analyzing. During the intervening months several key processes for analyzing this data were developed by the working group and approved by the principal group.

The T&SG conducted a commodity based analysis which considered the military value the Services submitted for each of their depot activities and the functional value the JCSG-DM established for the individual commodities supported at each of the depots. These values served as variable factors in a linear programming model developed to optimize the consolidation of depot commodity overhaul functions at all current DoD depots while emphasizing specified factors. Model runs were conducted on a wide variety of scenarios including minimizing the number of depot sites while maximizing military value, and minimizing excess capacity, to name only two.

Ultimately the JCSG-DM analysis process produced two final alternatives identified as DM-1 and DM-2. Both of these alternatives recommended consolidation of very substantial amounts of depot maintenance work between and within the Services. In November these alternatives were passed to the Services for consideration as they developed their 95 BRAC inputs for the SECDEF. The recommended alternatives proposed the consolidation of many similar depot maintenance activities at single DoD sites and eliminated depot maintenance work at several depots that could then be proposed for closure by their owning Service.<sup>43</sup> A summary of these alternatives is provided in Appendix 2.

Although these alternatives offered opportunities to substantially reduce long-term depot maintenance costs by consolidating significant depot maintenance functions within and between the Services, they were not favorably received by the Military Departments. Ultimately, each Department rejected the JCSG-DM alternatives, choosing instead to proceed with their own individual processes as they developed the final BRAC 95 inputs. As a result, the benefits possible from substantially increasing depot maintenance interservicing were once again rejected by the Services.

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<sup>43</sup> Deputy Under Secretary of Defense (Logistics) memorandum: *Joint Cross-Service Group for Depot Maintenance (JCSG-DM) BRAC 95 Alternatives*, 22 Nov 94

**BRAC 95:** The 1995 BRAC was scheduled to be the final BRAC round according to the 1988 law establishing the process. In preparation for this final round the DEPSECDEF issued a memorandum providing guidance to the Services. In this guidance he stressed the importance of fulfilling national goals by achieving increased interservicing across all common functions:

*“Significant reductions in infrastructure and overhead costs can only be achieved after careful studies address not only structural changes to the base structure, but also operational and organizational changes, with a strong emphasis on cross-service utilization of common support assets.”<sup>44</sup>*

Depot maintenance infrastructure was one of the many common support assets he included in his guidance. This guidance led to the formation of the six Joint Cross-Service Groups and specifically the JCSG-DM addressed in detail in the preceding section. It also put the Services on notice that increased interservicing was an expected outcome of the 95 BRAC round. Despite this guidance, none of the Services submitted recommendations to the SECDEF proposing installation realignments or closures based on expanding interservicing.

Therefore the SECDEF ultimately had no interservicing recommendations to propose to the BRAC Commission. However he did make recommendations affecting the depot infrastructure. He proposed closing four DoD depots and shipyards including the Naval Surface Warfare Center, Crane Division (Louisville, Kentucky); the Naval Air Warfare Center, Aircraft Division - Indianapolis (Indiana); the Naval Shipyard - Long Beach (California), and the Red River Army Depot (Texas). He also recommended substantial realignment of the workload at Letterkenny Army Depot (LEAD) which would have transferred its tactical missile guidance system workload to Tobyhanna Army Depot (TOAD).

Considering the SECDEF's recommendations inadequate, the BRAC Commission exercised its authority to scrutinize all DoD depot activities independently. Therefore, shortly after receiving the SECDEF's formal BRAC 95 recommendation, the Commission added all DoD depot activities to its formal list of installations under consideration for closure. The Commission then conducted an independent analysis of depot capacity and projected requirements and concluded that the DoD list of depot actions fell far short of what the nation needed. Accordingly, the Commission's final

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<sup>44</sup> DEPSECDEF memo: *1995 Base Realignment and Closures (BRAC 95)*, 7 Jan 94, pg. 1

recommendation to the President regarding depots differed substantially from the SECDEF's proposal.

However, despite the Commission's earlier emphasis on increasing interservicing, their final recommendations did little to capitalize on interservicing benefits. Instead, where it proposed depot closures or workload realignments, the Commission generally allowed workloads to be privatized in place or moved to other DoD depots without specifying interservicing as a desired outcome. The Commission mandated interservicing for only one transferring workload from all the depots affected by closure or realignment. In its only recommendation expanding interservicing, the Commission directed transfer of the common-use ground-communication electronics workload at SM-ALC to the Tobyhanna Army Depot in Pennsylvania. The final Commission recommendation allowed all other SM-ALC depot workloads to be transferred to other DoD depots or to private sector commercial activities (privatized-in-place) as determined by the DDMC.<sup>45</sup>

The Commission's final recommendation to the President included closure of the Naval Shipyard - Long Beach (California); the Naval Air Warfare Center, Aircraft Division - Indianapolis (Indiana); and the Naval Surface Warfare Center, Crane (Kentucky). They also recommended outright closure of the Air Force's McClellan Air Force Base and the Sacramento Air Logistics Center (SM-ALC) located there.<sup>46</sup> The Commission also recommended major base realignments for the Army's Letterkenny Army Depot (Pennsylvania) and Red River Army Depot (Texas); the Navy's Undersea Warfare Center, Keyport (Washington); and the Air Force's Kelly Air Force Base (Texas) and its resident San Antonio Air Logistics Center.<sup>47</sup>

The effect of these realignments substantially changed the structure of depot maintenance activities within, but not between, the Services. The biggest change was the closure of Kelly AFB's San Antonio Air Logistics Center and the privatization of a large percentage of the depot maintenance work located there. Additionally, realignment of the tactical missile guidance systems workload from LEAD to TOAD dramatically changed the nature of the Army depot structure.

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<sup>45</sup> DEPSECDEF memo: *1995 Base Realignment and Closures (BRAC 95)*, 7 Jan 94, pg. 1-85

<sup>46</sup> Base Realignment and Closure Commission, *1995 Report to the President*, 1 Jul 95, pg. xiii

<sup>47</sup> *Ibid*, pgs. xiii - xiv

Ultimately, the 95 BRAC recommendations were adopted by Congress unchanged and they are currently being implemented. The most recent national-level study addressing the subject of depot maintenance management was the 1995 Commission on Roles and Missions (CORM) of the Armed Forces.

**1995 Commission on Roles and Missions of the Armed Forces:** The CORM made many important recommendations affecting how the DoD should be reformed to best meet future needs more efficiently. One of these recommendations was to outsource non-Core depot work and consolidate more of the Core work. In their final report the CORM reflected on the general lack of interservicing growth and then focused specifically on the aviation element for particular attention.

They said:

*“Lack of trust and reliance on consensus among participating Services have limited the efforts to attain the full benefits of interservicing. In order to reduce these barriers, we recommend that the Secretary of Defense designate single management elements (SMEs) to oversee servicing of specific categories of aircraft.”<sup>48</sup>*

This recommendation proposed that the depot work for fixed-wing and rotary-wing aircraft should be organized under single commodity managers who would have authority to determine the location of routine aviation maintenance work, and the investments and divestments of equipment and facilities required to perform this work. Under this approach the single commodity managers would ultimately decide which aviation depots to retain and which to eliminate. SMEs were proposed to include appropriate Service representatives and operate through small joint staffs.<sup>49</sup> I strongly support this approach and believe there are many opportunities to improve depot efficiency by implementing these recommendations.

Despite all these past studies which consistently recommended expanding interservicing, only limited progress has occurred. As a result, substantial interservicing opportunities still remain.

## **Future Interservicing Opportunities:**

Depot support for most commodity groups is still distributed between the Services. This situation leaves many interservicing opportunities with great potential to increase teamwork while reducing

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<sup>48</sup> *Directions for Defense*, Report of the Commission on Roles and Missions of the Armed Forces, 24 May 95, p. 3-20

<sup>49</sup> *Ibid*, pgs 3-20 and 3-21

depot maintenance costs. Consolidation of depot work to reduce inefficiency is consistent with the recommendations of most past studies addressing depot maintenance improvements. Some of the most promising opportunities are outlined below.

**Gas Turbine Engines:** Support for gas turbine engines is perhaps the most obvious example of how the Navy and the Air Force could substantially streamline depot operations through interservicing. One example, the T56 turboprop engine, is used by the Air Force, Navy and Marines to power C-130 and P-3 aircraft. While these engines are used in numerous configurations, overhaul requirements for all configurations are very similar. The Navy currently conducts T56 engine overhauls for itself and the Marines in its Naval Aviation Depot - Jacksonville (NADEP-JAX) in Florida. The Air Force overhauls its T56s at the San Antonio Air Logistics Center (SA-ALC) in Texas.<sup>50</sup> Another specific illustration is the TF39 and LM2500 gas turbine engines. The TF39 turboprop engine is used by the Air Force to power its C-5 aircraft while the Navy uses a derivative, the LM2500 gas turbine engine, to power many of its surface ships. The Core sections of these engines are common and their overhaul requirements are likewise very similar. The only major differences between these engines are that the TF39 has a much larger fan module and the LM2500 has a power turbine segment after the engine hot section that transfers turbine power to the ship's propeller shaft. Because of the very large volume of air the TF39 turboprop moves during operation, that engine requires a unique test cell to perform final functional tests following depot overhaul. While the TF39 test cell can be inexpensively adapted to test LM2500 engines, an LM2500 engine test cell cannot be adapted to test TF39 engines without major modifications that would be very expensive.<sup>51</sup>

It is impossible to perform a discrete analysis on any particular engine, such as the T56 or TF39/LM2500, from the JCSG-DM data because this data was not collected at a low enough level to identify individual engine types. However, evaluation of the overall certified FY99 aviation and

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<sup>50</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 3a and 3b - Gas turbine engines (aircraft and ships), FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

<sup>51</sup> Facts cited in this section were derived from information obtained from Navy representatives during JCSG-DM Technical and Support Group meetings addressing possible joint service workload consolidations.

ship gas turbine engine data for NADEP-JAX, NADEP-NI, SA-ALC and the other Air Force engine depot, the Oklahoma City Air Logistics Center (OC-ALC) in Oklahoma, reveals the total Navy aviation and ship Core engine workload would fit within the maximum potential engine overhaul capacity available at either SA-ALC or OC-ALC.

Evaluation of NADEP-JAX's engine capability indicates they have less than 25 percent of the necessary maximum potential engine overhaul capacity needed to support the Core engine workload of either of these Air Force depots. NADEP-NI also projects insufficient maximum potential capacity to take on substantial gas turbine engine work.<sup>52</sup> Additionally, as the LM2500 is the only gas turbine engine currently overhauled at NADEP-NI, consolidation of this work with the TF39 at SA-ALC or with other similar engine work at OC-ALC would eliminate all gas turbine engine overhaul work and its many expensive support processes at NADEP-NI.

This capacity analyses demonstrates that interservicing offers an opportunity to eliminate virtually all aviation and ship gas turbine engine depot maintenance activities in the Navy by interservicing this work to one or both of the Air Force engine depots. Such a solution might seem radical but all the positive benefits of interservicing outlined throughout this paper should come into effect if such a solution is pursued. Only the Air Force has the depot facilities needed to accept a full DoD consolidation without substantial investment in additional facilities.

Further consolidation of common gas turbine engine work into only two depots would produce several benefits. Consolidation would eliminate one of the two redundant production lines on both the T56 and TF39/LM2500 engines and also eliminate the cost of maintaining and operating many of the engine test cell facilities now in use. Consolidation would also increase throughput and lead to greater efficiencies of scale at the remaining depots. Some of these economies stem from reduced payroll and training costs for the smaller total number of direct and overhead workers required to support the combined work. Therefore, overall depot costs can be expected to be lower after these workloads are merged and supported via interservicing.

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<sup>52</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 3a and 3b - Gas turbine engines (aviation and ships), FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

While more detailed studies may be needed to ensure the most practical and cost effective solution is ultimately adopted, greater consolidation of aviation and ship gas turbine engine commodity groups offers substantially improved efficiency. Consistent with the CORM recommendation, a decision should be made to consolidate these common workloads. Other commodities also offer similar interservicing benefits.

**Ground Combat and Tactical Vehicles:** Both the Army and Marine Corps operate ground combat and tactical vehicles. These vehicle categories include tanks, fighting vehicles, and other (self-propelled and towed) combat and tactical vehicles and their components. Currently both Services independently perform depot maintenance on their portions of these common systems. The Army supports some of these systems at each of its five depots, and the Marines do this work at their two Logistics Bases.

Although the JCSG-DM data does not indicate that all this workload could be consolidated at any single depot, it is clear that most of the current redundancy in these depots within and between the Services can be eliminated. Analysis of this data indicates that all DoD tanks and their components could be consolidated to a single site only in either the Anniston (Alabama) or Red River (Texas) Army depots.<sup>53</sup> Likewise, all DoD Core work for self-propelled and towed combat vehicles and their components could also be consolidated into only two depots by locating this work at the Anniston and Red River Army depots.<sup>54</sup> In a similar consolidation, the JCSG-DM data indicates that all DoD tactical vehicle Core depot maintenance could be consolidated into a single depot at either of the Marine Corps Logistics Bases, although full DoD consolidation into any single Army depot does not appear feasible.<sup>55</sup>

Considering the many benefits already established for consolidating similar depot work, there can be little justification for continuing to pay the higher cost for needlessly redundant production

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<sup>53</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Group 6b and 6d - Ground Combat Vehicles (tanks and their components), FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

<sup>54</sup> Ibid, Commodity Groups 6a, 6b, and 6d - Ground Combat Vehicles (self-propelled and towed combat vehicles and their components)

<sup>55</sup> Ibid, Commodity Groups 9a, and 9b - Tactical Vehicles and their components

lines for these common ground vehicle systems at multiple depots in both Services. Interservicing of airframe overhaul also offers great potential for substantial workload consolidation, improved efficiency and lower costs.

**Small and Medium Fixed-Wing Airframes:** Both the Air Force and the Navy currently operate depots supporting small- and medium-size fixed-wing airframes and their removable structural components. For example, the Air Force, Navy, Marines and Coast Guard all operate versions of the C-130 airframe. The depot work on all C-130 airframes and their related structural and flight control surface components can and should be consolidated into a single depot to achieve the benefits of larger economies of scale and to eliminate redundancy in depot capabilities.

The Navy currently supports Navy and Marine aviation airframe overhaul requirements at NADEP-NI and NADEP-JAX. Despite the impending elimination of two Air Force depots through BRAC 95 closure decisions, the Air Force depots with the greatest capability to support these classes of fixed-wing aircraft are the three continuing depots: Warner Robins ALC (Georgia), Oklahoma City ALC (Oklahoma), and Ogden ALC, (Utah).

Evaluation of the FY99 JCSG-DM data indicates that the two NADEPs performing fixed-wing aircraft overhaul are incapable of supporting the total combined DoD Core workload, regardless of how this work might be distributed between them. However, the three remaining ALCs would have sufficient capacity between them to effectively support these fully consolidated workloads.<sup>56</sup> This conclusion is based on the assumption that the BRAC 95 decisions to privatize the majority of depot maintenance work at the Sacramento and San Antonio Air Logistics Centers will be implemented as currently planned.

Consolidating these categories of fixed wing airframe workload could substantially reduce redundancy of repair processes between DoD depots while significantly increasing the efficiency of organic depot operations. In addition to the airframe work outlined above, there is also great

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<sup>56</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 1c3 - Aircraft Airframes (fixed-wing - light combat) and 2b - Aircraft Components (aircraft structures), FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

redundancy between Navy and Air Force depot capabilities supporting most aviation subsystem components.

**Fixed-Wing Aviation Subsystem Components:** Currently both the Air Force and Navy operate depot facilities for most of the components in these commodity groups. These groups include hydraulic and pneumatic components, aviation instruments, landing gear, ordnance, avionics/electronics components, aircraft power units, and other miscellaneous aviation subsystem components. However, this redundancy no longer make good business sense in light of the extremely constrained defense budgets in the foreseeable future..

The FY99 JCSG-DM data indicates the Navy does not have sufficient capacity in its aviation depots to support the entire DoD Core workload for most of these components. However, Air Force depots do have sufficient capacity within their single-sited Technology Repair Centers to support the consolidated work of both Services for virtually all of these categories of aviation subsystem components.<sup>57</sup> Therefore, the DoD could benefit from interservice consolidation of this work into single repair sites. Such consolidations would be more steps toward improved DoD efficiency by eliminating the current costly practice of operating redundant repair depots for these classes of components.

**Communication / Electronics Systems:** Despite progress made to consolidate Air Force and Army ground communication / electronics (CE) work during the 95 BRAC round, considerable additional consolidation opportunities remain in this commodity class. Currently ten DoD depots perform this category of work:<sup>58</sup> six in the Navy, two in the Marine Corps, and one in both the Army and Air Force; although the Air Force depot will be eliminated by FY01 at the end of the (95 BRAC implementation period. This unnecessary redundancy leaves substantial potential benefit from interservicing simply by reducing the total number of depots performing these common functions.

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<sup>57</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 2c through 2i - Aircraft Components (multiple), FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

<sup>58</sup> Ibid, Commodity Groups 7a through 7h - Communication and Electronics

Although Navy ship-related CE workload has traditionally been conducted at naval shipyards in conjunction with the overhaul of the host ship systems, few unique capabilities are needed to accomplish these repairs and modifications that are not already available in other Service CE depots. Nor is there any known operational requirement for these overhaul activities to be conducted in shipyard facilities. The overhaul requirements of both the ground-based and sea-based systems are very similar, requiring comparable repair skills, facilities, equipment and test processes for completion.<sup>59</sup>

JCSG-DM data indicates the Core depot CE work could be fully consolidated into one DoD depot only at the Tobyhanna Army depot in Pennsylvania.<sup>60</sup> The data shows that only Tobyhanna has sufficient maximum potential capacity to support the total consolidated workload. Again, consolidating these common CE depot maintenance functions would lead to greater efficiency and lower costs by reducing depot personnel, facilities and equipment requirements. Such a consolidation would allow all Services to benefit from the many substantial benefits of depot maintenance interservicing.

## **Conclusions:**

Despite the best efforts of many senior DoD leaders over the past 20 years, depot maintenance interservicing has not achieved its potential for enhancing teamwork between the Services, maximizing depot efficiency, and minimizing depot support costs. Even in today's environment of intense scrutiny over decisions affecting the cost of national defense, the benefits of interservicing have often been overcome by parochial thinking. As a result, many major interservicing opportunities remain.

Although the benefits of depot maintenance interservicing have been recognized and generally accepted in most informed circles, the DDMC and its Service representatives have not

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<sup>59</sup> Facts cited in this section were derived from information obtained from Navy representatives during JCSG-DM Technical and Support Group meetings addressing possible joint service workload consolidations.

<sup>60</sup> Office of the Deputy Under Secretary of Defense for Logistics, certified JCSG-DM data base, Commodity Groups 7a through 7h - Communication and Electronics, FY99 projected Core and Total Workloads, Current Capacity and Maximum Potential Capacity data

succeeded in making the tough decisions that could eventually produce the most economical DoD support structure. Today many additional interservicing opportunities exist to further streamline the DoD depot infrastructure consistent with the military strategy and forces planned for the next century. It is our joint responsibility to ensure these opportunities are realized. By aggressively pursuing the interservicing opportunities outlined above, the DoD can achieve substantial savings in depot maintenance support and continue reducing its costly and unnecessarily redundant depot maintenance infrastructure. Expanding depot maintenance workload interservicing can foster the improved teamwork needed to succeed in the challenging defense environment today and in the future.