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AIR WAR COLLEGE

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DPEM VERSUS DMIF: WHAT'S THE DIFFERENCE AND WHY SHOULD WE CARE?

By COLONEL DAVID M. REED

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AIR UNIVERSITY
UNITED STATES AIR FORCE
MAXWELL AIR FORCE BASE, ALABAMA

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by

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Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE RESEARCH

REQUIREMENT

Research Advisors:

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MAXWELL AIR FORCE BASE, ALABAMA

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AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: DPEM Versus DMIF: What's the Difference and Why Should We Care?

AUTHOR: David M. Reed, Colonel, USAF

The two major methods of accounting for depot maintenance resources in the Air Force are explored. First discussed are funds appropriated by Congress, including Depot Purchased Equipment Maintenance (DPEM) funds. Next reviewed is the Depot Maintenance Industrial Fund (DMIF), the revolving fund through which all Air Force depot maintenance funds must pass. These two methods of accounting for depot maintenance resources are compared and a series of basic issues are related to that accounting. These issues include DPEM backlogs, net availability, contract DMIF, stock funding of repairable spare parts, and other current issues affecting depot maintenance resources. The paper concludes with recommendations for further study, simplification and encouragement of a professional dialogue.

Now with Air Force Logistics Command, Financial Management, (SDA)

BIOGRAPHICAL SKETCH

Colonel David M. Reed (BBA, Western Reserve University; MBA, Southern Illinois University) is an aircraft maintenance officer who has been interested in wholesale logistics throughout his career. He has broad maintenance experience in Military Airlift Command, Air Force Logistics Command, Pacific Air Forces, and was a maintenance squadron commander in Tactical Air Command. His most recent assignment was as the Chief of Depot Maintenance Programs, Directorate of Logistics Plans and Programs in the Air Staff. Colonel Reed is a graduate of the Air War College, Class of 1988.

ACKNOWLEDGEMENTS

This paper was written because inadequate documentation of the depot maintenance funding process has inhibited a broad understanding of this important area. This lack of documentation would have made this paper a mere summary of the author's views if it were not for the help of the many people who agreed to be interviewed and add their professional experience to this project. While the author remains responsible for any errors, special thanks must go to Mr. George Falldine, Ms. Kathy Wilkinson, Col Harvey Nixon, Mr. Bob O'Mara, Lt Col Greg Stanley, Maj Ken Isbell, Mr. Steve Zimmerman, Mrs. Margaret Zook, Maj Jim Daup and Commander Terry Eargle for their help. Another depot maintenance expert whose advice was invaluable in helping make this study coherent is Col Denny Portz.

The most special appreciation, however, must go to Mr. C. D. McElhanon. Mr. "Mac" was the Air Force's depot maintenance expert--and much more--until his retirement last year. Those who had the privilege of working with him will understand the author's deep appreciation for his encouragement and support in untying (however incompletely) the Gordian knot of depot maintenance financing.

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CHAPTER I

INTRODUCTION

> It is a doctrine of war not to assume the enemy will not come, but rather to rely on one's readiness to meet him . . . .
>
> Sun Tzu[1]

The typical senior maintenance officer or logistician who enters the Air Force Logistics Command (AFLC) or the Air Staff has an excellent visceral understanding of the "readiness" referred to by Sun Tzu. That officer has undoubtedly seen the effects of excessive cannibalization actions, late aircraft deliveries from depot facilities and insufficient spare parts to meet the demands of the many missions he or she has tried to support. These officers usually have to take a public oath vowing to make things better before they're allowed to leave for their new AFLC assignment! But when they arrive at the new job, the terminology and interaction of "DPEM" and "DMIF" can complicate life so much that the officer can be very frustrated in satisfying that solemn oath.

This paper is written for this officer who needs to be able to speak the language of depot maintenance resources. It is also written for the more experienced logistician who sees the importance of adding to the meager professional dialogue in this area.

The ability to make depot level repairs to our war-making equipment is one of the key factors in the modern Air

Force's combat readiness equation. Depot maintenance not only overhauls, modifies and repairs aircraft, missiles, engines and a wide variety of ground equipment, but it provides about seven times more spare parts per dollar to busy Air Force flight lines than the much more highly publicized spare parts procurement activities.[2] That capability, however, costs the American taxpayer about $4 billion per year, and in these days of growing fiscal constraints, shortages are increasingly common.

> Insufficient depot maintenance funding reduces the replenishment spares support of weapons systems . . . . The Defense Guidance zero-backlog goal has been tempered with fiscal budget realities, and these reductions have forced large backlogs. The resulting shortfall is expected to cause readiness and sustainability reductions . . . . TAF combat sortie production capability is estimated to be reduced by over 5000 sorties in FY 88 and over 17,000 in FY 89.[3]

This plea from the 1987 Air Force Issues Book is cited to show that in spite of its unquestionable impact on combat readiness, depot maintenance funding has become a major issue in the national budget arena. Problems with depot maintenance funding have more than doubled since that plea and senior Air Force leaders are now deciding how to best survive these losses of spare parts and other depot maintenance services.[4]

What are some basic facts about the depot maintenance program which has become so contentious? Its annual costs have grown from about $2.3 billion in 1980 to

over $4.5 billion today.* It represents major investments in industrial resources made both by the Air Force and by civilian contractors. Over 38,000 Air Force civilians work directly in the Air Force's organic depot maintenance operation and many thousands of other Air Force people manage and procure contractor depot maintenance services. It is big business with significant indirect economic and political impact well beyond the obvious direct readiness capability it provides to the Air Force.

Most frustrating is the almost universally poor understanding of the program because the funding for these resources is extremely complicated. One set of books is used to track the funds needed by the "customers" who buy depot maintenance services, while yet another is used to track the costs and revenues accrued by the "seller" of these services. Both systems look at depot maintenance resources in very different ways, and much of the data in the two systems cannot be compared to each other. In spite of this, the two systems are highly interdependent. Some parts of these systems show incredible detail but the Air Force is frequently frustrated by its inability to aggregate data to respond to reasonable questions about depot maintenance because of the peculiarities of the systems.

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*Unless otherwise noted, budget data will be cited from FY 1987 estimates in the FY 1988/1989 Budget submitted to Congress in January 1987.

The "why should we care?" query in the title of this paper is answered briefly by simply recognizing that the Air Force cannot hope to compete effectively for scarce resources if only a handful of people understand this complicated process. A broader understanding of the depot maintenance process and of the basic issues involved is needed.

Consequently, this paper will not attempt to determine if we have ignored Sun Tzu's admonition or how the Air Force can best cope with the shortages of funds it now faces. The more modest objective is simply to define and explain the methods the Air Force uses to account for its depot maintenance resources. The discussion will go beyond the accurate but impersonal regulatory language and explain some of the underlying logic, history and relationships between the two basic systems. Basic issues will be explored to help understand these explanations and to give some insight into the difficulties of advocating this "must pay" program in today's world of diminishing resources. This paper proposes to give the reader the basic tools needed to understand this complex area and to facilitate a broader, more effective debate in this arena.

OVERVIEW

Before plunging into a detailed discussion of these systems, it is necessary to describe each in general terms. Figure 1 represents the two basic systems and will be the

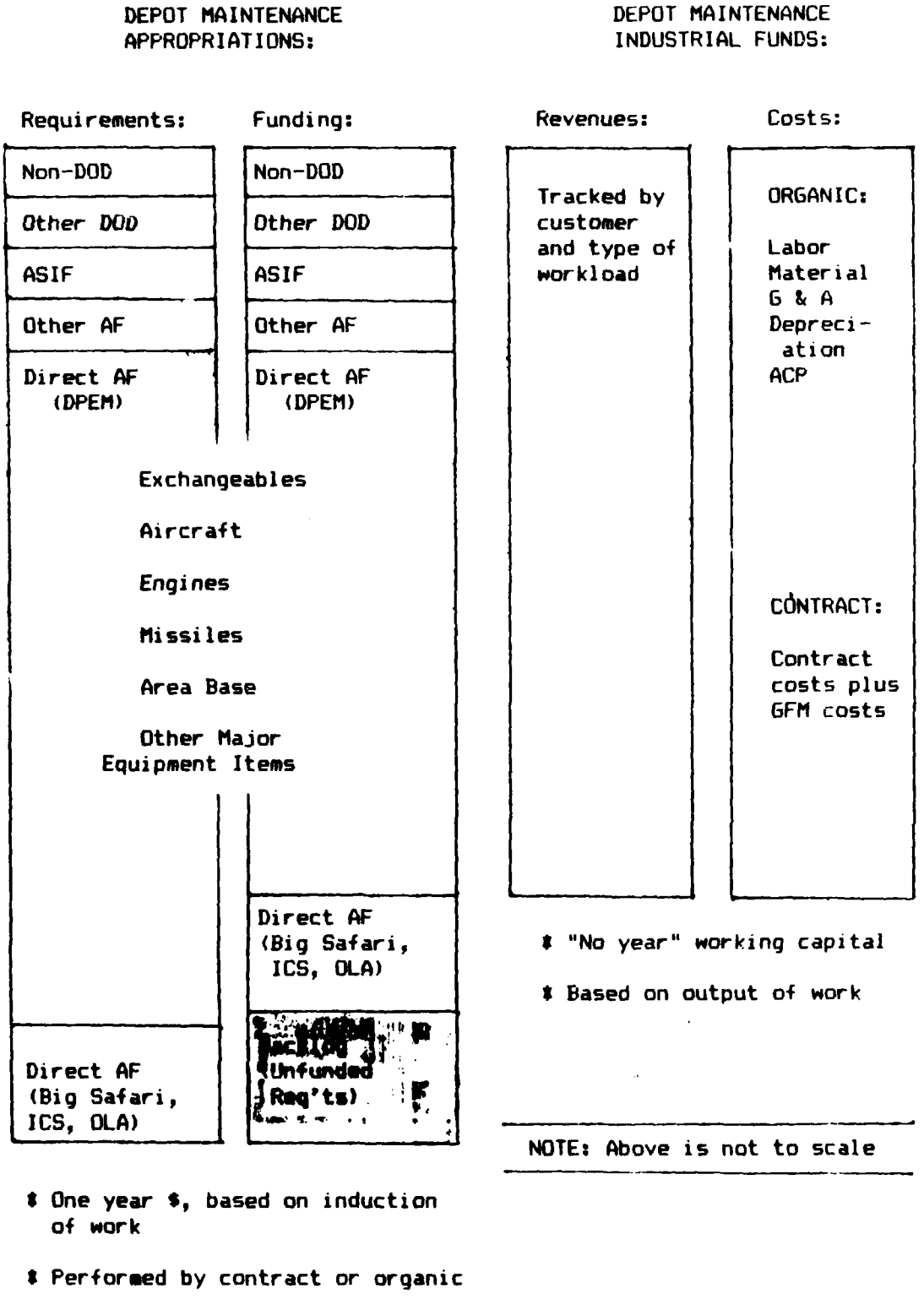
DEPOT MAINTENANCE APPROPRIATIONS:
DEPOT MAINTENANCE INDUSTRIAL FUNDS:
Requirements:
Funding:
Revenues:
Costs:
Non-DOD
Other DOD
ASIF
Other AF
Direct AF (DPEM)
Non-DOD
Other DOD
ASIF
Other AF
Direct AF (DPEM)
Exchangeables
Aircraft
Engines
Missiles
Area Base
Other Major Equipment Items
Direct AF (Big Safari, ICS, OLA)
Direct AF (Big Safari, ICS, OLA)
Tracked by customer and type of workload
ORGANIC:
Labor
Material
G & A
Depreci-ation
ACP
CONTRACT:
Contract costs plus GFM costs
$ One year $, based on induction of work
# Performed by contract or organic
$ "No year" working capital
$ Based on output of work
NOTE: Above is not to scale

Figure 1

focus of most of the first three chapters, where the terminology will be explained. Please note that the segments in the figure are not drawn to scale and that quantitative relationships are not precise.

The left half of Figure 1 represents the funds appropriated by Congress for the customers who buy depot maintenance services. Often incorrectly referred to in its totality as "DPEM," the reader should note that while the largest segment is called Depot Purchased Equipment Maintenance (DPEM), a large amount of total depot maintenance appropriations are not DPEM. Each customer participates with Air Force Logistics Command (AFLC) Materiel Management (MM) in determining requirements, obtaining appropriations and buying maintenance services to execute the program. The price the customer will pay for each workload must be determined by the Depot Maintenance Industrial Fund (DMIF).

The right half of Figure 1 represents the DMIF. It provides the working capital for the Air Force's depot maintenance industrial resources. Its revenues are the reimbursements from the appropriated funds mentioned above (and a small amount of foreign military sales funds) which must match its costs of operation. Organic DMIF funds are managed by AFLC's Maintenance community which sells its services to Materiel Management. Contract DMIF funds are different, being managed by a portion of the Materiel

Management community which is organizationally separate from the "buyers." The overall size of the DMIF is dependent on the funding of all depot maintenance appropriations. As a result, close, continuous cooperation is essential to insure obtaining the correct mix of organic resources and contract capabilities to satisfy customer requirements.

These short descriptions only provide a general sense of the degree of interdependence that operates between the appropriated and industrial funds. A more comprehensive view will start with a detailed look at depot maintenance appropriated funds in the next chapter.

CHAPTER II

DEPOT MAINTENANCE APPROPRIATIONS

In the 16th century, ". . . the first requirement for a well-ordained army was invariably money."[1] Nothing has changed except possibly that the complexities of our modern Planning, Programming and Budgeting System (PPBS) demand a new kind of tenacity and courage that ancient warriors didn't have to worry about. This chapter will discuss depot maintenance appropriated funding, identify its customers and services, explain its arcane terminology, and discuss some practical aspects of the budget process.

The Congress appropriates funds every year to the services through the Department of Defense (DOD) to procure equipment, perform research and development, and to operate and maintain its forces. Depot maintenance funds fall into the Operations and Maintenance (O&M) category, broken out by customer program elements (PEs). The left column in Figure 1 summarizes who the major customers of the DMIF are.

NON-AIR FORCE CUSTOMERS

"Non-DOD" customers (who obtain their own appropriations from Congress, separate from DOD) include the Federal Aviation Authority, Department of Interior, Drug Enforcement Agency and many other federal agencies who need the services provided by the DMIF. Support to Foreign Military Sales customers also falls in this area. The

volume of non-DOD customers' workload is relatively small--less than $40 million annually--but the services provided are critical to their operations.

"Other DOD" customers include the Army, Navy, Marine Corps, and various DOD agencies. The growing importance of interservicing is reflected in growth from about $70 million in FY 1986 to over $90 million in FY 1988.[2] Another DOD customer is the Airlift Services Industrial Fund (ASIF). The ASIF "appropriations," however, are included in various DOD O&M programs, primarily as air transportation costs paid by Military Airlift Command (MAC) customers.[3] The ASIF allocation to depot maintenance for support of assigned aircraft is substantial, typically over $300 million each year.[4]

AIR FORCE CUSTOMERS

"Other AF" customers include the Reserve forces, Stock Fund, Research Development Test and Evaluation (RDT&E), and Procurement functions. All these customers receive appropriations directly from Congress except the Stock Fund, which, similar to the ASIF, is a revolving fund whose depot maintenance "appropriations" are buried in its customers' appropriations for support. The stock fund spends about $100 million annually for depot maintenance, primarily for the manufacture of stock fund assets by the DMIF.[5]

The Procurement customer is similar to the stock fund customer because it also receives depot level manufacture services. The items manufactured, however, are investment items instead of stock fund items. Procurement appropriations also pay for overhaul of government furnished equipment items provided to production contractors.[6] The RDT&E customer is the support of Air Force Systems Command aircraft involved in RDT&E functions. Both Procurement and RDT&E customers are relatively small, spending about $30 million each annually.[7]

The Direct Air Force (DAF) is the largest program by far, in FY 1987 exceeding $3.2 billion compared to the Air National Guard $314 million, Air Force Reserve $173 million and RDT&E $38 million. The large DAF customer represents TAC, SAC, USAFE, PACAF and all the remaining major commands, including MAC non-ASIF resources. Consequently, with the exception of the Reserve Forces, some Air Force Systems Command activities and MAC airlift, the major commands do not plan, program and budget for depot maintenance resources. These activities are performed on the Air Staff for DAF customers by the Directorate of Logistics Plans and Programs. This representation extends to the Materiel Management (MM) functions at AFLC headquarters and at each Air Logistics Center where the MM represents the customer in obtaining depot maintenance services.

WHAT DO THEY BUY?

By now it is clear that the appropriated accounts represent a variety of customers for the DMIF. To show what services are bought and how these requirements are presented in budget requests, the DAF depot maintenance account will be explored in some detail. For the purpose of this discussion, it is unimportant whether these services are obtained organically or by contract so no distinction will be specified.[8]

Figures 1 and 2 show the DAF appropriation split in two parts. The largest segment of roughly $3 billion is Depot Purchased Equipment Maintenance (DPEM) and includes all DAF depot maintenance purchased from the DMIF. The remaining portion of the DAF appropriation includes non-DPEM programs costing over $300 million annually which do not go through the DMIF. The following detailed discussion of these elements of expense explains what kinds of services are received by the customers.

DPEM

The largest part of DPEM is the Exchangeable Component repair program which repairs spare components for all the equipment the Air Force possesses. These spares are not only used on aircraft, engines and missiles, but on a wide variety of other equipment such as ground communications vans, navigational aids, railroad cars and many other less well known systems. This program provides

DEPOT MAINTENANCE AND MODERNIZATION

DIRECT AIR FORCE OPERATIONS AND MAINTENANCE
PE 72207
($ Millions)

Element of Expense	FY 1987 CarryIn	FY 1987 Stand-Alone Req	FY 1987 Total Req	FY 1987 Funding	FY 1987 Backlog	FY 1988 CarryIn
Aircraft:	22	665	687	612	75	77
Maintenance	(22)	(482)	(503)	(429)	(75)	(77)
Mod Install	(0)	(184)	(184)	(184)	(0)	(0)
Missiles:	0	110	110	110	0	0
Maintenance	(0)	(106)	(106)	(106)	(0)	(0)
Mod Install	(0)	(4)	(4)	(4)	(0)	(0)
Engines	13	452	465	465	0	0
OMEI	0	88	88	88	0	0
Exchangeables	84	1583	1667	1537	130	91
Area Base	0	96	96	96	0	0
DPEM Total	**118**	**2995**	**3113**	**2908**	**205**	**168**
Big Safari	0	155	155	155	0	0
ICS	0	178	178	178	0	0
OLA	0	8	8	8	0	0
Other Total	**0**	**341**	**341**	**341**	**0**	**0**
DAF TOTAL	**118**	**3336**	**3454**	**3250**	**205**	**168**

Carry-In + Stand-Alone Requirements = Total Requirements
Total Requirements - Funding = Backlog
Backlog + Inflation - 20% = Carry-In

FY 1988 BUDGET EXTRACT FOR PE 72207f

FIGURE 2

funds for the repair of system components which cannot be repaired at base level and are sent to the depot for repair. As mentioned previously, each dollar spent in the repair of spares returns seven times more spare parts as that same dollar spent to procure spare parts, so the leverage of this program on readiness and sustainability is substantial. A unique feature of this program is that it is managed by commodity class instead of by identification with the weapon system(s) on which parts would be installed. That causes some basic analysis problems which will be discussed later.

The Aircraft program is the best known DPEM program and receives the most visibility. It includes Programmed Depot Maintenance (PDM) for those aircraft which are still on a time interval depot level inspection, and Analytical Condition Inspection (ACI) actions which validate service life data and PDM intervals. On-Condition Maintenance (OCM) repair requirements such as crash damage, deseal/reseal, severe corrosion, etc. are part of this element. The installation of modification kits is also included here and is shown as a separate entry to facilitate reporting of overall force modernization costs. Closely related is the smaller, but no less important Missile program which shows the same types of costs for intercontinental ballistic missiles.

The next largest program is for the repair of engines and engine modules. This also includes the cost of

repair of engine components removed during the depot level repair of the engines, but does not include the repair of engine components received from base level repair activities.

Other Major Equipment Items (OMEI) includes 34 different stock classes of equipment ranging from ground communications vans and navigational aids to snow plows and refueling vehicles. The diversity is no less within each stock class. Simulators, for example, range from desk top training devices to building-sized aircraft simulators.

The Area Base Support element is a composite of area support, base support and special support. Area support includes funds that each Air Logistics Center (ALC) needs to support its responsibilities linked to the geographical area it supports. These are primarily Precision Measuring Equipment Laboratory calibration responsibilities plus some relatively simple depot level equipment repairs. Base support responsibilities are related to host-tenant agreements which eliminate unnecessary duplication of resources at an ALC and provide maintenance of items stored in the depot. Special support is for a small amount of depot manufacture workload and software support for depot maintenance activities.

Other (Non-DPEM)

Interim Contractor Support (ICS) provides resources for temporary contractor accomplishment of depot maintenance

repair services, primarily for the repair of spare parts. As new weapon systems or major modifications are acquired, it is often more cost effective to rely on a contractor's technical skills and excess manufacturing capacity to provide repair services. This enables the Air Force to avoid premature design and procurement decisions for long lead time test equipment for components of sub-systems whose design has not yet stabilized. ICS is portrayed separately from DPEM because of Congressional interest in this area where sole source contracting predominates.[9]

The Big Safari element reflects total depot maintenance support for selected classified programs. The work is performed at two special contractor depots which have been established for this purpose. The element is separate from DPEM and DMIF to minimize exposure of classified information.[10]

The Other Logistics Activities (OLA) category consists of funding for the metrology function of the Aerospace Guidance and Metrology Center (AGMC), support for Minuteman test launches and for the Joint Depot Maintenance Analysis Group (JDMAG).

REQUIREMENTS DETERMINATION

Sun Tzu refers to the importance of "estimation of quantities" as his second element in the art of war.[11] The modern Air Force is no different because it has to estimate the quantities of expected failures and repairs and

accurately estimate pertinent costs for the five year defense program for all the elements of expense already discussed. These requirements are the estimated costs to maintain and repair weapon systems and to repair predicted asset failures. A key budgetary rule is that there must be a bona fide need to begin work on that asset (or assets) during the period of time for which the funding is requested. Appropriated funds are obligated when the workload is entered into the repair process, or "inducted."

The requirements determination process is important because any lack of confidence in the process will undermine attempts to obtain needed funding. The process is very different for each element of expense and it would be beyond the scope of this paper to review them all. The process for the large Exchangeable component repair and Aircraft programs will be summarized to give the reader a feel for the variables involved and the impact of the PPBS process.

EXCHANGEABLES: The D041 "Recoverable Consumption Item Requirements Computation System" computes repair and buy requirements for Air Force recoverable spare parts as part of its overall objective of determining future inventory needs. The inventory, as of 1985, consisted of over 170,000 line items with a value of $46 billion. The system looks at historical usage and cost data and the weapon system's operational environment, recognizes forecast operational changes and extrapolates future requirements. That simple

description requires inputs to DO41 from nine different families of data systems to satisfy an algorithm whose basic logic has only been faulted once in many years of continuous review by the General Accounting Office and the Air Force Audit Agency.

The system is not a "macro" system, but is processed by line item (all 170,000) four times a year to enable item managers to make the most current decisions on their items. At least once each year, HQ AFLC visits each ALC to sample selected data and insure policies are being applied consistently. Twice each year, aggregate totals are generated for budget purposes. The system cannot recognize customers, so each ALC and HQ AFLC manually converts the data to budget format by customer.

The "Transition Statement" is the document which converts the DO41 data to budget data. Adjustments include additive factors for line items which are not yet catalogued or are otherwise not in DO41, changes to force and flying hour programs after the computational baseline was set, and offsets for ICS and warranty programs, for example. "Non-generation" factors are applied which reduce requirements if the ALC has historically over-estimated repair generations. And adjustments are made for ever-changing inflation rates.[12]

The transition statement is submitted to the Air Staff in late summer--about 14 months prior to the start of

the fiscal year in question. Additional reviews are made both to validate the transition statement and to include the most recent program changes. The budget supported by this transition statement is submitted by the Air Staff to the Office of the Assistant Secretary of Defense/Comptroller (OASD/(C)) in early fall and is subject to scrutiny by the Office of the Secretary of Defense (OSD) and by the Office of Management and Budget (OMB) until the budget is finally submitted to Congress in January or February. By the time Congress approves a budget later in the year, the exchangeable figure invariably changes substantially from the original Air Force submission because of changes in flying hours and force structure, and because of mandated changes in how the Air Force intends to operate.

AIRCRAFT MAINTENANCE AND MODIFICATION: The GO79 Systems and Equipment Modernization/Maintenance Program is a semi-automated database which tracks the need for PDMs, ACIs, modification installation, etc. by type aircraft, by repair facility. The overall purpose of the system is to insure that the Air Force matches the procurement of modification kits to their installation to insure we have the needed kits in time, but don't waste funds on kits which will just sit on the shelf. A major collateral benefit is that the system enables us to keep close track of our on-aircraft depot maintenance requirements. System Program Managers (SPMs) at each ALC insure that the projected schedule of depot inputs

for both aircraft and ICBMs is kept current to show approved changes to work packages and approved DMIF sales rates.

While the system sounds simple, the turbulence in modification programs and kit deliveries combined with the problems of establishing an economical kit installation flow makes the actual execution much more difficult than the theory. The system is updated continuously throughout the year and semi-annual team visits by HQ AFLC and the Air Staff provide face-to-face coordination of program status with ALC managers so that GO79 products generated for budget use are accurate.

All the remaining elements of expense have equivalent methods of estimating appropriation requirements. Each customer uses these AFLC-operated systems to determine and justify their funding requirements. A significant exception to that is the Air Force Reserve's use of separate cost factors to develop its Exchangeable requirements.[13]

BUDGET PREPARATION AND PRESENTATION

The Budget Estimate Submission (BES) delivered to OSD in September shows more detail than budgets submitted to Congress the following January or February. For example, exhibits to OSD include detailed unit costs and quantities for all aircraft and missiles by mission designator and series (MDS) and for all engine type, model and series

(TMS). Congressional submissions, however, are summarized by element of expense.

The mechanics of the process, however, are still important. A distinction is made in our appropriations budgets between requirements and approved funding requests. Figure 2 shows both funding and requirements for FY 1987. Throughout the PPBS process, reductions in funding and requirements are tracked separately. Changes in inflation rates or identification of errors in requirements computations, for example, do not cause a problem because they will result in reductions of both funding and requirements and will not exacerbate funding shortages. Often, however, fiscal constraints result in cuts to funding which do not reduce requirements and result in increases in funding shortages or backlogs. These backlogs must be portrayed so that senior decision-makers can see the financial impact of inadequate funding.

Another look at Figure 2 shows that the first column is the backlog from the previous year carried into the current year and is called "Carry-In". The next column reflects all the requirements which will generate and can be inducted during that year (ignoring financial constraints) and is called "Stand-Alone Requirements." The "Total Requirements" column is the sum of the first two columns. The "Funding" column reflects the funding being requested, and the "Backlog" column is the resulting shortfall. This

terminology is very straightforward but gets confusing when we carry over the backlog to the next year.

First, the FY 1987 backlog has to be escalated into FY 1988 dollars. In Figure 2, the total goes from $205 million to $210 million using a composite organic/contract factor of 2.7%. Then that value is reduced by 20% to $168 million. The 20% reduction recognizes that if spares are in short supply, aircraft will operate in partially mission capable status instead of fully mission capable. In short, with fewer spare parts in the system, fewer will generate as repairable spares. While this logic is far from perfect, it is more logical than assuming all backlogs will carry over at 100%.

A few words characterizing Air Force interaction with OSD and Congress are appropriate here. OSD's fall reviews of both appropriated and industrial funds are performed primarily by the Office of the Assistant Secretary of Defense (Comptroller) (OASD(C)). These reviews are thorough, and for the past few years have been very contentious and have resulted in major reductions in funds. In the FY 1988/1989 cycle, for example, backlogs grew (in the opinion of the Air Force) by $75 million and $340 million respectively, with 18 different Program Decision Packages (PBDs) involved. No PBD appeal was successful. Congressional review has been less contentious, but is stiffening.[14]

SUMMARY

Congress appropriates depot maintenance funds for a large number of government agencies, and the largest is the Direct Air Force. DPEM is that portion of the direct Air Force appropriation which buys services from the DMIF. The funds are one year O&M dollars for workload which needs to be inducted during the budget year. A wide variety of workloads are supported which cross the entire spectrum of Air Force missions. A backlog of funds means that work that was expected to be needed can no longer be inducted and will probably have a serious readiness impact on one or more of those missions.

That describes appropriated depot maintenance funds; the related industrial fund described in the next chapter is very different.

CHAPTER III

AIR FORCE INDUSTRIAL FUND, DEPOT MAINTENANCE SERVICES (AFIF, DMS)

The term "DMIF" is perfectly acceptable to use, but the official name as used in the title of this chapter is useful because it recognizes that there is an entire family of Air Force industrial funds.[1] The other parts of the AFIF include the Airlift Services Industrial Fund (ASIF), the San Antonio Real Property Maintenance Activity and the Laundry and Dry Cleaning activities at a few bases. With revenues and costs exceeding $4 billion in FY 1987, the DMIF was over twice as big as the ASIF and comprised two-thirds of the total AFIF.[2]

As seen in the last chapter, the DMIF includes all Air Force depot maintenance costs except ICS, Big Safari and OLA costs. It not only provides the working capital for Air Force organic depot maintenance operations but provides the kind of management information needed to effectively and efficiently operate a responsive industrial complex. Lastly, it facilitates establishment of a buyer-seller relationship which should reduce total Air Force depot maintenance costs.[3] The remainder of this chapter will explain selected aspects of the DMIF, compare them to the appropriated funds, thereby explaining how some of the objectives of the DMIF are attained.

BUDGET PREPARATION AND PRESENTATION

The DMIF budget preparation differs in many ways from appropriated budgets. Instead of being a joint AFLC/MM and customer exercise, it is basically an AFLC/MA action.[4] The only formal Air Force submission for the DMIF is the Budget Estimate Submission (BES) in the early fall. Although substantial service effort is required, the subsequent formal submission to Congress is published by OSD.

The DMIF BES in FY 1988/1989 was 88 pages of exhibits and narrative showing manpower data and explaining revenues and costs for both contract and organic services. These exhibits show how the DMIF will operate by summarizing sources of revenue and anticipated costs, reflecting a balanced, zero profit operation. The OSD document to Congress limited the DMIF portion to eight pages.

OSD and Congressional reviews are thorough even though the DMIF is not appropriated because, in addition to insuring certain policies are being applied consistently by the services, an adjustment to the DMIF may result in reduced appropriated funds. A review of DMIF manyear authorizations during the FY 1988/1989 cycle, for example, reduced DAF appropriated funding by over $500 million.[5]

COSTS

The DMIF provides the Air Force an opportunity to account for its costs by workload and to be reimbursed for

those costs by customers through revenues. The types of costs incurred for contract DMIF are primarily contract costs (including interservice workloads) and the cost of government furnished materials obtained from the stock fund. Organic costs also include civilian pay and benefits, facility maintenance, depreciation, various overhead and administrative costs, and other typical industrial costs, as shown in Figure 1.[6] The major costs not in the DMIF which complicate comparisons with industry are for real estate and military personnel.

REVENUES

DMIF revenues are simply the funds paid to the DMIF, calculated by multiplying the quantity of work completed times the sales rate for that workload. Sales rates must be developed by workload--per hour for aircraft and missiles, and per type asset for engines and exchangeables--which will approximately recover the costs incurred by the DMIF. These rates are established prior to submission of appropriated budgets and, except where changed by OSD, are stabilized so that customers are not adversely affected by significant cost changes. The problems that rate stabilization causes the DMIF are well documented, including reducing the capability of the DMIF to measure performance and reducing the flexibility and financial authority of fund managers.[7] In spite of the high level of precognition demanded,

however, the sales rates must be developed relatively early in the PPBS cycle.

Sales rates are based on the costs anticipated to be incurred plus a surcharge for equipment modernization, known as the Asset Capitalization Program (ACP). In 1981, OSD was convinced that DOD depot equipment needed a serious upgrade to civilian industrial standards because it was not competing well against other service equipment requirements. Starting in FY 1983, the services were allowed to add a surcharge to their sales rates to cover this OSD-approved equipment procurement. The surcharge plus the budgeted depreciation cost built into the sales rates has resulted in substantially larger equipment procurement by AFLC.[8]

REVENUES VERSUS APPROPRIATIONS

The sales rates are developed based on the estimated costs in the fiscal year of induction, but revenue is not earned until completion of the workload and subsequent billing to the customer. For that reason, Figure 1 is misleading because the second and third columns are the same size, implying that appropriated funds are the same as DMIF revenues. They may be close, but will never be the same because the appropriated funds for a period are based on when the workload was actually inducted into production. DMIF revenues, on the other hand, are based on billings which are normally not made until production is completed.[9]

For example, if a customer purchases work from the DMIF by submitting a funded project order on the 10th of September, 1988, and the work is inducted into production, the customer's appropriated funds will have been obligated and he will not have to worry about underobligation of FY 1988 funds. The DMIF will be incurring costs which will be paid out of its working capital; DMIF funds are "no-year," not tied to a given fiscal year. If all the work is completed before the end-of-month billing cycle, revenues will be counted in FY 1988.

Most work orders, however, are not completed that quickly. Also, there is often a delay in the final sale or billing which represents the generation of revenue. The final complication is that some work is inducted into production, but work doesn't actually start. All these variables have generated the following budget terms and definitions:

Work in Process (WIP) = accumulated product cost for work inducted and completed (or manhours earned) but not billed

Net Availability (NA) = revenue value of job inducted but not yet completed (synonymous with "funded carryover" and "net available")

Unbilled balance = job inducted, not billed

Unbilled balance = WIP + NA

Each of these terms is useful in accounting for workloads and forecasting revenues. Particular attention has been placed on Net Availability because of concerns that a portion of it may represent work that was inducted prematurely.[10] This is discussed further in the next chapter.

PRODUCTIVITY

The DOD-wide emphasis on productivity improvements has not exempted depot maintenance. Particularly in view of improvements to depot maintenance equipment cited above, significant improvements to depot maintenance productivity are expected. At OSD insistence, the Air Force (AFLC) BES has included reporting of productivity improvements. These included an overview of PACER IMPACT (Industrial Maintenance Productivity through Accountability, Creativity, and Technology) and five examples of initiatives which were expected to generate productivity savings.[11] In a table summarizing projected budget savings and cost avoidances for FY 1986 through FY 1989, budget savings ranged from $9 million to $26 million and cost avoidance ranged from $105 million to $139 million.[12] It is noteworthy that the largest savings accrue from developing repair techniques for items previously discarded when worn; thus no labor productivity is realized.[13]

SUMMARY

The DMIF is very different from the appropriated customers it services. Organic DMIF is managed by the Maintenance community instead of the Materiel Management community, but the contract DMIF is managed by the "sellers" in Materiel Management. DMIF bookkeeping is based on output instead of input. Its funds are not constrained to a specific year, but care must be taken not to let Net Availability get excessive.

These basic facts about DPEM and DMIF provide enough background to discuss some basic issues of depot maintenance funding. The next chapter reviews some of these issues and provides some concrete situations to provide a more complete understanding of the preceding abstractions.

CHAPTER IV

BASIC ISSUES

The issues in this chapter reflect conflicts within the corporate Air Force and between the Air Force and OSD, OMB and Congress. These are important issues that drive deliberations on the amount of resources that can be applied to depot maintenance. They also affect many other policies and can have big impacts on day-to-day workloads. They usually surface during high pressure periods of program and budget deliberations, with higher levels of authority disputing the levels of funding being requested. Discussions within the Air Force predominate during the POM process and as subsequent funding adjustments are made. Issues with OSD or OMB surface as the Air Force BES is analyzed in the September to January time frame. Congressional review spans from the January submission of the Budget until its final adoption, which in recent years has not been until December.

DPEM BACKLOGS

One of the overarching issues in the depot maintenance arena is the validity of backlog estimates, their quantitative impact on readiness and their tangibility. Appropriated backlogs are normally referred to as "DPEM" backlogs because until FY 1987, these funding shortfalls were strictly allocated to DPEM. The following

shows recent DAF backlog history as of the FY 1988/1989 President's Budget:

($ Millions)

FY 1980	$103	
FY 1981	12	
FY 1982	11	
FY 1983	23	
FY 1984	179	
FY 1985	0	
FY 1986	120	
FY 1987	205	(estimated)
FY 1988	150	(estimated)
FY 1989	410	(estimated)[1]

Improvements in the early 1980s reflect the increased funding from the new administration. The FY 1984 problem was fixed by FY 1985, but problems reappeared as competition for funds increased. The common wisdom of the period was that in spite of strong Defense Guidance to fully fund depot maintenance DOD-wide, a shortfall of $50 million to $75 million could be tolerated in spite of the problems it caused. When FY 1987 backlogs started to approach $200 million, part of the backlog was allocated to Big Safari and ICS, the first time non-DPEM resources were affected. The following year backlogs were allocated to the Reserve forces for the first time.[2]

It is worth reviewing just what these backlogs are. As cited previously, they are the difference between depot repair requirements and depot repair appropriated funds. That difference results in reparable spare parts that are not repaired because of a lack of funds. DPEM backlogs should not be confused with the following:

1. Shop backlogs caused by unanticipated inability to support inducted workloads due to a lack of parts or a lack of other resources. Once inducted into a shop, they cannot by definition be DPEM Backlogs, but may be that other problem, Net Availability, which is the object of continuous Maintenance management attention.

2. All reparable assets on warehouse shelves. Many, if not the majority of such assets do not require immediate repair action because adequate serviceable inventories are available to satisfy current customer needs. This large number of apparently surplus assets should not necessarily suggest item mismanagement; normally these surpluses simply reflect a temporary lull in demand patterns.

Some of these reparable assets may, in fact, be part of the DPEM backlog, unable to be inducted because of a lack of appropriated funds or a shortage of materials or other resources. In times of severe funding shortages, the proportion of "backlog" assets to "non-backlog" assets may get fairly high. Unfortunately, there is no simple way to distinguish between these categories during a walk-through of a warehouse.

VALIDITY OF REQUIREMENTS. The overwhelming problem associated with DPEM backlogs is the validity of the underlying requirements. As mentioned previously, no

activity in AFLC is more closely managed and monitored than its requirements determination process. But the following review of DAF requirements estimates is revealing:[3]

($ Millions):

PPBS INSTRUMENT	FY 1985	(as of)	FY 1986	(as of)
POM	$ 3917	(5/83)	$ 4216	(5/84)
BES	4149	(9/83)	4091	(9/84)
President's Budget	3915	(1/84)	3789	(1/85)
ACTUAL	3395	(11/85)	3177	(11/86)

After comparing the initial estimates for each of these years as of the Program Objective Memorandum (POM) to the actual dollars obligated, it is not impertinent to ask what happened to half a billion dollars of requirements in FY 1985 and a billion dollars of requirements in FY 1986! The Senate Appropriations Committee (SAC) specifically cited the Air Force's reprogramming of $600 million in FY 1986 and $126 million in FY 1987 in cutting FY 1988 spending.[4] Reductions in inflation rates were a substantial cause and were not controlled by the Air Force. The other large reductions, however, were in reparable asset generations. It appeared that the requirements determination system moved much too conservatively and did not adequately consider the increased modernization of the force. This modernization includes both the increased proportion of F-15s and F-16s versus F-4s in the DAF inventory and the benefits of major systems modifications in

older aircraft such as the avionics upgrades in the B-52 and F-4 aircraft.

It would have been very satisfying if FY 1987 experience substantiated the above analysis, but it did not. FY 1987 requirements stayed firm and did not continue the downward trend in requirements. Analysis strongly suggests a reversion to the historical growth rates of the past.[5] Unfortunately, the fluctuation of these requirements does nothing to restore confidence in their development process. In these days of ever-increasing fiscal constraints, this circumstance will only serve to put more depot maintenance funding at risk.

IMPACTS: And if DPEM backlogs grow, so what? What are the real impacts? Every maintenance professional in the Air Force knows that base level cannibalization actions will increase and working hours will get longer and more frustrating. At depot level, "rob-backs" will increase and have the same impacts as base level cannibalization. Item and system management functions will get more complicated at a geometric rate of progression as all priorities creep higher and resource allocation decisions become increasingly difficult.

But how much? How much force structure will we lose for every $X million of DPEM backlog? How many flying hours will which command have to turn back in? What force structure and flying hour difference does it make if we

defer selected PDMs instead of deferring the repair of spares?

These questions remain, unfortunately, rhetorical. They are wrestled with daily by people armed with their own experiences and good judgement, but there is only a limited body of quantitative analytical tools, most of which were developed to work with spares procurement and do not consider the added variables in the world of repair. For example, manipulation of the Logistics Management Institute model through the conversion of DPEM backlogs into War Readiness Spares Kit quantities provides quantification of tactical combat sorties lost per level of DPEM decrement. But this is only valid in a fairly narrow range because it cannot consider the impacts of base level actions to compensate for parts shortages.[4]

In summary, the DPEM backlog is a key management indicator which attempts to portray the degree of damage to depot maintenance funding. Care must be taken not to confuse it with other backlogs and to recognize a certain amount of volatility in its underlying requirements. Lastly, its impacts are very real, but attempts to quantify those impacts have been inadequate and the subjective evaluations of experienced experts still remain the best estimates.

NET AVAILABILITY

In 1985, a substantial initiative was taken by OASD(C) to move the Net Availability issue to center stage. Net Availability represents workload that was inducted but on which work hasn't been completed. Their concern was, and remains, that the services prematurely induct work during a given fiscal year, wasting valuable budget resources. Perceived problems range from excessive concern about shop work backlogs to end-of-year spending sprees and the use-or-lose mentality which violate the bona fide need requirement. OSD recognizes the necessity of a small net availability and has informally suggested that it should not exceed two months worth of workload. While analysis continues to search for the appropriate level of net availability, this issue prompted OSD to cut Air Force funding for FY 1989 by over $260 million and by more than $2 billion DOD-wide.[7]

The Air Force agrees that excess net availability is a problem demanding immediate attention. Exceptional action has been taken to reduce real net availability problems. But the Air Force also argues that OASD(C) has not adequately considered workloads which extend the average net availability beyond the anticipated OASD(C) limit. Actual net availability in FY 1986 was 2.8 months and is expected to decrease to 1.9 months by FY 1989. The Air Force has proposed a range of acceptable volume of workload

of between 1.9 and 3.8 months based on a thorough study made at OASD(C) direction, using their criteria.

The AFLC study shows that most net availability balances do not reflect mismanagement but are simply fact-of-life circumstances which prolong the time between induction and completion. Specific reasons for net availability include normal workload flow time, material shortages and delays, erratic or slow generation of assets, late year inductions and other factors.[8] Workload flow times, for example, include crash damaged aircraft repairs which can last several years because of material availability problems. At one ALC, two-thirds of the net availability is for manufacture workloads which have typically long flow times frustrated with material problems. In addition, the system has built-in administrative delays which include the weeks between job completion and billing in the net availability calculation.[9]

The issue is important, but care must be taken as investigation and corrective actions evolve. Increased management attention is being paid to inductions of workloads to insure there is a bona fide need for repair services. If this action generates needed funds in these fiscally constrained times, the Air Force may yet consider it a worthwhile exercise. Care must be taken, however, to recognize increasing workload turbulence caused by growing consideration of net availability factors. Additional

management attention will probably be needed to assure the smooth production flow needed for an efficient shop operation.

PRODUCTIVITY REPORTING

Current anecdotal methods of displaying productivity in the DMIF budget are not consistent with relatively sophisticated productivity analyses used in industry. Budget reviews have suggested a growing impatience with this lingering problem. For example, the latest Senate Appropriations Committee report laments DOD's failure to document savings from the Asset Capitalization Program (ACP) and has directed all DOD agencies to account for all ACP savings since 1984 and include appropriate savings forecasts in the next budget submission.[10]

The problem is massive because no management information system exists to portray the changes in productivity in each resource control center (RCC). The variable factors which make up productivity are visible when RCC sales rates are developed, but are lost in the subsequent manipulation of data.[11] No system exists which will comprehensively capture changes in productivity except the manual attempts to capture major improvements. "Output Per Paid Manday" data is accumulated, but disagreement on its validity as a measure of productivity has precluded budgetary adoption.

In the meantime, Congressional staffers have levied huge analytical workloads on the Air Force in 1986 and 1987, requesting year-to-year comparisons of workload quantities, man-hours and costs of aircraft PDMs, with the intent of somehow gleaning productivity information from this data. It is virtually impossible to make this data comparable for productivity analysis, but the lack of another method of portraying productivity related to budget submissions gives the Air Force no alternative but to continue this frustrating task.

STOCK FUND DISCONNECT

The first of two major stock fund-related issues is the lag between stock fund prices recognized in the DMIF sales rates and the higher actual stock fund charges. This phenomenon, first recognized in 1983 during a period of steep inflation, results in a chronic understatement of sales rates which causes losses in the DMIF.

The timing of price updates to the Stock Fund and to sales rates used to develop the DMIF Budget and the various appropriated funds creates a two year lag which ignores inflation. When that effect is added to the lag caused by the stabilization of sales rates, it is possible that actual material costs will exceed estimates by several years' worth of inflation. This will cause chronic losses to the DMIF which, besides constraining DMIF operations, will eventually require appropriated reimbursement.

This was substantial when first noticed because of the double digit inflation experienced in the late 1970s and early 1980s. A typical example of the time reflected 15% to 20% understatement of material costs, and the Air Force succeeded one time in gaining additional funds to plug this gap. The underlying systemic problems, however, were not fixed. While the Air Force no longer has double digit inflation problems, it still understates requirements each year because of this phenomenon.[12]

STOCK FUNDING OF DEPOT LEVEL REPARABLES

Pressure may be building to change the way the Air Force funds its repair of exchangeable components. After much study, the Navy started a test in 1981 to stock fund its non-aviation depot level reparables (DLRs), or Exchangeable components. The rate of return for non-aviation reparable components rose from the mid 60% range to over 90%. Because of that success, that test was extended to its aviation DLRs in 1985 and should be completed by the end of FY 1988. Success is anticipated because preliminary data shows depot workload was reduced 15% because more repairs were performed at less expensive intermediate levels. That experience is attributed to the financial incentives to the "customer."[13]

What is involved? First, the procurement and repair of replenishment spares would no longer be centrally funded. While AFLC would continue to provide central

management services, the weapon system owning commands would have to plan, program and budget for buying and repairing its spare parts, theoretically accounting for assets all the way down to base level. DPEM would no longer include the Exchangeables element. Total management of procuring and repairing reparable spares would be managed in a separate division of the Air Force Stock Fund which would be reimbursed by its customers. This new Stock Fund division, of course, would be the dominant customer of the DMIF. In theory, it would always be fully funded. Also, financial incentives would be built in to the system to assure item accountability at all levels.

The Navy has been impressed with the benefits of the system because of the improved control of assets and reductions to depot inductions. It is difficult to see, however, what benefits could accrue to the Air Force which already incentivizes maximum base level self-sufficiency, loses virtually no assets, and sees little direct financial incentive to make the monumental changes required to maintenance, supply, logistics, and budget systems at all levels of command.

CONTRACT DMIF

Another issue driven by differences between the services is the constant pressure from OASD(C) to remove contract services from the DMIF. While the Army and Navy have industrially funded substantial R&D, warehousing, and

civil engineering functions which the Air Force considers inappropriate for industrial funding, these other services have excluded contractor services from their industrial funds.[14] Again, the drive for standardization forces the Air Force to continually defend its practice.

A 1981 General Accounting Office (GAO) report questioned the Air Force's use of anticipated customer orders for awarding depot maintenance contracts. Subsequent Congressional review recognized that the Air Force practice was consistent with generally accepted business practice and specifically appropriated funds for the Air Force to continue funding contracts through the DMIF, but requiring funding of DPEM project orders in advance of DMIF contracting actions.[15]

Other anti-contract themes include depletion of IF resources, contributions to net availability problems, and misalignment of fiscal and program responsibilities in this arena. Air Force analysis suggests that to include contract resources in the IF actually improves budgetary resources, that contract resources do not exacerbate net availability problems, and that responsibilities are clear and consistent with practices in other industrial funds. The most compelling argument may be the need to appropriate over $500 million in added O&M funds to remove contracts from the DMIF.[16]

DATABASE ANALYSIS

The most frequently asked type of question that can't be answered quickly by depot maintenance analysts and programmers is "If we cut DPEM by $X million, how will that affect TAC (or the 135 fleet, or PACCOM, etc.)?" Some of the reasons for this frustrating inability include:

1. A continuous update of workload baselines is not made every time the program is adjusted. This is because the requirements databases do not lend themselves to this sort of maintenance and because of extreme difficulties in making allocation decisions based on ambiguous Program Budget Decisions in very short periods of time. These questions often occur during a turbulent exercise when the baseline is no longer valid and there is inadequate time to consider hundreds of adjustments.

2. Even if the baseline were current, none of the data is maintained by CINC or major command. Aircraft, missile, engine and OMEI data is maintained by MDS or TMS but not by using organization. In addition, attempts to accurately track engine costs to the appropriate aircraft have been difficult, at best.

3. The largest workload, exchangeables, is extremely difficult to allocate accurately to the above categories. Exchangeables are managed by stock number rather than by end item on which they are used. A large enough number of exchangeables are used on multiple weapon

systems to complicate these estimates much more than one would expect. The problem should not be overstated because the estimates can eventually be made, but rarely within the time constraints of the requestor.

Similarly, problems exist in requests which compare appropriated data with DMIF data. Because of the differences in induction versus output, these sorts of analyses are not easily made. Very close coordination is needed with requestors on these types of analyses because any misunderstanding of the tasking can impose exhaustive burdens on the analysts. More and more requests are being received based on data requirements in DOD's Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting handbook (DoD 7220.29-H). Many errors have existed in the system because it is has not been fully integrated into the Air Force management system.

DISCOUNTING BACKLOGS

The discounting of backlogs as discussed in Chapter II, has been somewhat contentious since the practice started in the late 1970s. Backlogs ranged between $50 million and $100 million during that period, significant enough to provide enough experience to justify the 20% discount factor.[17] OASD(C) has never disagreed with Air Force discounting, but HQ AFLC and the Navy did not start discounting until the FY 1988/1989 budget cycle.

Difficulty is sometimes experienced in explaining the reasons for discounting. It is easy to fall into the trap that simply points to the unnecessary or deferable requirement. The corrosion control performed at base level because of PDM deferral should not have been part of the discount because if it was fixed at base level, it was not a valid depot level requirement. The reduced generation of fire control system circuit cards caused by flying partially mission capable (PMC) with three instead of four per aircraft, however, would be a valid discount of workload requirements.

The recent growth in forecast backlogs may justify a revalidation of the data if for no reason other than the larger size of the resource it is applied against. It is also possible that the process acts differently at the one billion dollar level versus the fifty to one hundred million dollar level.

SUMMARY

These issues comprise the majority of recurring problems which focus on funding of depot maintenance. The many other depot maintenance issues which are not related primarily to funding, such as centralized DOD depot maintenance and various workload shift issues, were not discussed. Additional funding issues related to differences between the services were not discussed because that would have required a detailed discussion of the structure of Army

and Navy depot maintenance financing--a subject far beyond the scope of this paper. This discussion was purposely limited to enhance understanding of the preceding chapters and to help solve the puzzle of Air Force depot maintenance financing.

CHAPTER V

CONCLUSION

The preceding discussion should have given the reader a basic understanding of what the depot maintenance appropriated and industrial funds are, how they differ, and how they are related. The role of depot maintenance as a key element of readiness should be clear, as should the fragility of that readiness. Hopefully it stimulated some questions and an interest in further study. Little, however, was said in response to the title question:

". . . Why Should We Care?"

On the 19th of February, 1988, the Washington Post editorialized on the pork-barrel game played with the defense budget. "As part of its share of Mr. Carlucci's budget cutting, the Air Force told its logistics command to find $1.6 billion in next year's estimated maintenance costs."[1] The editorial cited the fact that civilian layoffs would result and that affected members of Congress immediately protested to the Air Force. The implication in the editorial was that members of Congress would try to add funds to this particular cut of pork simply to satisfy their constituencies. And DOD and the Air Force were cleverly gaming the process.

Interestingly, the facts show that the Air Force did not reduce its FY 1988 or FY 1989 depot maintenance

program by $1.6 billion. Major reductions have occurred over the past two years, but these were the honest result of dealing with real issues, and they are far below $1.6 billion. And they certainly did not all occur since Secretary Carlucci assumed the post of Secretary of Defense.

How can this misinformation get in the editorial pages of a newspaper as influential as the Washington Post? It is certainly speculative but reasonable to assume that the Air Force may have done it to itself. How? Somebody along the communication chain between the Air Force and the Washington Post editorial staff probably didn't understand the program or the process and relayed incorrect information or jumped to an incorrect conclusion. The system for depot maintenance funding is so complicated that reasonably intelligent people simply can't understand it unless they are totally immersed in the process. And not many people want to be depot maintenance Baptists!

"We should care" because depot maintenance is critical to readiness and sustainability of combat operations. The amount of national treasure needed to perform the mission is huge--large enough to make the editorial page of the Washington Post. Even in good times, but particularly in bad times, the Air Force must be able to articulate its needs clearly, confidently and with a high degree of credibility. Unfortunately, it is difficult to do

this because of the abstruse nature of depot maintenance funding.

RECOMMENDATIONS

The purpose of this paper was exposition of the depot maintenance funding process, but two broad areas of recommendations beg discussion. They are to simplify the depot maintenance program and process and to stimulate a professional dialogue in this area. Obviously they are not mutually exclusive and improvements in either area will support the other.

Process simplification is not a trivial task because the process did not evolve capriciously. Its complexity is largely driven by an accumulation of changes which were made to satisfy unique, compelling requirements at different times. Several of the issues in the preceding chapter could result in a more simplified process if resolved. Stock funding of depot level reparables, for example, could result in simplification of the PPBS process for depot maintenance, although that action might complicate other activities.

Program simplification, however, might be easier. Some have suggested simply changing the term "DPEM" to something that is more logical. As cited above, the term is normally misused, so why not use the term "DMAF" for Depot Maintenance Appropriated Funds? It would be similar to "DMIF" but recognize its appropriated meaning. Other

potential terms come to mind such as "DMDAF," referring to the Depot Maintenance Direct Air Force funds in PE 72207f. "DMANG" could similarly refer to the Air National Guard's appropriated funds and "DMRES" being the Air Force Reserves' appropriated funds. Of course, an acronym explosion would be counterproductive, but there is room for improvement here.

In addition to this simplification, the Air Force should foster an expanded professional dialogue for depot maintenance. The previous chapter discussed issues which are related to how the Air Force accounts for depot maintenance. Most of these issues are currently being staffed within AFLC, the Pentagon, and on Capitol Hill because they have significant impact on Air Force readiness and sustainability and how the Air Force will operate in the future. But at the present time, the professional dialogue in this area seems to be a closed one.

The attached bibliography is not exhaustive, but it reflects a dearth of authoritative publications. Depot maintenance should not generate a "publish or perish" mind set, but <u>some</u> dialogue seems appropriate. The typical junior field level logistician has little to look at to prove that there is an equally dynamic wholesale aspect to logistics--particularly in maintenance. In addition to expanding the perspective of junior logisticians, by what means can our senior civilian logisticians document the

views they've distilled over many years of experience? How can more junior logisticians possibly understand many of the policies which demand an understanding of "the system?" And how can any logistician showcase the bright idea that saved resources that may be transferable to another operation?

The Air Force Journal of Logistics, the Society of Logistics Engineers' Logistics Spectrum, and even the Maintenance Officers Association Exceptional Release are public documents for this dialogue. Professional military education and Air Force Institute of Technology studies also provide exceptional opportunities to expand this exchange of ideas.

What should be the subject of this dialogue? Each one of the issues discussed in the last chapter could easily be treated in much more depth. In this paper, these issues were viewed with a Potomac perspective and certainly deserve treatment from the reality of an ALC, or from outside the Air Force. Valuable perspectives could probably be gained from field level activities as they gain an improved appreciation for depot level support. Other recommendations for further study are listed in the Appendix.

There are risks in encouraging a public dialogue in what is a very politically charged activity. The overriding risk, however, is in the limitation of understanding of how this business works to an elite cognoscenti. The organizational control of depot

maintenance funding must understandably be restricted. But an understanding of how the system works deserves wide dissemination or the Air Force will never reap the financial and operational benefits that a professional interchange of ideas will foster.

SUMMARY

> As to government expenditures, those due to broken-down chariots, worn-out horses, armour and helmets, arrows and crossbows, lances, hand and body shields, draft animals and supply wagons will amount to sixty per cent of the total.
>
> Sun Tzu[2]

Congress and the American people disagree with Sun Tzu. The modern logistics professional is expected to support combat forces at a fraction of the ancient sixty per cent mark. In depot maintenance, a system which accounts for appropriated and industrial funds has evolved which is extremely complex, but in its totality provides the accountability and management information needed to support the Air Force mission. The Air Force's ability to perform that mission in these days of dear resources depends in large part on its ability to clearly understand and explain its actions. The logistics professional needs to recognize that the days of Sun Tzu are long gone and that an understanding of the DPEM/DMIF process needs to be a part of that professional's tool bag.

APPENDIX

RECOMMENDATIONS FOR FURTHER STUDY

The following recommendations are intended to stimulate thought and also outline limits that should be recognized about preceding discussions in this paper.

REPAIR DEFERRAL PRIORITIES

Given a continuing shortage of appropriated funds, should AFLC defer repair of exchangeables or defer PDMs? The former action is most common and provides maximum flexibility to continue to meet flying hour committments. The latter action is less frequently done because while it provides a more dramatic statement about the seriousness of funding shortages, it offers less flexibility to base support and maintenance activities.

SIMPLIFIED REQUIREMENTS ESTIMATING

Does the current degree of accuracy in the depot maintenance requirements estimating process justify its cost? Reserve Forces' use of the CAIG factors instead of the DO41 estimates for Exchangeables suggests that may be appropriate for smaller programs. What other models have been tested or used?

Have HQ AFLC, OSD, OMB or Congressional staff forecasts been more accurate than official Air Force estimates?

If simply walking through a crowded warehouse is not necessarily an indicator of growing DPEM backlogs, then what approximations can be made which could provide reasonable, reliable backlog estimates on a frequent basis?

BACKLOG IMPACTS

Closely related to the prioritization of backlogs is the discussion of mission impacts. What factors have to be considered and can they be quantified? Are mission capable or aircraft availability rates the appropriate factors to measure, or are combat sorties (or some other indicator) more meaningful?

PASSTHROUGHS AND REFUNDS

These accounting devices allow the passing of funds through the appropriated and industrial funds without affecting sales rates. In so doing, however, they distort analysis thereby reducing one of the major benefits of industrial funds. What are the mechanics of these devices and how significant are they?

DIFFERENCES BETWEEN THE SERVICES

This paper did not discuss differences between the services' accounting methods and mentioned only two issues caused by interservice differences. Many more differences exist which appear to delay closer cooperation between the services' depot maintenance functions.

NOTES

CHAPTER I (Pages 1-7)

1. Samuel B. Griffith, Sun Tzu: The Art of War, (New York: Oxford University Press, 1971), p. 114.

2. Interview with Mr. Steve Zimmerman, Chief Repair Requirements and Modification Division, HQ AFLC, 14 January 1988.

3. Air Force Issues Book, (Office, Vice Chief of Staff, United States Air Force, Spring 1987), pp. 6-4 and 5.

4. Interview with Lt Col Gregory O. Stanley, Chief, Depot Maintenance Programs, HQ USAF/LEXM, 31 December 1987.

5. FY 1980 costs include $2.215B DMIF Revenues per interview with Mrs. Margaret Zook on 19 January 1988 plus $117M non-DPEM appropriations from FY 1980 (actual) column of the FY 1982 President's Budget as reflected in HQ USAF/LEXM Working Papers, "SS8087," 4 March 1987. "Today's" cost includes $4.19B FY 1987 DMIF revenues per Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), p. 177 plus $341M non-DPEM appropriations from FY 1987 (actual) column of the FY 1988/89 President's Budget as reflected in above-cited Working Papers. Civilian workforce size (FY 1987 38,038) per above-referenced Industrial Fund Overview FY 1988/FY 1989, p. 178.

6. Some budget exhibits also further segregate costs as "flying" and "non-flying," requiring a split of Exchangeables between these two categories.

CHAPTER II (Pages 8-22)

1. Martin Van Creveld, Supplying War: Logistics From Wallenstein to Patton (Cambridge: Cambridge University Press, 1977), p. 8.

2. Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), p. 178.

3. Portraying appropriated funds which reimburse the ASIF in its own category is inconsistent with conventions used in DMIF budget exhibit IF-1 which includes the ASIF revenues in Air Force O&M. The large amount of

non-Air Force revenues in the ASIF, however, supports the author's method as a means of emphasizing the "customer" concept.

4. Air Force Industrial Fund Budget Estimate FY 1988/FY 1989, (Department of the Air Force, 15 September 1986), pp. 164, 166, 168.

5. Approximation based on comparison of Air Force request in Air Force Industrial Fund Budget Estimate FY 1988/FY 1989, (Department of the Air Force, 15 September 1986), p. 80, compared to approved consolidated Stock Fund and ASIF funding in Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), p. 178.

6. Written comments from Mr. Charles D. McElhanon, former Chief, Modification and O&M Programming Division (HQ USAF/LEXM), dated 16 Feb 1988.

7. Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), p. 178

8. "Organic" refers to accomplishment of work by AFLC-owned resources. "Contract" workload not only refers to the work performed by privately owned businesses but to interservice work performed by other DOD-owned resources for Air Force customers.

9. It is noteworthy that while Air Force budgets have shown rigorous detail for ICS since FY 1978, the other services have not published this information.

10. Interview with Ms. Kathleen T. Wilkinson, Deputy Director of Budget, DCS Comptroller, HQ AFLC, on 31 Dec 1987.

11. Samuel B. Griffith, Sun Tzu: The Art of War, (New York: Oxford University Press, 1971), p. 88.

12. Headquarters USAF/LEXM. "Exchangeable Transition Statement." Unpublished, undated working papers which provide detailed explanation of the subject for the FY 1982 budget. Note the nongeneration factor only goes in one direction. Requirements are not increased if generations are historically underestimated.

13. Interview with Major Thomas E. Phalen, Chief of Aerospace Maintenance, Air Force Reserve Headquarters, Pentagon D.C., on 11 February 1988.

14. Backlog growth and PBD data per Headquarters USAF/LEXM, "BESTOPB," Working paper which summarizes impact of FY 1988/1989 Program Budget Decisions on PE72207f, dated 20 January 1987. Characterizations are the opinion of the writer.

CHAPTER III (Pages 23-29)

1. The acceptability of "DMIF" is based on its frequent use in both Air Force and OSD budget documents. Nevertheless, the continued use of the more cumbersome "DMS, AFIF" in AFLC publications suggests that acceptability is not universal.

2. Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), pp. 158-191.

3. Broadly interpreted from Industrial Fund Operations, (Department of Defense 7410.4-R, Washington, DC: Assistant Secretary of Defense (Comptroller), April 1982), pp. 1-1 and 2.

4. The Comptroller community is deeply involved at all levels in the preparation and presentation of all budgets. The primary variables, however, are determined by the cited functional areas.

5. Headquarters USAF/LEXM, "BESTOPB," Working paper which summarizes impact of FY 1988/1989 Program Budget Decisions on PE72207f, dated 20 January 1987.

6. Depot Maintenance, Air Force Industrial Fund (DMS, AFIF) Operating Procedures, (Air Force Logistics Command Regulation 66-9, Wright-Patterson Air Force Base, Ohio, Department of the Air Force, 15 January 1986), p. 2.

7. Caldwell, First Lieutenant Kenneth H., (USAF) "The Impact of Rate Stabilization Upon the Air Force Depot Maintenance Industrial Fund (DMIF) Management System," (Air Force Journal of Logistics, Winter 1984), pp. 31-35.

8. Interview with Mr. George L. Falldine, Chief, Resources Management Division, Directorate of Maintenance, Warner Robins Air Logistics Center on 17 December 1987 and Joseph E. Robinson's "Honing the Cutting Edge in Defense Depot Maintenance," (Defense Management Journal, Third Quarter 1986), pp. 38-40.

9. Until the late 1970s, revenues were tracked the same as appropriations. DOD Handbook 7220.29H, however,

changed to the current method to focus on asset delivery dates and more of a customer need orientation.

10. Interview with Mr. George L. Falldine, Chief, Resources Management Division, Directorate of Maintenance, Warner Robins Air Logistics Center on 17 December 1987 and Lieutenant Colonel Neil Raymond's "The Nature of Net Availability," briefing delivered to the DPEM/DMIF Symposium held at Air Force Logistics Command Headquarters, Wright-Patterson AFB, Ohio, 12 March 1987.

11. Initiatives included Automated Composite Tape Placement, Hydraulic Pump Automatic Test System, APQ 113/114 Antenna Reflectors, Locating Centers on Sundstrand Starter Turbine Wheels, and CETS Peacekeeper Missile.

12. Air Force Industrial Fund Budget Estimate FY 1988/FY 1989, (Department of the Air Force, 15 September 1986), pp. 48-51.

13. Written comments from Mr. Charles D. McElhanon, former Chief, Modification and O&M Programming Division (HQ USAF/LEXM), dated 16 Feb 1988.

CHAPTER IV (Pages 30-46)

1. Data from HQ USAF/LEXM, "SS8087," working papers which summarize Program Element 72207f from FY 1980 to FY 1989 at POM, BES and PB positions, 4 Mar 1987. The actual backlog cited for FY 1987 exceeded $400 million and estimates for FY 1988 and 1989 increased dramatically, with FY 1989 approaching $1 billion according to interview with Lt Col Gregory O. Stanley, Chief, Depot Maintenance Programs, HQ USAF/LEXM, 31 Dec 1987.

2. Author's experience while assigned as Chief and Deputy Chief, Depot Maintenance Programs, HQ USAF/LEXM, June 1983 to June 1987.

3. Data from HQ USAF/LEXM, "SS8087," working papers which summarize Program Element 72207f from FY 1980 to FY 1989 at POM, BES and PB positions, 4 Mar 1987.

4. U.S., Congress, Senate, Committeee on Appropriations, Department of Defense Appropriations Bill, 1988, S. Report 100-235 to Accompany S. 1923, 100th Congress, 1st Session, 1987, p. 85.

5. Data from HQ USAF/LEXM, "SS8087," working papers which summarize Program Element 72207f from FY 1980 to FY 1989 at POM, BES and PB positions, 4 Mar 1987 and

interview with Lt Col Gregory O. Stanley, Chief, Depot Maintenance Programs, HQ USAF/LEXM, 31 Dec 1987.

6. Author's experience while assigned as Chief and Deputy Chief, Depot Maintenance Programs, HQ USAF/LEXM, June 1983 to June 1987 and interview with Major James E. Daup, Chief, Logistics Systems Analysis, HQ USAF/LEXY, 10 February 1988.

7. Funded Carryover in Depot Maintenance Services Air Force Industrial Fund, (Study published by the Directorate of Resources Management, Deputy Chief of Staff, Maintenance, Headquarters, Air Force Logistics Command, Wright Patterson AFB, Ohio, July 1987,) p. ii.

8. Ibid., pp. ii-iii, 1-9.

9. Interview with Mr. George L. Falldine, Chief, Resources Management Division, Directorate of Maintenance, Warner Robins Air Logistics Center on 17 December 1987.

10. U.S., Congress, Senate, Committeee on Appropriations, Department of Defense Appropriations Bill, 1988, S. Report 100-235 to Accompany S. 1923, 100th Congress, 1st Session, 1987, pp. 54-55.

11. Interview with Col Harvey L. Nixon, Director of Resource Management, Deputy Chief of Staff, Maintenance, Headquarters Air Force Logistics Command. Wright-Patterson AFB Ohio, on 15 December 1987.

12. "Budget Process Disconnect," briefing presented by George Falldine and Ed Laase to various Air Staff and OSD agencies, Fall 1983.

13. Interview with Commander Terry Eargle, US Navy, Depot Maintenance Coordinator, OpNav Staff, OP514C, on 29 January 1988.

14. Industrial Fund Overview FY 1988/FY 1989, (Office of the Secretary of Defense, February 1987), pp. 10-11.

15. Written comments from Charles D. McElhanon, former Chief, Modification and O&M Programming Division (HQ USAF/LEXM), dated 16 Feb 1988.

16. Interview with Mr. Robert G. O'Mara, Senior Budget Analyst, Air Force Industrial Funds, SAF/ACBOI, 29 January 1988.

17. Interview with Col Harvey L. Nixon, Director of Resource Management, Deputy Chief of Staff, Maintenance, Headquarters Air Force Logistics Command, Wright-Patterson AFB Ohio, on 15 December 1987, and pre-1980s backlog data from Colonel Walter Kross' (USAF) Military Reform: The High-Tech Debate in Tactical Air Forces, (Washington D.C.: National Defense University Press, 1985), p. 68.

CHAPTER V (Pages 47-52)

1. ". . .And the Year of the YIMBY," Washington Post, 19 February 1988, p. 18.

2. Samuel B. Griffith, Sun Tzu: The Art of War, (New York: Oxford University Press, 1971), p. 74.

SELECTED BIBLIOGRAPHY

Air Force Industrial Fund Budget Estimate FY 1988/FY 1989. Department of the Air Force, 15 September 1986.

Air Force Issues Book. Office, Vice Chief of Staff, United States Air Force; Spring 1987.

". . .And the Year of the YIMBY," Washington Post, 19 February 1988, p. 18.

Caldwell, First Lieutenant Kenneth H. (USAF) "The Impact of Rate Stabilization Upon the Air Force Depot Maintenance Industrial Fund (DMIF) Management Syster." Air Force Journal of Logistics, Winter 1984, pp. 31-35.

Combat Support Doctrine. Air Force Manual 1-10. Washington, DC: Department of the Air Force, 1 April 1987.

Contract Maintenance Programs. Air Force Logistics Command Regulation 66-8. Wright-Patterson Air Force Base, Ohio: Department of the Air Force, 6 May 1987.

Daup, Major James E. (USAF). Chief of Logistics Systems Analysis, Directorate of Logistics Plans and Programs, DCS Logistics & Engineering, Headquarters USAF. Interview on 10 February 1988.

Depot Maintenance and Maintenance Support Cost Accounting and Production Handbook. Department of Defense Handbook 7220.29-H. Office of the Deputy Assistant Secretary of Defense (Management Systems), October 21, 1975 through Change 6, November 6, 1984.

Depot Maintenance, Air Force Industrial Fund (DMS, AFIF) Operating Procedures. Air Force Logistics Command Regulation 66-9. Wright-Patterson Air Force Base, Ohio: Department of the Air Force, 15 January 1986.

Depot Purchased Equipment Maintenance. Air Force Logistics Command Regulation 66-40. Wright-Patterson Air Force Base, Ohio: Department of the Air Force, 25 August 1986.

Eargle, Commander Terry (USN). Depot Maintenance Coordinator, OpNav Staff, OP514C. Interview on 29 January 1988.

Falldine, George L. "Incorporating Productivity into DMS, AFIF Budgets and Sales Rates." Discussion paper from the Resources Management Division, Deputy Chief of Staff, Maintenance, Headquarters Air Force Logistics Command, Wright-Patterson AFB, Ohio: 11 October 1983.

Falldine, George L. Chief, Resources Management Division, Directorate of Maintenance, Warner Robins Air Logistics Center. Various interviews in December 1987 and January 1988.

Falldine, George L. and Laase, Ed. "Budget Process Disconnect." Briefing presented to various Air Staff and OSD agencies, Fall 1983.

Funded Carryover in Depot Maintenance Services Air Force Industrial Fund. Study published by the Directorate of Resources Management, Deputy Chief of Staff, Maintenance, Headquarters, Air Force Logistics Command, Wright Patterson AFB, Ohio. July 1987.

Gonzales, David F. "The Role of Cost Accounting In Depot Maintenance." Armed Forces Comptroller, Winter 1985, pp. 19-21.

Griffith, Samuel B. Sun Tzu: The Art of War. New York: Oxford University Press, 1971.

Headquarters USAF/LEXM. "BESTOPB." Working paper which summarizes impact of FY 1988/1989 Program Budget Decisions on PE72207f, dated 20 January 1987.

Headquarters USAF/LEXM. "Exchangeable Transition Statement." Unpublished, undated working papers which provide detailed explanation of the subject for the FY 1982 budget.

Holmes, Raymond T. Spares Repair Impact on Weapon System Readiness: Can It Be Realistically Measured? Maxwell AFB Alabama: Air War College, May 1984.

HQ USAF/LEXM. "SS808'/." Working papers which summarize Program Element 72207f from FY 1980 to FY 1989 at POM, BES and PB positions, 4 Mar 1987.

Industrial Fund Operations. Department of Defense 7410.4-R. Washington, DC: Assistant Secretary of Defense (Comptroller), April 1982.

Industrial Fund Overview FY 1988/FY 1989. Office of the Secretary of Defense, February 1987.

Isbell, Major Kenneth D. (USAF) Faculty, Air Force Professional Military Comptrollers School, Maxwell Air Force Base, Alabama. Interview, 28 October 1987.

Isbell, Major Kenneth D. (USAF) "Introduction to Stock and Industrial Funds." Briefing delivered at the Professional Military Comptrollers School, 28 October 1987.

Justification of Estimates for Fiscal Years 1988/1989; Submitted to Congress January 1987: Operation and Maintenance, Air Force Reserve. Department of the Air Force, January 1987.

Justification of Estimates for Fiscal Years 1988/1989; Submitted to Congress January 1987: Operation and Maintenance, Air Force, Volumes I & II. Department of the Air Force, January 1987.

Justification of Estimates for Fiscal Years 1988/1989; Submitted to Congress January 1987: Operation and Maintenance, Air National Guard. Department of the Air Force, January 1987.

Kross, Colonel Walter (USAF) Military Reform: The High-Tech Debate in Tactical Air Forces. Washington D.C.: National Defense University Press, 1985.

McElhanon, Charles D. Former Chief, Modification and O&M Programs Division, Directorate of Logistics Plans and Programs, DCS Logistics, Headquarters USAF. Written comments dated 16 February 1988.

Nixon, Harvey L. Director of Resource Management, Deputy Chief of Staff, Maintenance, Headquarters Air Force Logistics Command, Wright-Patterson AFB Ohio. Interview on 15 December 1987.

O'Mara, Robert G. Senior Budget Analyst, Air Force Industrial Fund, Secretary of the Air Force, Directorate of Budget Operations. Various interviews November 1987 through February 1988.

Raymond, Lieutenant Colonel Neil (USAF) "The Nature of Net Availability." Briefing delivered to the DPEM/DMIF Symposium held at Air Force Logistics Command Headquarters, Wright-Patterson AFB, Ohio, 12 March 1987.

Reed, Col David M. (USAF) Experience gained as Deputy Chief and Chief, Depot Maintenance Programs, Directorate of Logistics Plans and Programs, DCS Logistics & Engineering, Headquarters USAF from June 1983 to June 1987.

Robinson, Joseph E. "Honing the Cutting Edge in Defense Depot Maintenance." Defense Management Journal, Third Quarter 1986, pp. 38-40.

Rutenberg, Lieutenant Colonel David C. (USAF) and Allen, Jane S. eds. The Logistics of Waging War. Air Force Logistics Management Institute, Gunter Air Force Station, Alabama: (1987)

Stanley, Lt Col Gregory O. (USAF). Chief, Depot Maintenance Programs, Modification and O&M Programs Division, Directorate of Logistics Plans and Programs, DCS Logistics and Engineering, HQ USAF. Various interviews October 1987 through March 1988.

U.S. Congress, Senate. Committee on Appropriations. Department of Defense Appropriations Bill, 1988. Report 100-235 to Accompany S. 1923. 100th Congress, 1st Session, 1987.

Van Creveld, Martin. Supplying War: Logistics From Wallenstein to Patton. Cambridge: Cambridge University Press, 1977.

Wilkinson, Kathleen T. Deputy Director of Budget, DCS Comptroller, HQ AFLC. Interview on 31 Dec 1987.

Zimmerman, Stephen J. Chief, Repair Requirements and Modification Division, HQ AFLC. Interview on 14 Jan 1988.

Zook, Margaret. Chief, O&M Programs, Modification and O&M Programs Division, Directorate of Logistics Plans and Programs, DCS Logistics and Engineering, HQ USAF. Interview on 14 Jan 1988.

GLOSSARY

ACP	Asset Capitalization Program
AFIF, DMS	Air Force Industrial Fund, Depot Maintenance Services
AFLC	Air Force Logistics Command
AFRes	Air Force Reserve
AGMC	Aerospace Guidance and Metrology Center, at Newark AFS, Ohio
ALC	Air Logistics Center; integrated wholesale logistics operations, differs from traditional "depot" concept
ANG	Air National Guard
ASIF	Airlift Services Industrial Fund
BES	Budget Estimate Submission; budget request from Air Force to OSD in September
Big Safari	Selected classified programs
Buyer	People in Directorate of Materiel Management responsible for obtaining depot maintenance services
CAIG	Cost Analysis Improvement Group
Cannibalization	Removing parts from one weapon system for another because of unavailability of parts from supply channels
Carry-In	DPEM Backlog from one year carried into next
Customer	Broader term than "Buyer" which also includes any government entity which purchases DMIF services
D/M (or MA)	Directorate of Maintenance
D/MM (or MM)	Directorate of Materiel Management

DAF	Direct Air Force; includes all Air Force except Reserve forces, MAC ASIF, some Air Force Systems Command functions
DG	Defense Guidance; annually published quidance to the Services from the Cairman, Joint Chiefs of Staff
Discounting	Reducing future estimates of requirements to recognize reduced numbers of installed assets
DLR	Depot level reparables; spare components reparable at depot level
DMIF	Depot Maintenance Industrial Fund
DPEM	Depot Purchased Equipment Maintenance; Appropriated funds for Direct Air Force depot maintenance work which is performed through the DMIF
DPEM Backlog	DPEM repair requirements not inducted during a period solely for lack of adequate funding
Funded Carry Over	See Net Available
ICBM	Intercontinental Ballistic Missile
ICS	Interim Contractor Support
JDMAG	Joint Depot Maintenance Advisory Group
MAC	Military Airlift Command
MDS	Mission designator and series used to identify aircraft such as C-141B or LGM-118
Net Available (NA)	Revenue value of inducted workload on which work is not yet complete
O & M	Operations and maintenance
OASD(C)	Office of the Assistant Secretary of Defense (Comptroller)
OLA	Other Logistics Activities
OMB	Office of Management and Budget

OMEI	Other Major Equipment Items
OSD	Office of the Secretary of Defense
PACAF	Pacific Air Forces
PB	President's Budget; submitted to Congress in January
PBD	Program Budget Decision document from OSD ruling on a budget issue
PDP	Program Decision Package
POM	Program Objective Memorandum
PPBS	Planning, Programming and Budgeting System
RCC	Resource Control Center
RDT&E	Research, Development, Test and Evaluation
Reserve forces	ANG and AFRes forces
Rob-back	Cannibalization at depot level
SAC	Strategic Air Command
Seller	People in Directorate of Maintenance who sell organic depot maintenance services to the D/MM buyers; people in Directorate of Material Management who sell contract depot maintenance services to D/MM buyers.
SPM	System Program Manager
Stand-alone requirements	Depot maintenance requirements which generate during a period, exclusive of requirements carrying in from a prior period
TAC	Tactical Air Command
TAF	Tactical Air Forces; TAC, USAFE, PACAF
TMS	Type, model and series used to identify engines such as TF39 or F100-100

Unbilled balance	WIP plus NA
USAFE	United States Air Forces in Europe
WIP	Work In Process; accumulated product cost for work inducted and completed (or man hours earned) but not billed