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AIR FORCE MANAGEMENT ANALYSIS GROUP MCCLELLAN AFB CA
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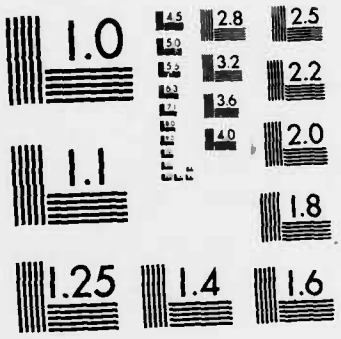

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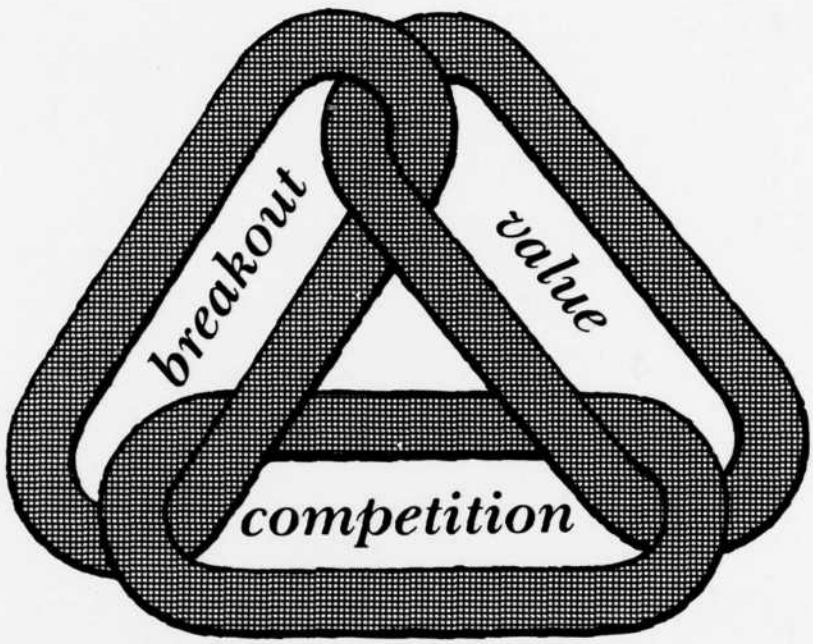

Spare Parts Acquisition

Final Report
October 1983

VOL I
Executive Summary

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A detailed study of Air Force spare parts acquisition process, systemic problems, and recommended corrective action. Includes evaluation of AF requirements, financial, budgeting, data, provisioning, contracting, pricing, and post-production systems in support of spare parts.

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PREFACE

The Air Force Management Analysis Group (AFMAG) - Spare Parts Acquisition Study was made possible by bringing together sixty-two professionals, military and civilian, representing many major Air Force commands, the Air Staff, the Air Force Secretariat, the Air Force General Counsel, and the Defense Logistics Agency. They came to study a very complex problem with truly a positive attitude, great abilities, and tremendous dedication. I would like publicly to thank each major command and agency for providing these quality people, for giving us excellent, thoughtful comments, and for the timely furnishing of the tremendous amount of data and information we requested - usually under nearly impossible time constraints.

A report of this magnitude demanded inputs beyond the formation of a special study team. The reactions, recommendations and ideas of every major command and several hundred companies were solicited through questionaires, personal discussions, and formal and informal inquiries. Each response was evaluated, factored and assimilated for the final report. The help of industry associations, particularly the National Security Industrial Association, the Aerospace Industries Association, the Electronic Industries Association and the National Tooling and Machining Association, was very beneficial.

After 100 days of studying the whole range of problems, we have concluded that there are no simple answers because of the complex interrelationships. Nevertheless we now believe we have identified most of the problems - and how to fix them. But this report does not have all the answers. In most cases, solutions or recommendations are quite specific, in others, we have only pointed the way.

If we are to have a lasting solution to the spare parts acquisition problem, both the Air Force and industry must step up boldly and make the necessary changes to the way we do business. For its part the Air Force must invest the necessary resources.

Dewey K. Lowe

DEWEY K. LOWE, Major General, USAF
Director
HQ USAF/IG-AFMAG

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OVERVIEW

The Air Force Management Analysis Group (AFMAG) - Spare Parts Acquisition was formed at the direction of the Secretary of the Air Force and the Air Force Chief of Staff and formally chartered by the Air Force Assistant Vice Chief of Staff on 20 May 1983. The AFMAG was established under the auspices of the USAF Inspector General to provide oversight, Air Staff interface, and for follow-up actions relating to the implementation and execution of the AFMAG findings and recommendations. The study began on 14 June 1983 and was completed on 12 October 1983 with a final out briefing to the Secretary and Chief of Staff.

Several major events occurring in the 1982-1983 time period formed a prelude to the media blitz which highlighted to the Congress, to the general public and, perhaps for the first time in many years, to the senior Department of Defense and Air Force leadership, the recurring problems associated with the acquisition of spare parts.

With the Reagan Administration's Fiscal Year 1982 Budget, the Air Force decided for the first time in many years that it would fully fund its stated requirement for aircraft spare parts. However, in executing the Fiscal Year 1982 program, the Air Force experienced a dramatic growth ($873.5 million) in peacetime aircraft spares requirements which was unprecedented in the post-Southeast Asia time period. The shortfall adversely impacted the Air Force's planned progress toward achieving stated readiness and sustainability objectives.

The economic conditions in the years (FY 78-81) prior to executing the Fiscal Year 1982 program produced an overheated aircraft industry operating within a diminished defense industrial supplier base which caused production lead times to increase significantly. Compounding the problem was a high rate of inflation which was not accommodated by the low Office of the Secretary of Defense (OSD) inflation indices used in projecting requirements. Inflation and lead time growth were the underlying factors which set the stage for the unanticipated growth in aircraft spares requirements which caused the Chief of Staff to charter the special Corona Require Study. Completed in March 1983 Corona Require played an outstanding role in reviewing the requirements process and explaining the underlying causes of the aircraft replenishment spare parts requirements growth. While the AFMAG relied extensively on the study results, it should be noted that Corona Require investigated only the aircraft replenishment spares requirements and computation process. It did not dwell on how the Air Force in fact spends the money (program execution), or how the Air Force initially brings spares into the inventory.

During the period, FY 79-82, the Air Force, and more specifically the Air Force Logistics Command (AFLC), began to investigate the causes of the sharp increases in prices paid for certain spare parts. A series of internal studies and investigations beginning in 1979, resulted, late in 1982, in a public disclosure of an Oklahoma City Air Logistics Center report on engine spare parts price increases. This disclosure led to a series of Congressional hearings. Coupled with three significant audit reports, the disclosure highlighted two key points:

1. Competition will result in fair and reasonable prices.

2. For many reasons the Air Force does not and could not take maximum advantage of competitive "market place forces" in executing its spares acquisition program.

AFMAG CHARTER

It was against this backdrop of significant engine spare parts price increases and other price increases that led to the chartering of the Air Force Management Analysis Group. The charter required an indepth study of the entire spectrum of the spare parts acquisition process. The group was tasked to examine the functions in the weapon system design, development and production phases, as well as post production support activities, such as requirements computation, pricing and contracting activities. The impact of these activities on the Air Force's ability to ensure that spare parts are available at a fair and reasonable price is to be assessed.

The AFMAG Charter required the group to focus on both near and long term initiatives to solve the overpricing problem. Near term is defined as those actions that could be taken immediately to meaningfully influence the FY 84 spares buy program.

NEAR TERM ACTIONS

Recognizing the time remaining to influence the FY 84 spares program was getting short, the AFMAG made a series of near term recommendations for immediate implementation. These actions are summarized in Figure 1-1. These recommendations will put the Air Force in a better position to safeguard against potential overpricing and to increase competition. The first two recommendations involve establishing a dedicated organization at each of the five Air Logistics

Centers to screen spare parts for breakout to increase competition and to conduct value analysis of spare parts to ensure price reasonableness.

AFMAG NEAR TERM RECOMMENDATIONS

IMPACT FY 84 BUY ACTIONS

- INSTITUTIONALIZE PRICE SCREENING/COMPETITIVE BREAKOUT
  - SCREEN EACH ITEM FOR PRICE REASONABLENESS
  - SCREEN EACH ITEM FOR BREAKOUT POTENTIAL
- AFLC IMPLEMENT PACER PRICE IMMEDIATELY
- CONSOLIDATE REQUIREMENTS - ANNUAL EOQ BUY POLICY
- PUBLICIZE ZERO—OVERPRICING PROGRAM
- COOPERATIVE ACTION BY INDUSTRY

FIGURE 1-1

These screening recommendations were based on the AFMAG's analysis of a prototype program called Pacer Price at the Oklahoma City Air Logistics Center. The AFLC Commander accepted the recommendations and had an initial cadre of personnel in place on 18 July 1983 at each Air Logistics Center. Screening of the 88,000 individual spare parts projected to be bought in FY 1984 was then underway.

The AFMAG also recommended that AFLC implement immediate changes to their EOQ (nonreparable parts) buy policy and Automated Purchase System (JO23). These actions will reduce the numbers of purchase requests required to be processed and increase the potential for quantity price reductions.

GROUP ORGANIZATION

The research, investigation, writing and reporting of this study was under the Directorship of Major General Dewey K.K. Lowe, Commander, Sacramento Air Logistics Center. Major General Russell E. Mohney, Deputy Chief of Staff, Logistics, Pacific Air Forces and Brigadier General James C. Dever, Jr., Deputy Chief of Staff, Contracting and Manufacturing, Air Force Systems Command, provided direct leadership to the Requirements Division and Execution Division respectively. The Requirements Division included the Requirement/Financial, Data Management, and Provisioning panels, while the Execution Division included the Contracting, Pricing, and Contract Administration panels. An AFMAG organization chart is depicted at Figure 1-2.

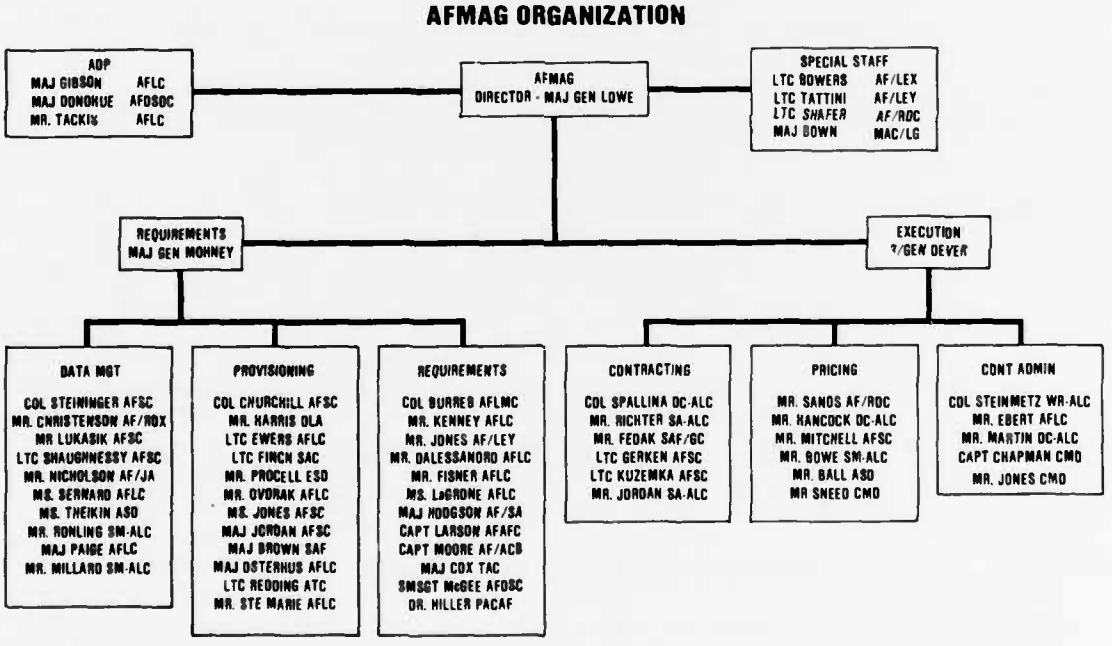


FIGURE 1-2

STUDY METHODOLOGY

The AFMAG capitalized on investigations and studies previously undertaken by the Air Force, the Department of Defense Inspector General, the General Accounting Office and other agencies. There was no attempt to replow old ground. Instead, the focus was concentrated on understanding the cause and effect relationships of problems, correcting the problems, and institutionalizing the corrective measures to be taken.

In addition to a complete review of all available literature on the subject of spare parts, the primary investigative techniques used by the AFMAG were field visits and interviews. The group visited all five AFLC Air Logistics Centers, four of the five Air Force Systems Command (AFSC) Product Divisions, and many field contract administration offices. Many noteworthy written comments were received from Air Force Major Operating Commands in response to an AFMAG questionaire. In addition to these Air Force activities, meetings were held with both the Army and Navy.

INDUSTRY INTERCHANGE

Extensive interchange meetings were held with industry. This included meetings with five industry associations in addition to field visits to 14 of the largest aerospace companies. The interface with industry was extremely valuable. Where possible the group compared the methods of support provided commercial customers to the method of support provided the Air Force. Valuable insights were gained in this process and they are reflected in the recommendations. Each company and industrial association visited was given an opportunity to provide the team a no holds barred input on how the Air Force could improve its business

practices. Additional comments were solicited from industry on technical data rights, competition, and industry's ability to provide firm fixed prices for initially provisioned spare parts.

The interchange with industry not only once again highlighted industry practices as a major contributing cause of apparent overpricing but also reinforced our initial opinion that the only real solution to the overpricing problem critically depends on establishing a constructive dialogue with industry to change certain practices. Seeking to elicit cooperative action from industry, the Secretary of the Air Force sent a letter, dated August 31, 1983, to the Chief Executive Officer of the top 35 companies doing business with the Air Force. Industry has become as concerned as the Air Force over the cost of spare parts and has made spare parts acquisition practices a major agenda item at top management levels.

REPORT ORGANIZATION

This report is in two volumes. Volume I is an expanded executive summary which describes the causal relationship of the spare parts acquisition process, major issues and problems. Volume I also contains an overview of the major recommendations, both near term and long term, to improve the process. Volume II contains detailed findings and recommendations and specifies action agencies (Offices of Primary Responsibility/Offices of Collateral Responsibility) for evaluation and implementation of recommended actions.

SPARE PARTS - A BIG BUSINESS

For item management purposes spare parts are categorized as "reparables" or "nonreparables". Reparable spares, also called investment spares or recoverable spares, are the parts that are repairable at either the Air Force base or depot level. They are of relatively high dollar value and are funded through annually appropriated procurement accounts, such as Budget Programs 3010 (1500) (1600), 3020 (2500) (2600), 3080 (8100) (8200) (8300) and (8400), and the appropriation is valid for a period of three years. Nonreparable spares, also called EOQ (economic order quantity), expendable, or consummable items, are the parts and repair parts that are consumed in use, of relatively low value, and are purchased with System Support Division Stock Fund funds.

Figure 2-1 depicts the size and value of the Air Force spares family. The over 834,000 spare parts the Air Force manages, by the Air Force Logistics Command, represent only 41% of the over two million parts it uses. The other parts are purchased from the other military services, the Defense Logistics Agency, and other agencies.

SPARES FAMILY

	ITEMS	VALUE
• AF MANAGES	834,473	$38.28
REPARABLES	265,604 (1/3)	34.8 (91%)
NONREPARABLES	568,869 (2/3)	3.4 (9%)

• AF USES 2,010,000 ITEMS
(INCLUDES AF, DLA, OTHER SERVICES/AGENCIES, GSA)

SOURCE: 00-M(A) 1000, 30 SEP 82

FIGURE 2 - 1

Figure 2-2 depicts the Air Force's total annual spares budgets for all initial and replenishment spares, representing both reparable and nonreparable categories. During FY 1982, $5.29 billion were spent for replenishment spares and $930 million for initial spares. Also, of the total expenditure, $4.4 billion (70%) went for purchase of reparables and $1.8 billion (30%) for nonreparables during FY 1982. Typically, of the total items purchased annually, approximately 75% are nonreparable parts and 25% reparable parts.

ANNUAL SPARES BUY

	FY 82	FY 83	*FY 84
NUMBER OF ITEMS	83,000	83,000	88,000
DOLLAR VALUE	$6.2B	$6.0B	$8.7B

*AS REPORTED BY FY1984 DEFENSE AUTHORIZATION BILL CONFERENCE COMMITTEE

FIGURE 2-2

THE SPARE PARTS BALANCE

In discussing spare parts requirements one must understand the need for balanced funding of several interrelated budget accounts. The availability of spare parts, both reparables and nonreparables, is the most significant determinant of Air Force readiness, and historically the greatest limiting factor.

The availability of serviceable reparable parts depends on:

-The System Support Division Stock Fund to buy repair parts as well as nonreparable spares.

-Depot Purchased Equipment Maintenance (DPEM) to pay for depot repair, both organic and contract.

-Major Command Operations and Maintenance (O & M) funds to pay for field level repair and procurement of repair parts. Repair parts, base repair and depot repair must be available to rapidly restore serviceability when reparable parts fail.

SPARE PARTS REQUIREMENTS

Spare parts requirements are divided into two segments: Readiness and Sustainability. Force readiness is supported through peacetime operating stock (POS). Wartime combat sustainability is supported through:

- War Readiness Spares Kits (WRSK)
- Base Level Self Sufficiency Spares (BLSS)
- Other War Reserve Materiel (OWRM)

The WRSK and BLSS provide the capability to fight during the initial war surge. OWRM provides the additional quantity of spare parts required to meet wartime objectives until American industrial production can catch up to meet wartime demands.

UNDERFUNDING - READINESS IMPACT

Following the Vietnam War, the Air Force was faced with declining budgets and the need to modernize and increase force structure — deferring support considerations. However, beginning in Fiscal Year 1981, following Congressional and Department of Defense guidance, the Air Force established readiness and

sustainability objectives and funded these objectives in the budget and Program Objective Memorandum (POM).

While the Congress has fairly well funded Air Force requests for replenishment spares dollars - and in some years had exceeded the Air Force requests - the Air Force has not, in the past, requested its total computed requirements. (Figure 2 - 3) For the POS segment of replenishment spares, total computed requirement means an 85% fill rate objective; that is, 15% of the time the depot could not fill a spare requisition by an operational base from off-the-shelf. It would be cost prohibitive to buy all the parts to keep weapon systems 100% operational ready.

AIRCRAFT REPARABLE SPARES
AF/OSD/CONGRESSIONAL COMPARISON

	FISCAL YEAR											
	1978			1979			1980			1981		
	POS	WRSK/ BLSS	OWRM	POS	WRSK/ BLSS	OWRM	POS	WRSK/ BLSS	OWRM	POS	WRSK/ BLSS	OWRM
A.F. REQUIREMENT	744.0	311.2	679.7	1006.5	489.6	882.0	1566.3	579.2	1491.1	2135.9	990.3	1303.2
A.F. REQUEST	722.7	153.9	0	758.2	123.5	0	758.0	87.1	0	1178.0	227.3	60.2
OSO APPROVED	677.4	153.9	0	733.8	123.5	0	640.2	87.1	0	860.1	227.3	60.2
CONGRESS	677.4	153.9	0	758.2	123.5	0	661.6	87.1	0	1072.0	462.5	60.2
SUPPLEMENTAL	—	—	—	—	—	—	—	—	—	1472.0	558.0	160.2

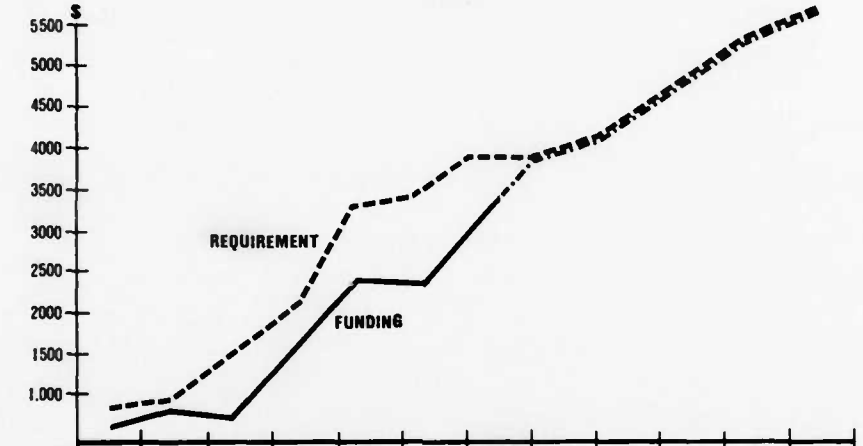
	FISCAL YEAR								
	1982			1983			1984		
	POS	WRSK/ BLSS	OWRM	POS	WRSK/ BLSS	OWRM	POS	WRSK/ BLSS	OWRM
A.F. REQUIREMENT	3321.8	1111.8	1399.9	3413.1	876.5	1265.7	3892.0	1141.3	1747.0
A.F. REQUEST	1882.0	370.0	359.0	2094.0	398.0	142.0	2636.0	560.0	188.0
OSO APPROVED	2016.0	370.0	359.0	2173.0	398.0	102.0	3021.0	740.0	15.0
CONGRESS	—	—	—	1815.7	398.0	102.0	2603.0*	740.0	15.0
SUPPLEMENTAL	1902.0	659.0	653.0	—	—	—	—	—	—

*AUTHORIZATION CONFERENCE

FIGURE 2 - 3

Although the Air Force began to emphasize the funding of spares in the early 1980s, we are still living with a legacy of underfunding. Figures 2-4 and 2-5 compare readiness (POS) spares funding to computed requirements for aircraft and telecommunications/electronics equipment in each of the fiscal years indicated.

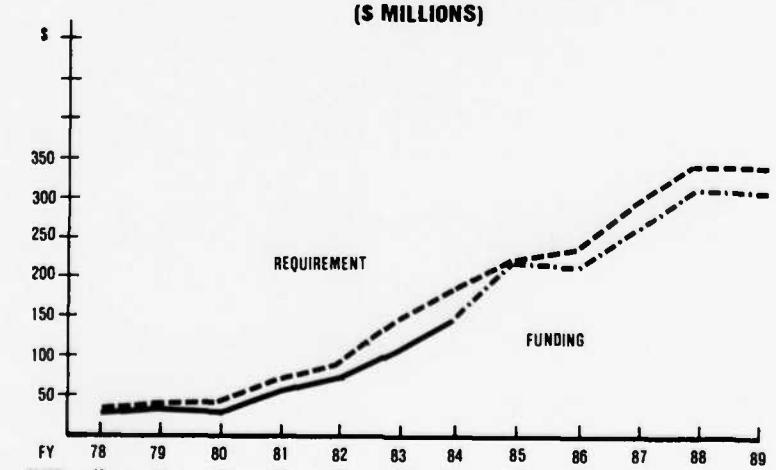
AIRCRAFT REPLENISHMENT READINESS SPARES
POS
($ MILLIONS)



FY	78	79	80	81	82	83	84	85	86	87	88	89
REQMT	774	1007	1588	2138	3322	3413	3892	3807	3918	4519	5404	5699
FUNDING	669	864	784	1588	2449	2441	3192	3807	3918	4519	5404	5699

FIGURE 2-4

COMM ELECTRONICS REPLENISHMENT READINESS SPARES
POS
($ MILLIONS)



FY	78	79	80	81	82	83	84	85	86	87	88	89
REQMT	25	34	38	60	73	130	171	229	234	290	347	344
FUNDING	25	34	30	40	59	83	122	229	210	260	317	314

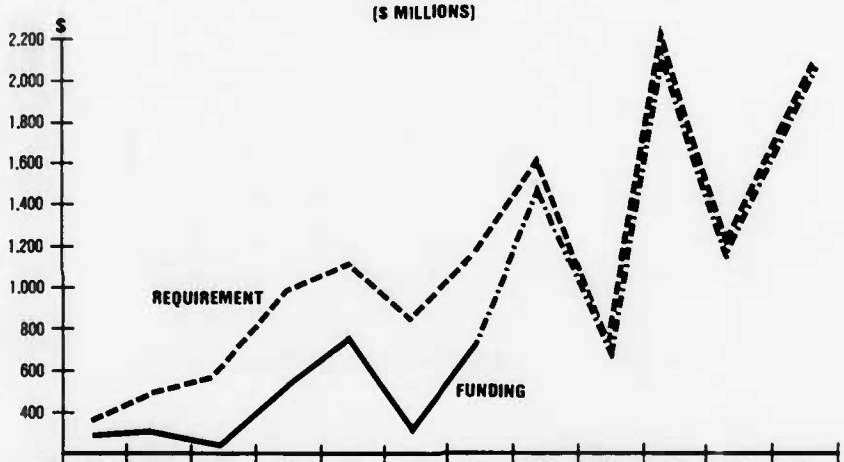
FIGURE 2-5

These and subsequent charts showing the underfunding of our spares accounts also reflect the Air Force's commitment to fully funding these requirements in its five year defense budget program objectives. Continued underfunding would continue to defer the Air Force's ability to meet readiness and sustainability requirements.

UNDERFUNDING- SUSTAINABILITY

Sustainability spares have also been underfunded. The majority of the WRSK/BLSS requirements shown in Figure 2-6 are for new A-10, F-15 and F-16 squadrons which the Air Force has activated over the last decade. Underfunding limits the deployment capability of these squadrons.

AIRCRAFT REPLENISHMENT SUSTAINING SPARES
WRSK/BLSS
($ MILLIONS)



FY	78	79	80	81	82	83	84	85	86	87	88	89
REQMT	311	490	579	990	1112	877	1141	1640	717	2265	1264	2100
FUNDING	154	156	87	597	779	290	740	1547	717	2265	1264	2100

FIGURE 2-6

Additionally, ground telecommunications/electronics systems, which in the past few years have grown at a phenomenal rate to match new technology and to satisfy Air Force requirements, also require WRSK/BLSS. Figure 2-7 illustrates the underfunding of these critical wartime spares.

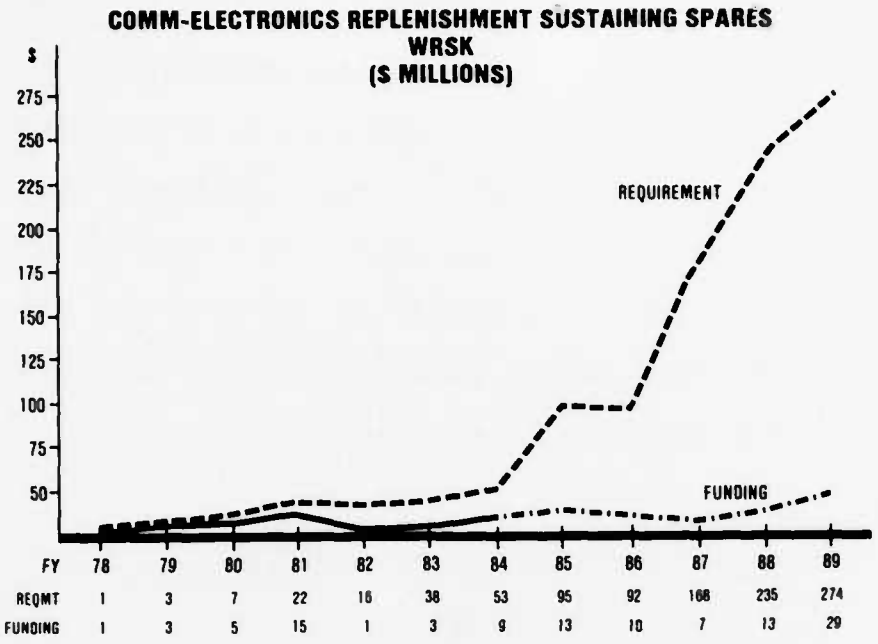
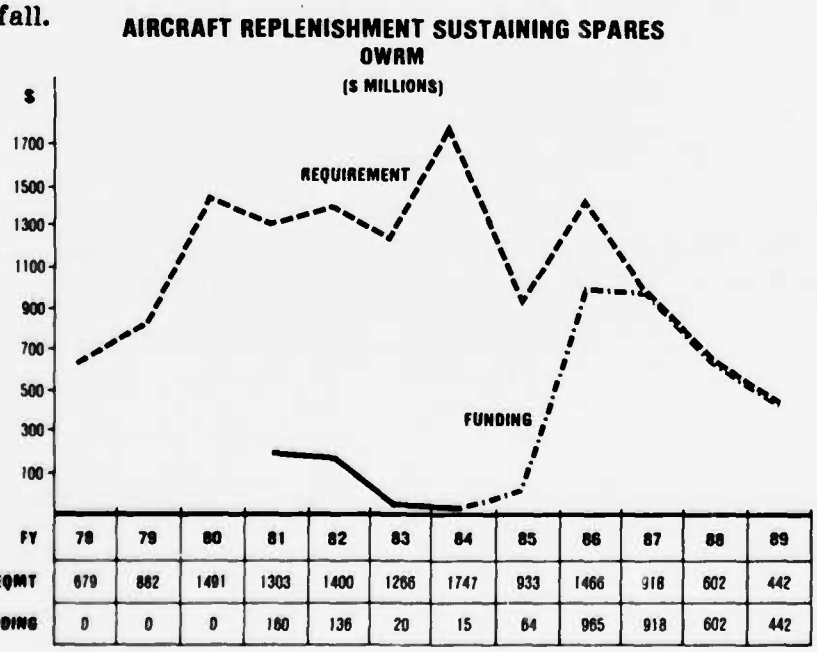


FIGURE 2-7

The balance of the spare parts needed to sustain combat (OWRM) has not been funded to any significant degree. Only in the last three years has any OWRM been funded and that has been for strategic airlift. Figure 2-8 depicts the funding shortfall.



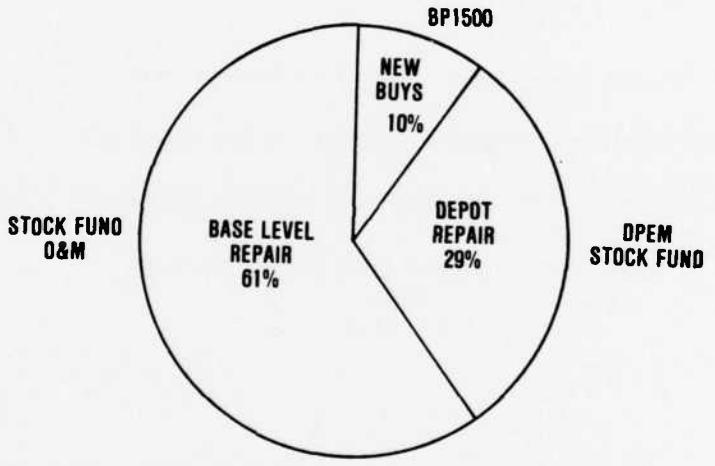
FY	78	79	80	81	82	83	84	85	86	87	88	89
REQMT	679	882	1491	1303	1400	1266	1747	933	1466	918	602	442
FUNDING	0	0	0	160	136	20	15	64	965	918	602	442

FIGURE 2-8

READINESS IMPACTS

The underfunding of reparable spare parts has had a significant impact on the Air Force's day-to-day readiness. Reparable parts shortages have historically been the greatest limiting factor for achieving high operationally ready rates. Moreover, 90% of the demand for reparable spares is satisfied by repair actions at base level or the depot (figure 2-9). Underfunding stock fund, DPEM or MAJCOM O&M accounts will impact readiness quicker and more severely than reparable spares underfunding because of the longer leadtimes to produce reparable spare parts.

FAILURES OF REPARABLE ITEMS SATISFIED BY



NOTE:
STOCK FUND & DPEM FUNDING DEFICITS WILL IMPACT MISSION SUPPORT MORE RAPIDLY AND MORE SEVERELY THAN WILL BP1500 DEFICITS.

FIGURE 2-9

The funding trend since FY 1981 in the System Support Division stock fund, which funds the acquisition of nonreparable spare parts and repair parts, has not been good. (Figure 2-10)

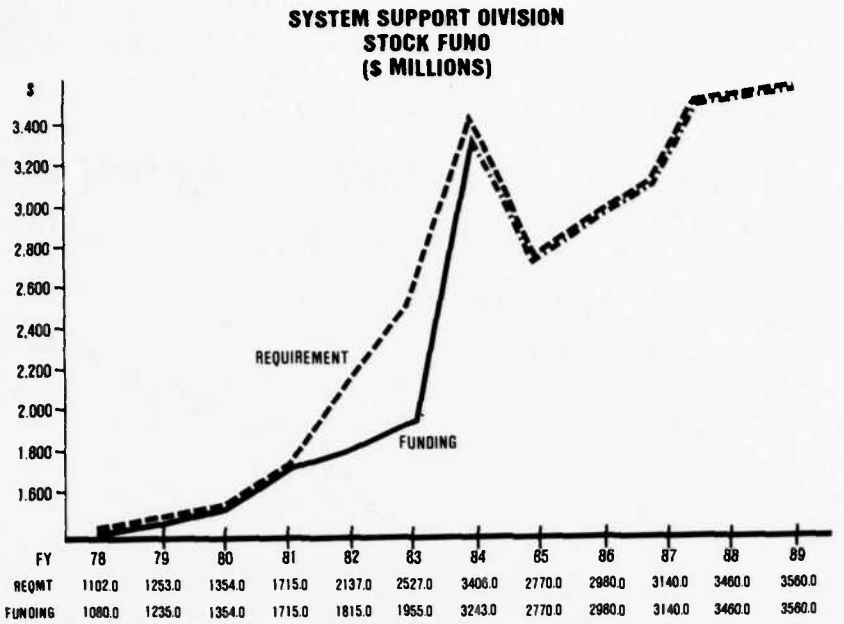


FIGURE 2-10

This underfunding and the already constrained fill rate objective of 85% (for a different reason than for reparable readiness spares) have limited the Air Force's ability to rapidly repair unserviceable spares. For example, in FY 1983, the Air Force System Support Division Stock Fund was only funded to 77% of requirement. Stock fund deficiencies result in the Air Force placing unserviceable spare parts into an "awaiting parts" status at a significant rate (figure 2-11). Ninety-five percent of these awaiting parts problems are caused by the nonavailability of System Support Division Stock Fund repair parts.

AWAITING PARTS

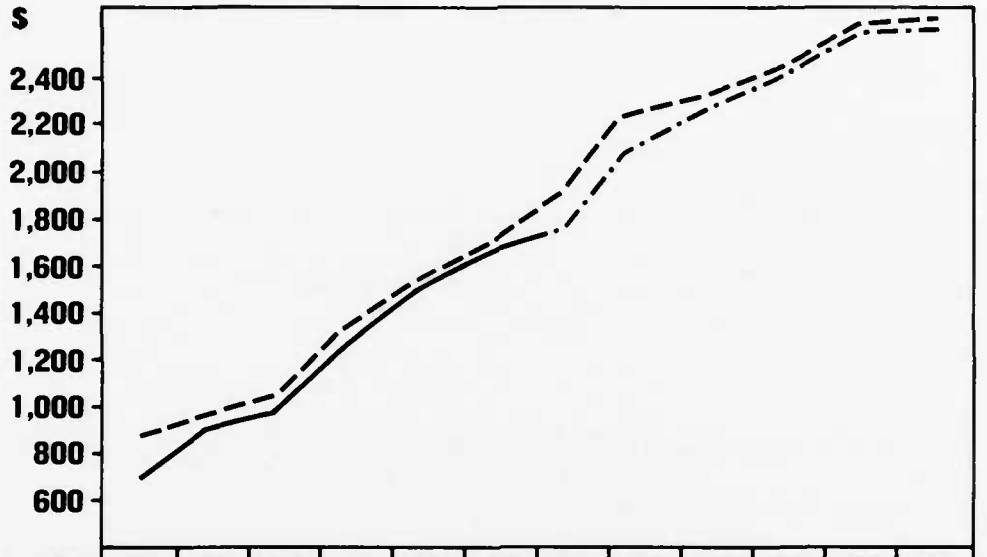
ITEMS

	JAN-JUN 81	JUL-DEC 81	JAN-JUN 82	JUL-DEC 82
ITEMS HELD	230,000	225,000	220,000	210,000
VALUE OF ITEMS	$1.5B	$1.5B	$1.4B	$1.4B
$ VALUE REPAIR PARTS REQUIRED	$68M	$68M	$63M	$63M

FIGURE 2-11

The underfunding of DPEM (figure 2-12) has also limited depot repair (organic and contract) of reparable spare parts.

DEPOT PURCHASED EQUIPMENT MAINTENANCE
REPARABLES ONLY
($ MILLIONS)



FY	78	79	80	81	82	83	84	85	86	87	88	89
REQMTS	847	903	1026	1273	1439	1719	1964	2228	2306	2483	2743	2745
FUNDING	786	850	967	1230	1428	1695	1769	2155	2246	2432	2743	2745

FIGURE 2-12

SATISFYING READINESS NEEDS

As a consequence of these funding shortfalls, the Air Force has increasingly resorted to satisfying aircraft grounding conditions through cannibalization, WRSK withdrawal and lateral support (figure 2-13). For example, in FY82 the needed spare parts were available "off the shelf" to satisfy only 36% of the grounding incidents. Sixty-four percent were from "stealing", "borrowing", and "begging".

UNDER FUNDING
OPERATIONAL IMPACT

(BASE LEVEL ACTIONS TO RESOLVE MICAPs)

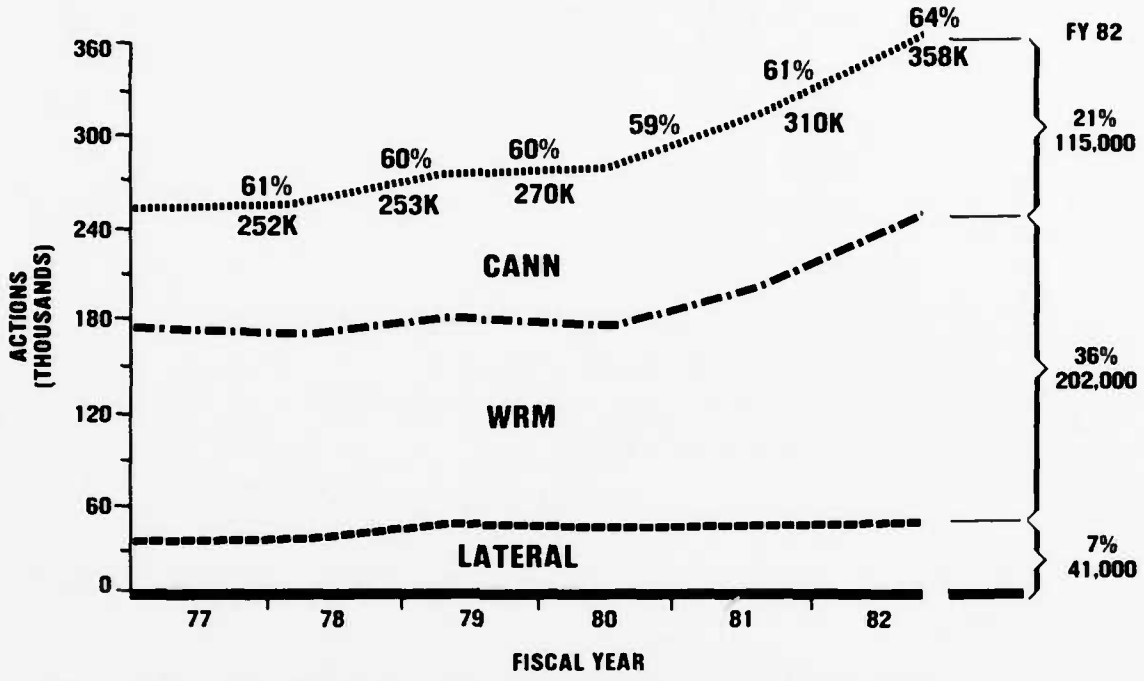


FIGURE 2-13

IN SHORT:

THE AIR FORCE DOES NOT HAVE ENOUGH SPARE PARTS TO MEET READINESS AND SUSTAINABILITY OBJECTIVES.

WHAT IS THE PROBLEM

The underfunding of the spares accounts accentuates the need to spend spare parts dollars in the most effective and prudent manner possible. The price paid for spare parts becomes even more important. There are, of course, a number of conditions that influence price. Figure 2-14 shows the what, where and why of the current Air Force spare parts acquisition problem.

THE PROBLEM

WHAT

- LOW COMPETITION RATE
- HIGH PRICES - PRICE INCREASES

WHERE

- MOSTLY LOW VALUE NONREPARABLES
- HOW BIG

WHY

- DO NOT SCREEN LOW VALUE ITEMS FOR BREAKOUT
- UNDERFUNDING/BUY GUIDELINES
- PRICING AND COST ALLOCATION METHODS
- MANNING/WORKLOAD

FIGURE 2-14

COMPETITION

It is acknowledged that a competitive market place will yield fair and reasonable spare parts prices. Since 1973 the Air Force spare parts competition rate has declined from a high of 37.5% to 20.7% in 1982. This is shown in Figure 2-15.

SPARE PARTS COMPETITION

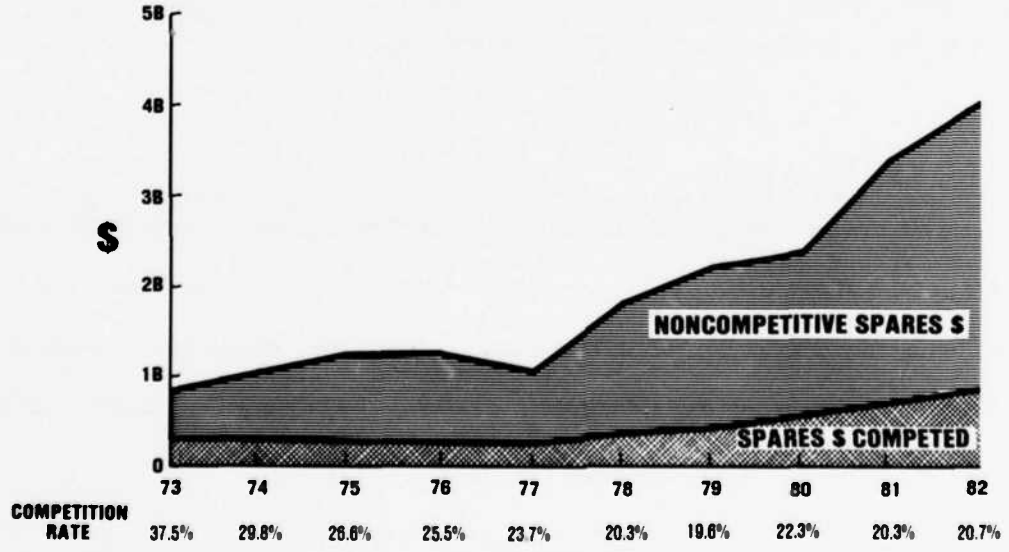


FIGURE 2-15

In the competitive environment, there is continuing pressure on the competitors to increase the productivity of their resources and thus minimize their cost to produce. This benefit will accrue to the Air Force. In addition, different sectors of the industrial base have differing cost structures. Wage and overhead rates and general and administrative costs vary across wide ranges. Opening the competition to qualified, competent companies from lower cost segments of the industrial base will provide spare parts at lower cost to the Air Force.

LOW COMPETITION FACTORS

Current DOD Directives require screening of spare parts for breakout and competitive reprocurement down to an individual item annual buy value of $10,000. It has been Air Force practice to screen down to an annual buy value of $7,500 (one Air Logistics Center screens down to $2,500 annual buy value). As a consequence low value items are not typically considered for breakout or competitive reprocurement.

In addition to not screening low value items for competitive breakout, there are a number of additional factors which have given rise to the low competition rate for replenishment spare parts extant in the Air Force today. (figure 2-16)

LOW COMPETITION FACTORS

- FIELDING OF NEW WEAPON SYSTEMS
- INADEQUATE/MISSING ENGINEERING DATA
- PROPRIETARY RIGHTS
- BUREAUCRATIC PROCESS
  - REGULATIONS
  - CERTIFICATION/QUALIFICATION

FIGURE 2-16

NEW SYSTEMS ACQUISITION

Between 1976 and 1982, the Air Force added 1,691 A-10s, F-15s, and F-16s to its attack and fighter force. These new systems represented 41% of the total active Air Force, Air National Guard and Air Force Reserve attack and fighter force inventory. To provide the replenishment spares support for these new systems and their associated engines, $2.680 billion or over 32% of the total Air Force aircraft replenishment spares dollars (BP1500) of $8.261 billion were spent from FY 1978 through FY 1982. (figure 2-17)

REPARABLE SPARES

($ IN MILLIONS)

	FY 78	FY 79	FY 80	FY 81	FY 82	TOTAL	COMPETITIVE %
A-10	27.5	37.9	22.5	36.4	65.6	189.9	8
TF-34 ENG	9.1	10.7	4.3	44.9	37.0	106.0	5
F-15	185.7	133.2	85.6	155.5	376.0	936.0	5
F-16	38.0	41.5	12.5	272.1	207.0	571.1	8
F-100 ENG	61.7	190.6	114.6	175.4	334.5	876.8	5
TOTAL	322.0	413.9	239.5	684.3	1020.1	> 2679.8	
						> 32% OF	
TOTAL BP1500	823.0	1,020.0	871.0	2,185.0	3,362.2	8261.2	

FIGURE 2-17

As can be seen, the competition rate in the procurement of these new systems replenishment spares ranged from 5% to 8%. While the competition rates are low, one should not conclude, ipso facto, that the Air Force had not paid fair and reasonable prices in acquiring these spare parts. Perhaps greater efforts could have been devoted later in the production phase of these systems to compete some of these parts. However, it would not have been prudent from a configuration control standpoint or cost effective to do so during the early production phase

because of the numerous on-going engineering changes. In addition, duplication of tooling and manufacturing facilities plus increased government procurement and contract administration resource requirements would have likely added to the total cost of the systems.

While the acquisition of these new systems resulted in a reduction in the replenishment spares competition rate, it must nevertheless be recognized that there was still substantial room for increasing competition. Figure 2-18 reflects the significant amount of noncompetitive spares dollars expended even when the replenishment spares dollars in support of the new systems were removed from the calculation.

SPARE PARTS COMPETITION

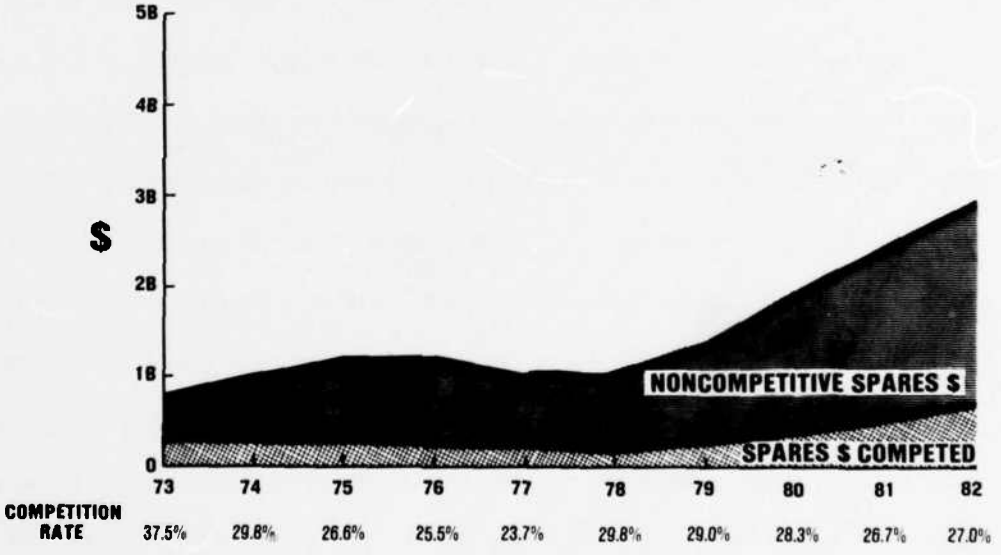


FIGURE 2-18

INADEQUATE/NON EXISTENT ENGINEERING DATA

The engineering data necessary to support competitive spares acquisition is created as part of the design and initial production of the weapon system, but Air

Force efforts to obtain the data necessary for competitive spares purchasing have not been effective. Approximately 57,000 or 16% of the 364,000 spare parts currently coded with a procurement source code are usually purchased from the prime system contractor on a sole source basis because the requisite data is either missing or inadequate. The necessary technical and engineering data even for recently acquired weapon systems such as the F-15 and A-10 are not generally available to support competitive spare parts purchasing. These problems are even more acute on subcontracted items. Competitive spares acquisition is being restricted because prime contractors are not required to flow down data requirements and data rights clauses to subcontractors.

PROPRIETARY RIGHTS

In addition to the technical data, the Air Force must also have the right to use the data for competitive purchasing. When a contractor asserts that a part, component or process was developed at private expense, data is delivered to the Air Force with limited rights. This restriction precludes the use of the data for competitive spares purchasing. Currently, limited rights in data account for approximately 8% or 29,000 of the spares coded with a procurement source code. While there are regulatory provisions which require the Air Force to determine the validity of contractor limited rights assertions, minimum action has been taken to enforce these provisions. Current acquisition regulations and directives provide for the protection of data marked with limited rights legends in perpetuity even though technological advances or other events may have nullified the justification for the limited rights legend.

Additional problems arise because the Defense Acquisition Regulation does not adequately define the requirement for "developed at private expense" used in

determining whether or not engineering data is proprietary. The lack of definition permits relatively unconstrained use of restrictive markings which inhibit competitive acquisition. Further, when limited rights data is received, it is not adequately challenged for validity because the Air Force does not have sufficient technical and engineering resources to accomplish these reviews.

DATA MANAGEMENT

In addition to the problems which exist in properly structuring the requirements for engineering data during the early phases of system development and acquisition, other difficulties in data management have impeded increasing spares competition. In many cases, delivery of engineerng and reprocurement data packages occur much earlier than needed and while designs are still unstable. This results in maintaining and using inaccurate data as well as incurring unnecessary costs to maintain and update the data. Current procedures for ensuring that the required data is contractually specified, delivered and adequate for use are outdated, complex and contradictory. Acceptance procedures for engineering data have focused on format with little attention to usability. Adequate criteria for the evaluating the usability of data do not exist. The adequacy of the data can only be determined, in most cases, at the time it is attempted to be used for competitive reprocurement, long after the data was developed, delivered and accepted. By then, the Air Force is normally left with very little recourse when the data proves inadequate. The lack of an Air Force policy to require contractors to warrant that acquisition data packages will be complete, accurate and adequate for competitive spare parts acquisition has resulted in recurring problems. Further, the true cost of data (including engineering data needed for competitive reprocurement of spare parts) for most Air Force weapon systems is not known.

Once the data enters the Air Force system, there are serious problems with storage, distribution and control of the data. The data is stored in engineering data repositories at each of the Air Logistics Centers and at a central facility, the Engineering Data Services Center (EDSC) at Wright-Patterson AFB. These repositories manually file the data on aperture cards by drawing number sequence in tub files - some 17 million aperture cards. This open loop, people dependent system has proved inefficient for receiving, storing, distributing and controlling engineering data. Interviews and audit reports indicate a 10% error rate in processing the data. Additionally, the EDSC has been able to fill only 40% of requests from users. Even when requests are filled, the information often does not arrive at the user location for weeks. Attempts to modernize the equipment at the repositories have not been successful. The technology exists to automate the repository function which will eliminate manually induced errors and make the system significantly more responsive to user needs at reduced operating cost. A proposed system, if FY 84 funding is provided, can be implemented with a pilot system at the first ALC in FY 1986 and a completely fielded system in place by FY 87.

SHRINKING SUPPLIER INDUSTRIAL BASE

For a number of years, there has been a steady reduction in the number of firms actively participating in the defense industry. This reduction in the base has been driven by a number of factors. The relatively low profit margins as compared with comparable civilian sector work has drawn many suppliers away from defense efforts. These low profit margins are accompanied by relatively high levels of administrative demands on the participating companies. Socioeconomic program requirements are passed down through much of the subcontract structure. When combined with complex and mountainous paperwork requirements, many contractors perceive the administrative effort to be frustrating and not worth it.

As defense expenditures fell during the post-Vietnam era, the volume of business necessary to support the industrial base diminished, resulting in a net outflow of companies. This was perceived by industry as one more example of the instability and unpredictability of defense requirements. Companies seeing a need for stability in their market are thus motivated to leave the defense base.

Environmental protection legislation has also caused some loss of companies in the defense base. Where profit margins were viewed as too thin to support the necessary capital upgrade to meet environmental controls, companies elected to cease operations. This has particulary impacted sources for metals, castings and metal treatment. The net result of these, and other causes, has been a reduction of the defense industrial base from 6000 suppliers in 1964 to 3500 in 1980. As the base shrinks, the ability to achieve competition is reduced.

BUREAUCRATIC PROCESS

There are also regulatory and legal constraints which tend to inhibit competition. The Air Force Supplement to DAR 1-313 requires that suppliers seeking approval as a source for a restrictively coded item certify that the necessary technical data was obtained in a proper manner. The supplement also requires that the sole source supplier be notified of Air Force intent to change the item to a competitive code and allows time for the sole source supplier to comment. Both of these actions increase the already significant administrative burden associated with breakout. It is often difficult, time consuming, and costly for new suppliers to become qualified to do business with the Department of Defense.

Defense Acquisition Regulation 7-104.9 provides for protection in perpetuity of proprietary data and technical data marked with limited rights legends. By

comparison, even patent rights are protected for only 17 years. To foster increased competition, the Air Force should establish a time limitation on the life of proprietary or limited rights technical data. For the proprietary and limited rights data already in the system, the Air Force should actively seek the removal of these rights to allow the Air Force unrestrictive use of the data — especially where technological or other reasons may now have rendered the justification inappropriate.

DEFICIENT FRONT END PLANNING AND ACTION

Competitive spare parts acquisition can only occur when certain prerequisite conditions exist. The spare parts to be purchased must be adequately described in technical data for which the Air Force has unlimited rights. There must also be two or more existing sources willing and capable of producing the required part. Historically, the Air Force has not planned or taken the actions necessary to create the environment in which competitive spare parts purchasing could be increased.

Creation of this environment depends critically on actions which are taken during the development and initial production of Air Force weapon systems. The current low competition levels of spare parts are indicative of the fact that the appropriate actions have not been taken. Our investigations have confirmed that little management emphasis is placed on planning during system development and acquisition for spare parts competition and for ensuring that appropriate actions are taken to make possible the attainment of competition and to preserve our ability to compete spare parts throughout the system life cycle in an orderly manner.

The measurement of program manager success has largely been focused on near term program requirements - acquisition schedules, cost and technical performance. Logistics support costs in general, and spares competition in particular, are illusive issues to measure early in the acquisition process and consequently receive little attention from the program manager. Acquisition strategies and program office planning activities have not focused on the need to create and preserve the necessary ingredients to bring about replenishment spare parts competition. In addition, Program Management Directives have not required the necessary planning to make this possible. The issue of competition in spare parts acquisitions had low visibility and little attention within both the program office and the contractor organization.

INITIAL PROVISIONING

The provisioning process enables the Air Force to identify the type and quantity of spare parts needed to support the initial fielding of the operational system. These activities also establish the basis for future purchasing of replenishment spare parts. While representing only a small portion of the total spares purchases for a weapon system, these initial provisioning actions have a significant impact on the Air Force's subsequent ability to foster competition. They also impact on the Air Force's ability to establish fair and reasonable prices.

The myriad of provisioning activities required on a major weapon system is typically conducted within an extremely compressed time frame. These activities include maintenance/repair decisions on every item in the system, economic analysis of various acquisition alternatives, and procurement actions to assure the delivery of items in time to meet initial need dates. Although we have had some success in having spare parts on hand, the limited time available to accomplish

provisioning has greatly reduced the ability of the Air Force to increase competition. As a result contractors' recommendations regarding repair levels, initial requirement quantities and procurement method codes are usually unchallenged. The consequencial lack of adequate engineering data, unchallenged proprietary and limited rights data, and our inability to identify true manufacturers impede direct purchase or competitive purchase of these spare parts. In the final analysis, most weapon system peculiar provisioned spare parts are procured from the prime contractor. The current cumbersome process often results in delivery of provisioned spares well after the specified need date.

PROGRAM MANAGER RESPONSIBILITY

A January 1982 CSAF letter reaffirmed that Air Force System Command program managers (PM) have the fundamental responsibility for acquisition logistics and delivery of a supported weapon system. In executing this responsibility, the PM is hampered by lack of control of the necessary resources, confused responsibilities and fragmented tasking. This situation has impeded the development and execution of an effective spares acquisition strategy.

Interim Contractor Support occurs in most programs but is not acquired in accordance with an established plan. Typically, this support is acquired on an urgent basis and at premium prices. Provisioning and Interim Contractor Support (ICS) planning have not been effectively integrated. AFLC funds the ICS but has minimal involvement in planning for ICS.

HIGHER PRICE/PRICE INCREASE FACTORS

There are a number of factors that tend to increase the prices paid for spare parts. These factors are shown in figure 2-19.

HIGHER PRICE/PRICE INCREASE FACTORS

- INITIAL PROVISIONING METHODOLOGY
- UNDERFUNDING
- PRICING METHODOLOGY
- OVERHEAD/PASS THROUGH COSTS
- COST ALLOCATION METHODOLOGY

FIGURE 2-19

INITIAL PROVISIONING METHODOLOGY

As a new or modified system enters the operational inventory, initial spare parts are provisioned and acquired through the process illustrated in Figure 2-20.

SIMPLIFIED VIEW OF THE PROVISIONING PROCESS

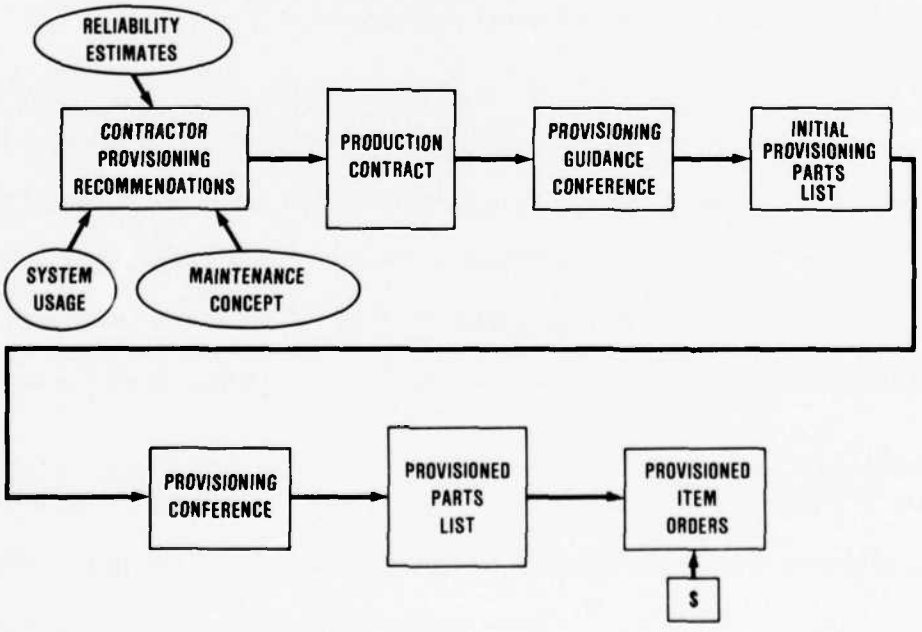


FIGURE 2 - 20

The order of specific spare parts is consummated in the form of Provisioned Item Orders (PIO) which are the contractual instruments used by the Air Force to order initial spares. The PIO is based on estimated prices and allows the contractor to proceed with production prior to definitizing a firm price. Normally, definitized prices are negotiated by the Administrative Contracting Officer and finalized as much as 6 - 12 months after the PIO is released. This process has the potential for price distortion for two reasons.

First, the contractors are instructed (MIL-STD 1552) to provide their initial PIO price estimates based on unit #1 of the learning curve without regard to minimum buy quantities or the economies of the ongoing production run. Accordingly, estimates often include the cost of special tooling, machine set-up costs, performance test and the cost of bulk quantities of packaging materials. When the contractor's budgetary and planning price is inflated with these factors it becomes even more difficult to unmask a fair and reasonable price. Secondly, the total price of the PIO is typically negotiated on the basis of a sample of the parts included in the total order. Negotiating the total order price in this manner results in a distortion of the individual item prices.

Another problem associated with initial provisioning centers around the fact that the initial provisioned price estimate is entered into Air Force catalog lists and is used to charge stock fund customers - the Air Force operational units. This situation results not only in a cash flow drain to the stock fund customer but also gives the impression of overpricing when that might not have been the case.

Figure 2-21 illustrates this problem. The catalog list prices shown in column 1 were based on initial provisioning budgetary estimates. The negotiated prices,

those actually paid by the Air Force, are shown in column 2. The using command would reimburse the stock fund from its O & M account in the amount of $653.03, when, in fact, the Air Force paid $112.20 for these parts. The inability of Air Force antiquated computer systems to provide real time updating of the catalog list prices results in a drain of the using command's O & M funds.

INITIAL PROVISIONING PRICING PRACTICES EXAMPLE

PART	COLUMN 1	COLUMN 2
	CATALOG PRICE	NEGOTIATED PRICE
COVER, ELECTRICAL CONNECTOR	$214.49	$10.20
STUD, PLAIN	$208.63	$50.00
SEAL	$229.91	$52.00
TOTAL	$653.03	$112.20

FIGURE 2 - 21

UNDERFUNDING - ECONOMIC IMPACT

Underfunding has resulted in issuance of restrictive buy guidelines in order to limit annual investment cost. The impacts are shown in Figure 2-22.

UNDERFUNDING

ECONOMIC IMPACT

LIMIT ANNUAL INVESTMENT COSTS

- SHORT SUPPORT PERIOD BUY POLICY
  - REPARABLES - 1 YEAR
  - NONREPARABLES - 3 MOS-3 YEARS
- RESTRICT BUYS
  - REPARABLES: 65-75% OF REQUIREMENT
  - NONREPARABLES: 58-78% OF REQUIREMENT
- REPETITIVE, SMALL QUANTITY BUYS
  - REPARABLES: 50% < 5 EACH
  - NONREPARABLES: 39% < 20 EACH
- RESULT - HIGHER UNIT PRICES
  - ESTIMATED INCREASE 15%

FIGURE 2 - 22

Buying spare parts to short support periods is used to limit annual investment costs. In the System Support Division of the Stock Fund the Air Force has since 1975 constrained the safety level segment of the requirement to 55 days' worth of sales. As a consequence, the Air Force buys reparable spares and repair parts to a fill rate objective of 85%. On the other hand, the Defense Logistics Agency computes its safety level to a 93% fill rate objective for weapon system support parts.

The FY1983 buy guidelines further restricted the quantities of individual reparable spares to be purchased to 65 - 75% of the computed requirement and 58 - 78% of computed requirement for nonreparable spares and repair parts.

As a consequence of restrictive buy guidelines, the Air Force experienced many repetitive, small quantity buys. For the past few years, approximately 50% of the reparable spares purchases involved quantities of 5 or less (Figure 2-23); 39 % of nonreparable spares orders were for quantities of 20 or less (Figure 2-24).

REPARABLE
SPARES QUANTITIES PER PURCHASE REQUEST

QUANTITY RANGE	YEAR		
	1981	1982	1983 (thru MAY)
1-5	11,463(46%)	10,828(50%)	3,645(50%)
6-10	3,838(15%)	3,107(15%)	1,046(14%)
11-20	2,975(12%)	2,435(11%)	834(11%)
21-30	1,468(6%)	1,214(6%)	404(5%)
30 +	5,329(21%)	3,948(18%)	1,432(19%)

FIGURE 2 - 23

NON REPARABLE
SPARES QUANTITIES PER PURCHASE REQUEST

QUANTITY RANGE	YEAR		
	1981	1982	1983(THRU MAY)
1-5	12,730 (13%)	13,258 (14%)	5,687 (16%)
6-10	10,032 (10%)	9,789 (10%)	4,186 (11%)
11-20	12,573 (13%)	12,058 (13%)	4,647(13%)
21-30	8,475 (9%)	8,078 (9%)	3,168 (9%)
30 +	54,444 (55%)	50,337 (54%)	18,400 (51%)

FIGURE 2 - 24

The impact of underfunding is higher unit prices. Figure 2-25 shows an example of higher unit prices caused by the restrictive buy guidelines. In this sample there are quantity decreases ranging from 7 to 50% of the computed requirement. After adjusting FY1982 prices for inflation, the unit prices paid in FY1983 increased from 4 - 68%.

IMPACT OF UNDERFUNDING
HIGHER UNIT PRICES

PART	FY 82 QTY	FY 83 QTY	COMPUTED UNCON-STRAINED RQMTS	FY 82* PRICE	FY 83 PRICE PAID	% INCREASE
J-85 ENGINE MANIFOLD	78 EA	51 EA	71EA	$217.36	$250.00	15.0%
C-141 HOSE ASSY	1117 EA	59 EA	73EA	$92.63	$130.20	40.6%
TF-39 ENGINE MOUNTING LINK	151 EA	66 EA	71EA	$127.98	$139.60	9.0%
J-69 ENGINE LINER	89 EA	42 EA	70EA	$63.95	$76.00	18.8%
F15 OSCILLATOR ASSY	18 EA	7 EA	14EA	$1767.60	$2361.15	33.5%
F15 SAMPLER ASSY	19 EA	12 EA	17EA	$1550.68	$2605.79	68.0%
C5 HOUSING GEAR	40 EA	19 EA	25EA	$561.60	$582.15	4.0%
B52 DUCT ASSY	58 EA	18 EA	23EA	$376.00	$410.00	9.0%
F-111 HOUSING PLATFORM	101 EA	83 EA	117EA	$78.07	$85.79	9.9%

*ADJUSTED FOR 8% INFLATION

FIGURE 2 - 25

Figure 2 - 26 provides an analysis of the economics of buying for longer support periods in the aircraft wheels and brakes industry. Price breaks of 17 - 37% could be obtained with the best price breaks occurring in the three to five year support periods.

UNIT PRICE REDUCTIONS
ON
LONGER SUPPORT PERIODS
($ THOUSANDS)

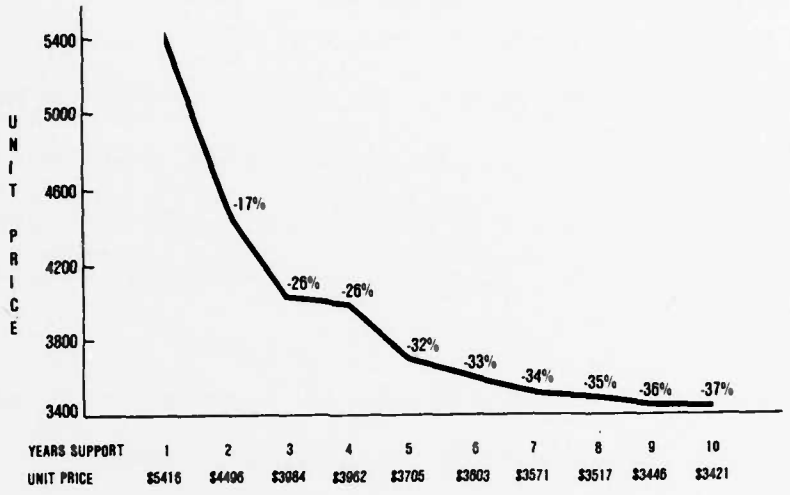


FIGURE 2 - 26

In addition to small quantity buys, underfunding also impacts workload by causing repetitive contracting actions. Figure 2 - 27 shows that from 1980 - 1982 AFLC procured the same item more than once each year for well over half of the items purchased. Not only does this impact unit prices, it also may impose an unnecessary workload.

NUMBER BUY ACTIONS PER ITEM

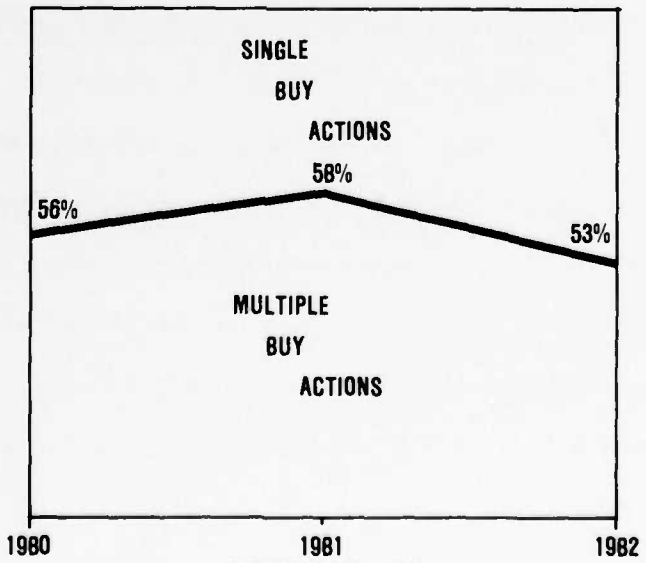


FIGURE 2 - 27

PRICING METHODOLOGY

The large number of actions in the low value catagory and the low dollar value of contracts for these parts, coupled with very substantial personnel reductions (over 22,000 in 6 years), have resulted in the use of many techniques to proceduralize the pricing of these actions. These procedures have been developed to price parts based on broad catagories or commodity classes without regard to individual item price integrity.

For procurements from $1,000 to $25,000 AFLC used a "cost benefit" analysis method of pricing small purchases entitled "Statistical Pricing." Statistical Pricing requires that only 10% of the actions between $1,000 - $5,000 be individually priced. The upper limit can be extended to $25,000 if shown to be cost effective. The remaining 90% of the actions in the population are then accepted as proposed. This method is designed to permit processing of small purchases with minimum personnel. The potential for paying significantly overstated prices for relatively common low value items (nuts, bolts, etc.) bought in small quantities is great. Formula pricing agreements are also used for spare parts purchases. Formula pricing agreements are pre-agreements negotiated with contractors for homogeneous groups of spare parts by which spare parts orders are priced using prenegotiated factors and standards, including the allocation of various direct and indirect costs. While the use of formula pricing agreements facilitates spares ordering and does not require many contracting personnel resources, the method of cost allocation incorporated in most of these agreements does not result in unit price integrity. This method of cost allocation used by most contractors and its consequence are discussed later in this section of this report. At the present time there are 35 formula pricing agreements in use by the Air Logistics Centers.

Another method used is basically a comparison of price history to current price. This method attempts to factor out inflation and quantity price differences and then compares price. If this comparison shows a price decrease or no significant change in price, the proposed price is deemed acceptable. This method of price analysis is based on the assumption that the last price paid was fair and reasonable. This assumption is so widely accepted that the buyer's analysis is often accomplished with little or no knowledge of the item itself. An example of this is shown in Figure 2-28.

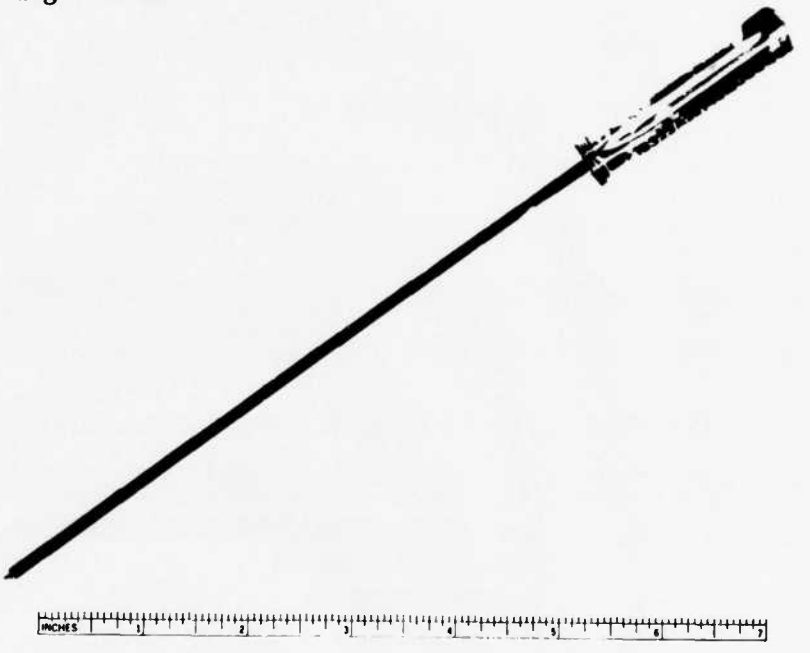


FIGURE 2-28

If the buyer had had either a picture or drawing of the tool, he or she would have realized very quickly that $58.00 was not a fair and reasonable price for a small plastic screwdriver.

It is important to note also that current regulations require no documentation for purchases under $1,000; consequently, there is no price analysis of these small purchases.

OVERHEAD/PASS THROUGH COST

The Air Force buys a large number of spare parts from weapon system prime contractors who are not the actual manufacturers of the parts. In some instances the parts are delivered to the primes in a semi-finished condition to be completed. In other instances, however, the parts are already finished when the vendor delivers them to the prime. The prime may inspect a portion of the parts or repackage them or do nothing at all.

When the prime adds zero or negligible value to the parts, the costs the prime adds to the vendor's price for pass through to the Air Force are not in return for any value added. At one ALC an analysis (figure 2-29) of pass-through costs revealed mark-ups as high as 250% added to the vendor's price. As can be seen, contractor pass-through costs contribute significantly to the unit price the Air Force pays - particularly for low value items.

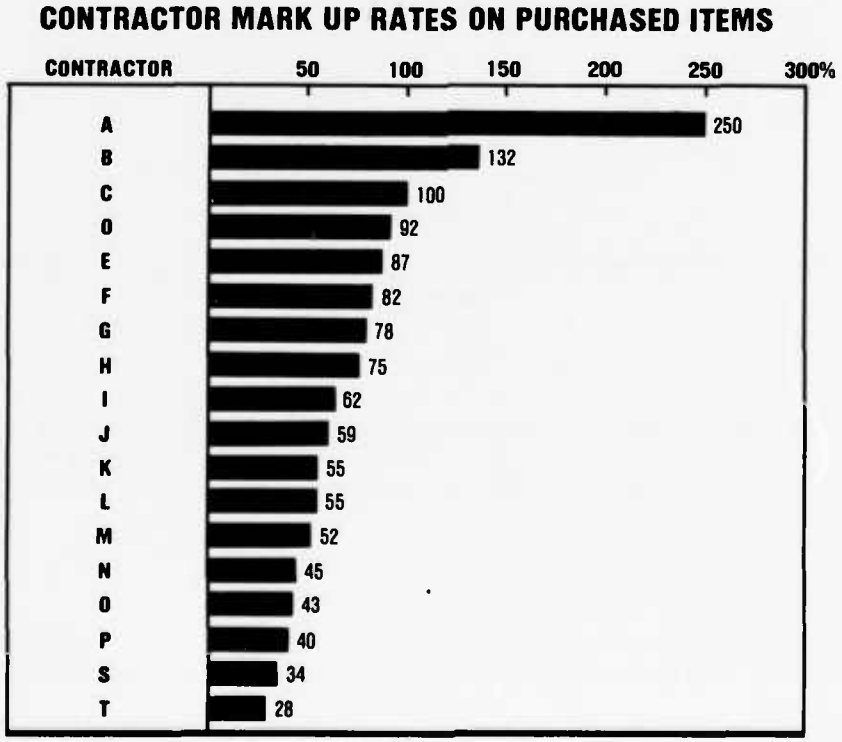


FIGURE 2 - 29

COST ALLOCATION METHODOLOGY

Most prime contractors allocate direct and indirect expenses to spare parts whether or not those specific expense pools contribute to the production of the specific spare parts. Most prime contractors provide a series of services which are neither required of nor available from small competitive suppliers. Included in this group of expense pools are the costs associated with configuration management, material handling, provisioning, IR&D, engineering support to production, service engineering (in-house and field), source approval, training, quality assurance and development of repair processes. All of these services are often unnecessary for the procurement of replenishment spare parts.

Most major defense contractors allocate their costs by prorating the cost equally to each line item of the spare parts order. The total price of the contract may be reasonable, but some contract line items will appear overpriced and some will appear underpriced. An example of the effect on unit price of this allocation method is found in Figures 2-30. Thus the 4¢ diode ends up costing the government, in this case, $110.34.

COST ALLOCATION EFFECT ON UNIT PRICE

EQUAL LINE ITEM PRORATION BASIS	DIODE	POWER SUPPLY
PURCHASED PARTS	2@4¢ $.08	6@$100 $600.00
MATERIAL HANDLING LABOR COST	81.00	81.00
4.5 HOURS @ $18.00		
OVERHEAD 94%	76.14	76.14
TOTAL MANUFACTURING COST	$157.22	$757.14
G&A 21%	33.02	159.00
	$190.24	$916.14
PROFIT 16%	30.44	146.58
TOTAL PRICE	$220.68	$1062.72
UNIT PRICE	$110.34	$177.12

FIGURE 2 - 30

Had the contractor allocated its material handling labor cost pool on the basis of the intrinsic value of each item in that order, the 4¢ diode would have had a unit price of 9¢ while the power supply would have had a more equitable price of $213.87 instead of $177.12 (figure 2 - 31). In either case the total price of the two items, or of the total order, would remain the same (figure 2 - 32). Contractors' cost allocation methodologies that are not value based have resulted in incomprehensible distortion of prices for low value items.

COST ALLOCATION EFFECT ON UNIT PRICE

"VALUE" ALLOCATION BASIS		DIODE		POWER SUPPLY
PURCHASED PARTS	2 @ 4¢	$.08	6 @ $100	$600.00
MATERIAL HANDLING LABOR		.02		161.98
OVERHEAD 94%		.02		152.26
TOTAL MANUFACTURING COST		$.12		$914.24
G&A 21%		.03		191.99
		$.15		$1106.23
PROFIT 16%		.03		176.99
TOTAL PRICE		$.18		$1283.22
UNIT PRICE		$.09		$213.87

FIGURE 2 - 31

UNIT PRICE COMPARISON

	DIODE	POWER SUPPLY
EQUAL LINE ITEM PRORATION BASIS	$110.34	$177.12
"VALUE" ALLOCATION BASIS	$.09	$213.87
	(-100%)	(+21%)

TOTAL PRICE COMPARISON

	DIODE	POWER SUPPLY	TOTAL
EQUAL LINE ITEM PRORATION BASIS	$220.68	$1062.72	$1283.40
"VALUE" ALLOCATION BASIS	$.18	$1283.22	$1283.40

NOTE: UNDER EITHER METHOD TOTAL PRICE IS SAME

FIGURE 2 - 32

WHERE ARE WE VULNERABLE - HOW BIG IS THE PROBLEM

Two major forces contribute to the attainment of economical prices. They are: competition and buying economical quantities. To size the vulnerability of paying higher than economical prices, AFMAG examined the FY 1982 Air Force replenishment spares buy program to determine where these forces were at play and where they may have been less than effective.

Before going into this AFMAG analysis, it is important to point out that the flight safety criticality of many spare parts in the Air Force inventory demands careful scrutiny of our industrial supplier base. While the Air Force must do everything possible to increase spare parts competition, this competition must be fostered from among qualified, competent suppliers.

Using easy, commercial contracting practices to purchase all Air Force spare parts, forcing the awarding of contracts on the basis of the lowest bid price alone, would be disastrous. The contract negotiation process, even for low value, safety critical items, and competition among qualified suppliers for safety critical items must be preserved.

The AFMAG believes that because of the relatively complex nature of much of the Air Force's spare parts inventory, especially from a dollar value standpoint, the attainment of a replenishment spare parts competition rate of 40% ($) would be a monumental achievement.

The first major consideration of the AFMAG vulnerability analysis of the FY 1982 replenishment spares buy program was competition. It is reasonable to assume that where true competition exists the likelihood of excessive prices is low. It

was found that 22% of the total replenishment spares dollars were spent competitively. This accounted for 34 percent of the items bought (figure 2 - 33 and 2 - 34).

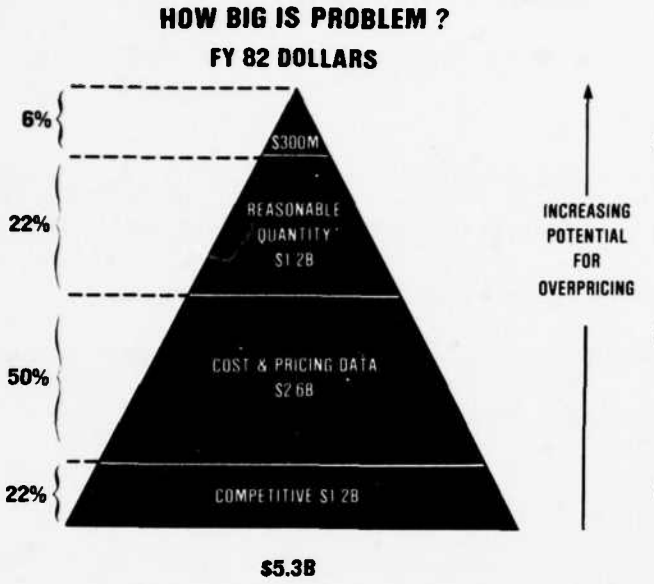


FIGURE 2 - 33

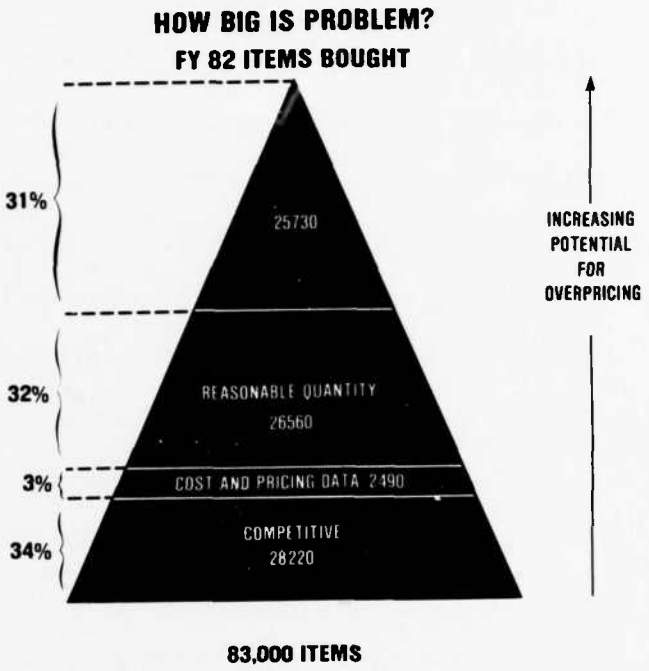


FIGURE 2 - 34

The majority of the dollars spent in FY82 for replenishment spares were not subjected to competitive market place forces. However, public law and acquisition regulations have devised a substitute for competition - negotiation and the use of cost and pricing data. The government obtains certified cost and pricing data whenever a noncompetitive purchase exceeds $500,000. This data is audited by the Defense Contract Audit Agency and results in the examination of contractor proposed costs to determine if they are fair and reasonable. The receipt of certified cost and pricing data and the contract negotiation process offer a powerful substitute for competition. Nearly 50 percent of the dollars, but a relatively small 3 percent of the items, were covered by this procedure in FY 1982. It is reasonable to conclude that the probability of excessive pricing is

lowered when spares are purchased through negotiation with audited, certified cost and pricing data.

Along with competition there must be concern that spares orders involve economical quantities. This is particularly important when competition or cost and pricing data are not available. In FY 1982, 22% of the dollars and 32% of the replenishment spare parts were purchases in reasonable quantities. Based on an analysis of past purchases as well as discussion with industry, the AFMAG concluded that when the Air Force buys, as an average, reparable items in quantities of 10 or more and nonreparables in quantities of 50 or more, that that would be fairly considered as reasonable quantities. In these circumstances, while not as low as in the case of competition and negotiation with certified cost and pricing data, the potential for paying excessively high prices is nevertheless lessened.

The area where the Air Force is most vulnerable to high prices and excessive price increases is where small quantities of low value items are purchased noncompetitively. For FY 1982, this accounted for 6 percent of the dollars and a relatively large number of items - 31 percent. The combination of the lack of competition, nonavailability of cost and pricing data, buying in low quantities, and the manner in which most contractors allocate costs to low value items meets all the conditions for uneconomical buying and high prices. This is when the potential for excessive price is the highest. AFMAG analysis shows that the forces that yield reasonable prices - competition and quantity buys - are well recognized but not fully within the control of Air Force.

ZERO OVERPRICING PROGRAM

The Air Force Zero Overpricing Program shown in Figure 2 - 35 was established in May 1979. This outstanding program is intended to generate price awareness and challenging of prices for goods and services down to the grass roots level of the Air Force - at the flightline mechanic and unit supply levels.

ZERO OVERPRICING PROGRAM

- 1979 AIR FORCE INITIATIVE
- GRASS ROOTS PRICE AWARENESS/CHALLENGE
- REEMPHASIZED THROUGHOUT AIR FORCE
  - FEEDBACK
  - AWARDS/RECOGNITION
- 4% OVERPRICING VERIFIED
- 15% INTERNAL CATALOGING ERRORS

	1980	1981	1982	1983
REFERRALS	2690	3290	4945	6938

FIGURE 2 - 35

This program has received nearly 18,000 referrals since 1980. Of this number, 4% of the reports involved spare parts that have been verified as having been overpriced.

UNIT PRICE INTEGRITY

Past and current pricing and cost allocations methodologies reinforce the need to purge the Air Force spare parts data base to establish value based unit price integrity. This will entail performing value analysis on each spare part projected to be purchased. Unit price integrity based on value analysis is the key to fair and reasonable prices in the absence of competition.

PACER PRICE

Value analysis is a detailed technical and pricing investigation. The value analysis team consists of price analysts, material and labor estimators, engineers, and packaging specialists. The "should cost" price estimates developed through value analysis conducted by PACER PRICE have a number of applications. The estimated prices and rationale therefore provide a solid basis for price negotiations. They identify and quantify excessive pricing for follow-up management action. These "should cost" prices are also used to identify lack of adequate price competition, the use of inappropriate contracting methods, and overstated requirements.

PACER PRICE OBJECTIVES

- PERFORM VALUE ANALYSIS
- VALIDATE PROCUREMENT METHOD CODES
- INVESTIGATE RESTRICTIVE SOURCES
- OPTIMIZE ORDER QUANTITIES

FIGURE 2 - 36

Within AFLC, PACER PRICE is the program for identifying and correcting overpricing whether the cause is contract methodology, pricing practices, or material management requirements. Figure 2 - 36 describes the overall objectives

of the PACER PRICE activity. The PACER PRICE operation has been placed under the new Directorate of Competition Advocacy.

COMPETITION ADVOCATE

The Air Force Logistics Command established a new organization, the Directorate of Competition Advocacy, in July 1983, at each Air Logistics Center, with the responsibility, authority, and accountability for ensuring that fair and reasonable prices are paid for every spare part projected to be purchased and for increasing competition.

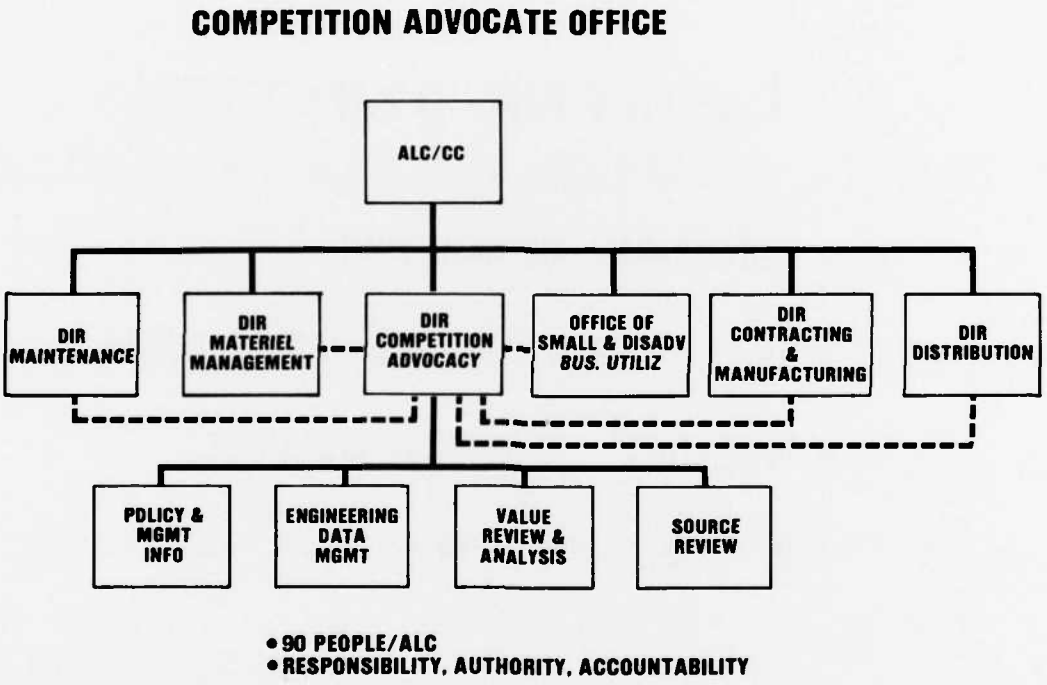


FIGURE 2 - 37

This organization, reporting directly to the Air Logistics Center Commander, is independent of the Directorate of Materiel Management, where system program

managers and item managers reside, and from the Directorate of Contracting and Manufacturing, where buyers, contracting officers and pricing analysts are assigned. This is where screening of every item projected for purchase will take place. As these items are purged by the Competition Advocate, the screening results are fed back to item managers and contracting officers and are used to update the spare parts data base. The Competition Advocate will, in association with appropriate agencies, also seek new supplier sources and provide for qualification of new suppliers. In time - after screening current year buy items - the Competition Advocate will be screening the spare parts that are projected to be purchased in future years. Requirements computation systems provide 3 year buy projections for reparable items and 2 years for nonreparable items.

The AFMAG recommended that the Directorate of Competition Advocacy be manned with a total of 450 personnel - approximately 90 at each Air Logistics Center. These organizations must also be provided with relatively low cost microcomputers to assist and facilitate screening, record keeping and reporting, relieving the current labor intensity as much as possible.

MANPOWER

An extensive review was conducted of both the quantity and quality of the people resources associated with the spare parts acquisition process. Figure 2 - 38 shows a nine year trend of AFLC manning. From 1973 (110,000 personnel) to 1979, AFLC experienced a loss of over 22,000 personnel authorizations, with over 11,000 of these losses occurring between 1973 and 1975.

TOTAL PERSONNEL ASSIGNED GAINS/LOSSES
AF LOGISTICS COMMAND

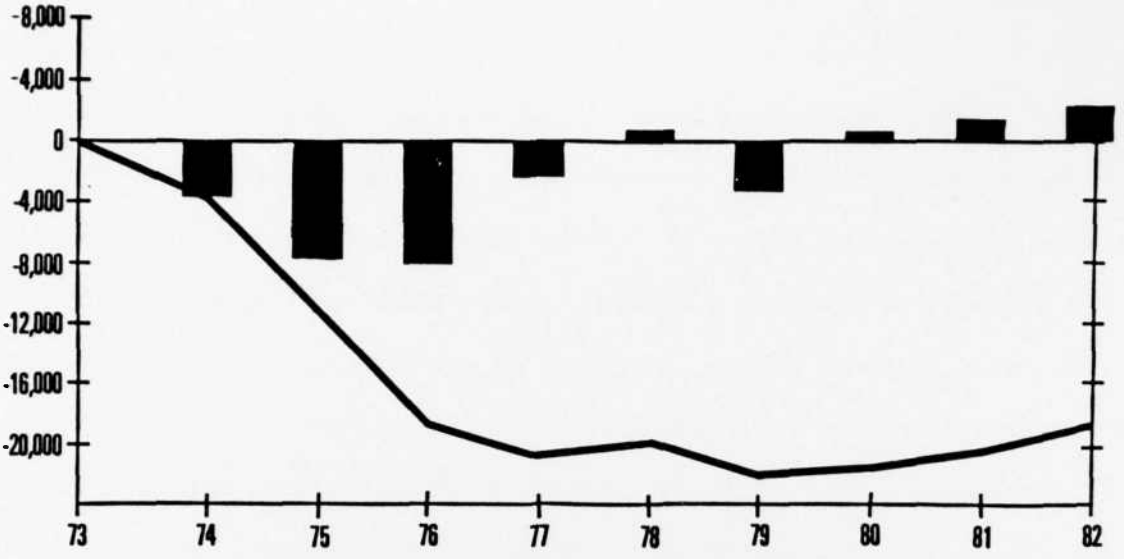


FIGURE 2 - 38

These dramatic reductions caused a great deal of turmoil, generated by the ripple effect of Civil Service bumping actions. To deal with these significant reductions at the Air Logistics Centers, organizational consolidations were made. All item managers were placed into a single organization, losing the synergism with the hardware knowledgeable equipment and production specialists who remained assigned to the weapon system management organizations.

Despite increasing workload since about 1976, resulting from the Air Force force modernization program, there were significant losses of key skills, and experience levels plummeted. Between 1975 and 1983, 30% of the AFLC item managers were lost. The turnover of item managers is greater than 14% a year. Since 1976, the numbers of equipment specialists and production specialists within the AFLC materiel management organizations declined 14% and 18% respectively. Experience levels dropped across the board. Materiel management manning today

is still only 72% of requirement. Training became a problem. The effects on the spare parts acquisition process have now become obvious.

In the central contracting functions a similar manning picture exists. While total buyer manning has increased 10% in the past 5 years, the average number of purchase requests handled per buyer has increased 21%. Moreover, AFLC contractor manning is still only about 71% of requirement.

In addition to the decline in manning and experience level of AFLC contracting and materiel management personnel, training has not been adequate. The increasing and complex nature of the AFLC workload requires that specialized training courses be expanded and made available to the workforce. Currently less than 40% of the validated training needs of the AFLC contracting workforce is being provided. In the data management career field 64% of the AFSC data managers and only 56% of the AFLC managers have attended the Engineering Data Acquisition course. Further, the AFMAG found that no formal training is offered in the area of supplier source qualification or on actions necessary to develop new competitive sources in an effective and efficient manner.

The effect of these significantly reduced manning levels, high turnover rates and the lack of training are even more dramatic when one considers that most of the findings of this report are, to some extent, critical of the management tools used as a result of manpower losses. Management decisions such as limiting breakout screening to items with annual buy values over $7500, statistical pricing, and no documented price analysis for line items under $1,000 may be defended in terms of cost versus benefit analysis. Nevertheless, these practices heighten the probability of unreasonable price increases and reduced competition.

SECTION 3 - OVERVIEW OF AFMAG RECOMMENDATIONS

The review of spare parts acquisition, from development, design, and production of a weapon system to post production support, has resulted in a series of both near and longer term recommendations. Figure 3 - 1 is a summary of the recommendations pointed toward fixing the problems that exist in managing spare parts currently in the Air Force inventory.

FIXING THE PROBLEM

SPARES IN CURRENT INVENTORY

- ACCOUNTABILITY IN COMPETITION ADVOCATE
  - INSTITUTIONALIZE ITEM SCREENING - VALUE/BREAKOUT
- PROVIDE MANPOWER AND ADP
- CHANGE COST ALLOCATION METHODS
- PLAN, PROGRAM, BUDGET TO COMPUTED REQUIREMENTS
- CHANGE FINANCIAL REGULATIONS/BUY POLICIES/SUPPORT PERIODS
  - INCREASE QUANTITIES
  - MULTI-YEAR SELECTED SPARES
- EXECUTE ANNUAL BUY PROGRAM EARLY

FIGURE 3 - 1

The AFMAG recommends that the Air Force program and budget for the computed spares requirements in its Five Year Defense Plan or Program Objective Memorandum period to avert the economic as well as the operational impact of underfunding.

The Air Force should relax restrictive financial policies and buy guidelines to allow larger quantity purchases to reduce unit prices. The Air Force should make greater use of multi-year procurement for selected design stable, high demand spare parts.

An approach for improving the execution of the annual spares buy program is also recommended.

The AFMAG has made recommendations to enhance competitive procurement and to ensure price reasonableness. A Competition Advocacy organization at each of the 5 Air Logistics Centers has been established and is being manned. Actions are underway to provide computer resources to this organization.

AFMAG strongly recommends that contractor cost allocation methods be changed to provide a more equitable distribution of costs to avoid the severe distortion of unit prices - particularly of low value items.

Figure 3 - 2 provides a summary of the recommended actions to bring items into the active spare parts inventory in a manner that will ensure reasonable prices as well as establishing and preserving the ability to increase spare parts competition throughout the system life cycle.

FIXING THE PROBLEM
WEAPON SYSTEM DEVELOPMENT/ACQUISITION

- MAKE SPARES ACQUISITION MAJOR AREA IN SOURCE SELECTION
- PHASED SUPPORT CONCEPT
  - CONTRACTOR INCENTIVES
- MANAGEMENT OF ENGINEERING/ACQUISITION OATA
- SPARE PARTS BREAKOUT OVER ENTIRE SYSTEM LIFE

FIGURE 3 - 2

The AFMAG recommends the early planning and establishment of a spares acquisition strategy involving major input from industry during competitive system source selection. Take the necessary steps to establish and preserve the Air Force's ability to increase competition in spare parts procurements and to establish good unit prices at initial spares provisioning.

It is recommended that the Air Force evaluate further a phased contractor support concept for new major systems to provide improved initial support and an orderly transition to in-house Air Force support. The contractor should be incentivized to increase the reliability of his product by establishing appropriate support goals. A preplanned Interim Contractor Support period will allow the Air Force to provision and order the delivery of initial spares after they have become design stabilized. This will avert the problems associated with acquiring technical data for reprocurement purposes too early and finding them not useable because of design changes.

Since the adequacy and availability of technical data is the greatest inhibitor to the Air Force's ability to increase competition, many recommendations are made to improve the management of technical data.

The breakout of spare parts for competitive reprocurement should be planned for over the entire life cycle of the system.

The Air Force has established a General Officer Steering Group at Headquarters USAF, chaired by the Deputy Chief of Staff, Logistics and Engineering, to oversee evaluation of the AFMAG recommendations, promulgate implementation actions, and measure progress of implementation commands and agencies. In parallel with

IMPLEMENTATION ACTIONS - FOLLOW-UP

AFMAG RECOMMENDATIONS 159

- BUDGETING, FINANCIAL POLICY, REQUIREMENTS COMPUTATION 37
- FRONT END PROGRAM DECISIONS 46
- CONTRACTING TECHNIQUES 28
- POST PRODUCTION SUPPORT 18
- MANAGEMENT RESOURCES AND EQUIPMENT 30

AF/LE AND RD - GENERAL OFFICER STEERING GROUP - POLICY - RESOURCES

AFLC/AFSC - IMPLEMENTING ACTIONS

AF/IG - FUNCTIONAL INSPECTIONS, SYSTEM ACQUISITION INSPECTIONS

FIGURE 3 - 3

the General Officer Steering Group activities, the AFMAG recommends that the Air Force Inspector General establish a follow-up inspection program through continuous functional and system acquisition management inspections.

The balance of the report highlights selected key recommendations, divided into five major areas, to improve and institutionalize the spare parts acquisition process. Volume II provides detailed rationale for the recommendations outlined below as well as many others. These changes will fundamentally alter our approach to spares acquisition and provide long term assurance of success.

REQUIREMENTS, FINANCIAL POLICY AND BUDGETING

- Spare parts requirements provide only 85% fill of operational needs. Fund the computed requirements in the budget and program objective memorandum. (OPR: Air Staff Board structure)

- Seek change in OSD policy to allow advance procurement of long lead components for selected spares procurements where leadtime and cost savings accrue. (OPR: HQ USAF/AC, OCR: HQ USAF/RD/LE)

- Change Air Force policy to buy a minimum of one years requirement on stable design high demand nonreparables items. (OPR: HQ USAF/LEY)

FRONT END ACQUISITION DECISIONS

- Establish support baselines for each major weapon system acquisition program to define specific support requirements for initial support and follow-on support. (OPR: HQ USAF/RD, OCR: HQ USAF/LE)

- Assign responsibility for initial provisioning and interim contractor support, to include funds control, to the AFSC program manager. (OPR: HQ USAF/RD, OCR: HQ USAF/LE/AC)

- Develop an integrated spares acquisition & support (ISAS) plan contractual requirement during the full scale development competition. (OPR: HQ USAF/RD, OCR: HQ USAF/LE)

- Establish a phased (contractor) support program as an authorized method of initial support for Air Force weapon system programs. (OPR: HQ USAF/LE, OCR: HQ USAF/RD)

- Change initial provisioning pricing methodology to ensure realistic pricing of individual items. (OPR: HQ AFLC/MM, OCR: HQ AFSC/PM)

- Consolidate and clarify Air Force policy for acquiring engineering data and acquisition data packages. (OPR: HQ USAF/LE, OCR: HQ USAF/RD)

- Establish a 5 year time limit on proprietary date from data of acceptance of the first production article. (OPR: HQ USAF/RDC)

CONTRACTING/PRICING TECHNIQUES

- Change method of allocating costs to "value" basis with the intent of cost accounting standard 418. (OPR: HQ USAF/RDC)

- Eliminate "formula pricing" agreements that do not allocate costs on dollar value basis by 30 June 1984. (OPR: HQ USAF/RDC, OCR: HQ AFLC/PM)

- Expand use of multiyear contracts for selected spares. (OPR: HQ AFLC/PM, OCR: HQ AFLC/MM, ALCS/PMIMM)

POST PRODUCTION SUPPORT

- Establish policy and procedures for reviewing contractor proposals to identify for breakout those purchased parts to which the contractor adds no "value". (OPR: AF/RDC)

- Streamline qualification process for alternate manufacturing sources. (OPR: HQ AFLC/CR, OCR: HQ AFLC/PM/MM)

- Fund the automated data retrieval system in FY 84 and install the two pilot systems. (OPR: HQ USAFE/LE, OCR: HQ AFLC/AQ)

MANAGEMENT RESOURCES AND EQUIPMENT

- Provide manpower resources to fully establish the competition advocate organization as well as accepted activities within AFLC and AFSC. (OPR: HQ USAF/MP, OCR: HQ AFLC/MP, HQ AFSC/MP)

- Obtain ADP resources to support the competition advocacy function at all five ALCs. (OPR: HQ AFLC/CR)

- Revise work plans to include performance standards in general manager appraisal system (GMAS) and job performance appraisal system (JPAS) to motivate employees to reduce costs and increase competition. (OPR: HQ USAF/MPK, OCR: HQ USAF/RDC/LEY)

- Fund the contract data management system program in FY 85. (OPR: HQ USAF/LEX, OCR: HQ AFLC/PM, HQ AFLC/XR, HQ USAF/RDC)

- Expand contract data management system to provide a picture and technical description of every item in the Air Force inventory. (OPR: HQ AFLC/PM)

- Establish a joint AF/industry program to identify production leadtimes, economic production quantities, actions to deal with obsolete or out-of-production parts and to expand the industrial base. (OPR: HQ AFLC/PM, OCR: HQ AFLC/MM, Air Logistics Center Business Management Steering Committees)

probability of unreasonable price increases and reduced competition.

greater use of multi-year procurement for selected design stable, high demand spare parts.

FIGURE 3 - 2

and measure progress of implementation commands and agencies. In parallel with