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EASING THE BURDEN: RESTRUCTURING AND CONSOLIDATING DEFENSE SUPPORT ACTIVITIES

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Medical

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SUMMARY

In 1948, leaders of a victorious United States met in Key West, Florida, to mold the defense establishment of a nation whose role in the world was fundamentally changed. Today, this country again confronts the uncertainties of victory, as the end of the Cold War presents both opportunities and challenges. Anticipation of a peace dividend has left the defense community with the challenge of decreasing spending. Many observers believe the defense budget will continue to decline. But military leaders often argue that the United States still faces substantial--though uncertain--threats. As a result, many defense experts have expressed concerns that forces--now a third to a half of their size of a few years ago--should not be cut further.

THE ROLES AND MISSIONS DEBATE

Some Members of Congress, including Senator Sam Nunn, the Chairman of the Senate Armed Services Committee, have suggested that the end of the Cold War offers the opportunity for restructuring. Using the term "roles and missions," in a speech in 1992, Senator Nunn laid out a vision for a restructured defense establishment that would place America's interests before service or agency concerns. The issue of reorganization remains of interest to the Congress. Just last year, the authorizing committees set up an independent commission to review the Department of Defense's (DoD's) roles and missions. That commission had its first meeting last May and will report on its findings next spring.

Interest in reviewing roles and missions springs in part from the notion that the organization of a defense establishment that confronts post-Cold War threats should differ from that of the Cold War establishment. But at the heart of the debate is the belief that DoD must do more with less and that it

Over the next five years, the Administration's projected budget may provide roughly enough funds for DoD's program, but the number of potential problem areas suggests that funds will be tight at best. The Administration itself has acknowledged shortages of about $20 billion over the 1995-1999 period, and its plans do not include enough funding for future pay raises as large as those that DoD military and civilian personnel seem likely to receive. Potential also exists for increases in funding for weapons and for environmental cleanup. Moreover, recent press reports suggest that the Administration is expressing concerns about its ability to close bases as fast as the current plan would envision. Although deferring base closures could save money in the short run, since closures require up-front funding, it will add to costs in the long term, when CBO's analysis has suggested that funding could be even tighter. But even without these added pressures, DoD could be short $12 billion to $25 billion annually over the 2000-2010 period if it receives no real increases above the 1999 level in the Administration's current plan.

Barriers to Change

DoD may be able to realize savings to solve budget problems without major reorganization. In many cases, savings would result from eliminating excess capacity or cutting functions that are no longer needed. If the Administration and the Congress chose to make them, most of these cuts could take place within the current organizational framework.

But institutional barriers to intraservice streamlining could prove insurmountable. The military branches may keep functions in-house--even at the risk of continuing inefficiencies--because they receive more responsive services or services that are tailor-made for the functions they control. Incentives to streamline may be lacking, since gains from increased efficiency are more likely to result in overall budget reductions than increased funding for other programs. Also, the services may fear streamlining with its risk of reducing the bureaucratic scope of their organizations. Thus, a restructuring

pluralistic U.S. political structure than the benefits of efficiencies to the economy as a whole.

Focusing on Support

Despite the difficulties inherent in making major changes, DoD will need to consider restructuring. Moreover, it may focus on support functions, since support represents such a large portion of the budget. Support functions and infrastructure must also feature prominently in any roles and missions debate, since DoD is anxious to avoid further sharp reductions in combat forces and to preserve their readiness.

What is infrastructure? The staff of the commission on roles and missions provided a rough division of DoD's budget that would allocate to infrastructure any resources not found in a major program that funds forces. According to this definition, funding for support makes up roughly half of the defense budget, totaling about $125 billion in 1994 and the same amount in 1995. Even broader definitions of support could be used. The Administration's Bottom-Up Review estimated that infrastructure spending in 1994 totaled $160 billion, thus including about $35 billion found in force programs.

Other trends also argue for restructuring support functions. Support functions might merge to conform with combat functions that are melded. Even if combat functions remain discrete, advantages may accrue from consolidating support functions since defense strategy now seems to place more emphasis on joint warfighting. Restructuring might also be considered if competitive industries in the private sector perform functions now done by DoD. Changes in the geopolitical environment may also have altered the need for some support activities.

Characteristics of Candidates for Consolidation or Restructuring

Several characteristics may make some infrastructure functions better

- Maintain common equipment or offer opportunities for savings from buying or developing common systems;
- Support combat activities where missions are shifting; and
- Support joint combat activities.

Support functions that might be restructured include those that:

- Are not uniquely military or have competitive industries performing them in the private sector;
- Are not closely tied to warfighting capabilities, though unique to DoD; and
- Meet requirements that are undergoing significant change.

SOME EXAMPLES OF CONSOLIDATION OR RESTRUCTURING

A number of support functions may meet these criteria. The Congressional Budget Office (CBO) has analyzed examples of consolidation or restructuring in several areas: services to DoD personnel, weapons purchases and maintenance, intelligence, and training. Only four of the options CBO analyzed seem likely to offer significant savings in the near term. One alternative might actually add to costs initially because the up-front costs associated with reorganization or base closings swamp operating savings. Over the long term, however, the alternatives should reduce the burden DoD carries for supporting its forces.

Services to DoD Personnel

when that approach is in fact the most cost-effective way to provide a high quality of life for military families.

Military Medical Care. DoD currently has four separate organizations with both fiscal and management authority over the Military Health Services System (MHSS): the Assistant Secretary of Defense for Health Affairs and the Surgeons General of the Army, Navy, and Air Force. In spite of that divided structure, the Assistant Secretary is responsible for ensuring that the department effectively carries out its medical mission.

DoD will have a total physician end strength of about 13,000 in 1995, almost three times the projected wartime requirement of about 5,000 active-duty physicians. Since peacetime medical care requirements now largely drive the size and structure of DoD's medical establishment, the department has been placing more emphasis on developing ways to provide peacetime care in a cost-effective manner. It is implementing several initiatives to accomplish this goal in its Tricare program, including a new management structure and a revised system of reimbursing providers of health care. But CBO's analysis suggests that adopting HMO staffing patterns at the military facilities--a goal that Tricare may not be able to accomplish--might enable DoD to reduce its physician end strength by almost 11 percent more in 1995. Reducing the number of physicians by about 1,500--in addition to the cuts the Administration already plans--could save about $400 million over the 1995-1999 period, and about $100 million annually once reductions are fully phased in (see Summary Table).

Consolidating control of all the medical resources that are now controlled by the Assistant Secretary of Defense for Health Affairs and the services under a single manager might allow for more effective management of the MHSS, and it might provide DoD the leverage needed to adopt HMO staffing patterns. CBO's option would place all funding for the Defense Health Program to support the MHSS--including all resources for military medical personnel, now controlled by the services--under a single manager: the Assistant Secretary. He or she would be responsible for developing a unified budget for the MHSS and allocating resources to the services based on those

Reducing the number of physicians might not be without its disadvantages, however. Having fewer military physicians would mean that beneficiaries would have less access to military medical care, which would require different practice patterns by military physicians if long lines for beneficiaries are to be avoided. Furthermore, an influx of military beneficiaries to the system could make the situation worse for current beneficiaries. If those problems materialized, they would probably increase costs for the civilian

SUMMARY TABLE. COSTS AND SAVINGS FROM OPTIONS (In billions of dollars)

Option	1995	1996	1997	1998	1999	1995-1999	Long-Term Steady-State Annual Savings[a]
Adopt HMO Staffing Patterns	b	0.1	0.1	0.1	0.1	0.4	0.1
Increase Incentives for Privatization of Family Housing							
Revolving fund	0.3	0.5	0.5	0.5	0.6	2.3	0.5
Single housing appropriation	0	0	0	0	0	0	0.5
Consolidate Acquisition Work Force	0	b	0.4	0.9	1.5	2.8	2.1
Consolidate Depot Maintenance	0	-0.4	-0.4	b	0.3	-0.5	0.4
Restructure Intelligence Community	0	0	0	b	b	b	1.0
Consolidate Undergraduate Pilot Training	0.1	0.2	0.3	0.4	0.6	1.6	0.2

portion of care that beneficiaries receive under DoD's Civilian Health and Medical Program of the Uniformed Services (CHAMPUS).

In view of those risks to beneficiaries, this option conservatively estimates the reductions in the number of physicians by assuming that all care that beneficiaries receive from DoD is provided at the military treatment facilities. In effect, that assumption leads to ignoring any care provided under CHAMPUS, which could have permitted an even larger reduction in the number of physicians needed to staff the military treatment facilities.

Family Housing. Family housing benefits are another important element in the compensation package that DoD provides its military personnel. About one-third of the military families in the United States live on-base in DoD housing; the other two-thirds receive cash housing allowances that they use to help defray the cost of obtaining housing in civilian communities. Although the current organization for military medical care results in overlap between military departments, DoD's role in providing on-base family housing may overlap with the role of the private-sector housing industry.

CBO's analysis of family housing presents several options that--by consolidating responsibilities for on-base family housing with those for cash allowances--might encourage the department to rely more on private-sector housing. A reduced DoD role could offer significant savings, since the federal government spends 25 percent more on average to provide DoD housing units than what military members choose to pay when they obtain housing in the private sector.

One of these options would involve creating a revolving fund for DoD housing. DoD would pay cash housing allowances to all military families living in the United States; families living in DoD housing would then pay their base housing office a rent equal to their allowance. The rents (allowances) would be used to pay operating costs and to make contributions to a sinking fund that, subject to Congressional authorizations, would finance housing investment. In one version of this approach, the revolving fund would be required to pay the Treasury an annual interest charge for units construct-

A revolving fund without supplemental appropriations would save about $300 million in 1995 and about $2.3 billion over the 1995-1999 period. Over the long run, such a revolving fund would save about $500 million annually, as DoD reduced its housing stock and shifted to a more efficient mix of cash and in-kind compensation.

The greatest disadvantage of this alternative stems from the risk that separate appropriations for housing construction might be continued. If such appropriations were made, a revolving fund for family housing could easily result in a greater DoD role in family housing and increased costs. By CBO estimates, DoD's budgets could grow by about $400 million in 1995 and as much as $1.8 billion over the 1995-1999 period. Costs could continue to be higher over the long run, perhaps by about $400 million per year.

A second option would be to establish a single appropriation for family housing benefits. Under this approach, all federal funds currently spent on DoD housing benefits for military families (including family housing operations, family housing investment, and housing allowances) would be consolidated into a single appropriation. DoD and the Congress would review the appropriation annually based on the average amount requested for family housing benefits for each military family in the United States and overseas. Congressional authorization would still be required for investment projects.

Since a single appropriation would free DoD to shift funds to the most cost-effective method of providing housing, the department might be expected to invest in family housing only if the value of the investment to service members over its life cycle exceeded the cost of the unit to DoD. Previous CBO analyses suggest that over the long run the costs the federal government incurs in providing DoD housing exceed the value of that housing to service members. Thus, DoD's role in providing on-base housing would probably decline under this alternative in which DoD managers would have an incentive to choose the most cost-effective form of compensation.

Under the assumptions of this alternative, the immediate savings from a

focuses on the average cost per military family, which in turn would require some reallocation of responsibilities within the Congress. The same subcommittees would have to be responsible for both allowances and family housing. Moreover, responsibilities within DoD would need to be similarly realigned.

Support for DoD's Weapon Systems

DoD maintains sizable stocks of sophisticated weapons to provide its military with a qualitative advantage over potential opponents. Thousands of people in each of the services and several defense agencies are engaged in developing and buying new weapons. Maintenance personnel perform daily and periodic maintenance on these weapons. CBO's analysis discusses consolidating portions of these acquisition and maintenance work forces.

Consolidating the Acquisition Work Force. Ten major organizations and a number of small components in various defense agencies make up the defense acquisition work force. About 450,000 military and civilian workers in DoD conduct and manage the process of developing and producing weapons, equipment, and supplies. The size of the acquisition work force--about 23 percent smaller today than it was in 1988--has declined more gradually than has its work load, according to a number of measures. Acquisition funding declined by about 28 percent over the same period. Quantities of major weapons bought are also sharply lower than in recent years. For example, the Administration's budget this year requested about 125 aircraft, compared with more than 500 authorized in 1990. Ship procurement is a third of 1990 levels, and quantities of strategic missiles requested about a tenth. The number of programs in the acquisition development pipeline is down by about 30 percent.

Perhaps responding to duplication in the organizations providing acquisition services, or to the sluggish effect of reductions on the acquisition work force, several Members of Congress have proposed that acquisition functions be consolidated or streamlined. In fact, the Congress recently

CBO's analysis considers an option that goes beyond current legislation to streamline the acquisition process by consolidating these activities into a single agency. Consolidating all defense acquisition functions could promote savings and efficiencies by creating a management structure that is more conducive to cross-service purchasing of weapons and equipment than current practices that often result in each service developing its own systems. A single agency could also achieve a variety of management efficiencies: administrative and support functions could be consolidated and cut back, contracting support and oversight could be centralized, and management information systems could be revamped to meet uniform needs.

Consolidating acquisition functions, however, has its risks. The near-term costs of reorganizing could be significant. Such costs would come at a time when budgets are severely constrained by the need for reducing the deficit. Further, consolidation could create, at least initially, a new layer of bureaucracy to oversee the process that could delay savings and efficiencies. Finally, many of the advantages of an acquisition agency might be realized simply by eliminating the redundancy of military functions among services so that the acquisition work force could be reduced in ways other than through reorganization.

Consolidating Weapons Maintenance. Today, the military services operate 34 major facilities that perform about 70 percent of DoD's annual $15 billion bill for depot repairs and related maintenance. Although 10 facilities are scheduled to close as a result of previous base realignment and closure (BRAC) decisions, reductions in the numbers of U.S. forces and in the tempos at which they operate will still leave considerable excess capacity at the remaining public depots. The magnitude of this excess capacity may be even larger than current estimates if the Administration succeeds in carrying out its policy of redefining a "core" set of maintenance capabilities and then awarding a greater share of maintenance contracts to the private sector.

Public depots are dedicated primarily to a single service, and with the possible exception of fixed-wing aircraft, the Administration plans to let each

management structure could make intraservice and interservice depot consolidations more likely.

In a 1993 report, the Joint Chiefs of Staff proposed one option for centralization: establish a joint depot maintenance command. A joint command or, alternatively, a civilian depot agency could take a DoD-wide perspective in managing existing facilities, assigning similar work loads to specific depots, and making recommendations to the BRAC commissions about which facilities to close. Since service depot personnel might be assigned to work together in a common facility or at least collaborate more extensively at separate facilities, a centralized management structure might make it more likely that the services will learn from each other's experiences in maintaining similar equipment. And a DoD-wide perspective might also result in better choices about how maintenance resources should be allocated. By encouraging more collaboration on similar work loads, a centralized management might also gain a better sense of the readiness and reliability of each service's weapon systems.

Under this option, assigning maintenance work loads among the services would allow DoD to close seven depots--three aviation facilities, two ground equipment depots, and two naval shipyards--in addition to those closures planned under previous BRAC decisions. Calculations based on one measure of capacity and future work load suggest that the greatest opportunity for consolidation among service facilities lies in fixed-wing aviation: work on aircraft and their components could be consolidated among six depots rather than the seven that might remain if, instead, the Navy and Air Force were to reduce their capacity individually.

The costs associated with this option would outweigh its benefits by about $500 million (in current-dollar budget authority) over the 1995-1999 period. This shortfall is the result of up-front costs associated with moving equipment, retiring and separating personnel from the work force, and performing environmental cleanup at depot sites. But by early in the next decade, DoD would save an average of about $400 million per year in budget authority, or a total of about $2 billion over the 2000-2004 period (in 1995 dollars). Other estimates have suggested that DoD could save from $350 million to $700

Opponents of a centralized management structure argue that it is politically and bureaucratically impractical. The services are reluctant to cede control over maintaining their weapons, arguing that separate control of depots provides a closer link between the users and suppliers of maintenance services. Some argue that overlap may be needed to ensure a ready source of repair that is dedicated to each service's mission and knowledgeable about its specific operational needs.

In recent years, the Congress has imposed constraints on centralizing and consolidating depot operations, preferring that any further base closures be left to the BRAC process. In the face of these hurdles, DoD will find it difficult to gain the authority to implement such a dramatic change in management structure.

Intelligence Activities

If unclassified press sources are accurate, spending on the more than 20 agencies that make up the intelligence community amounts to about $28 billion per year, or about 10 percent of the DoD budget (where most of it is found). Intelligence plays a critical support role for national defense, determining both how well the U.S. military performs in wartime and when and if it will engage in combat. The intelligence community has played a useful role in producing analysis about many other countries in the world, including their economies, military forces, and political structures. Its analysis has provided the basis for negotiating arms control treaties, responding quickly and effectively in crises, and ensuring that a surprise attack against the United States was not under way.

The intelligence community's budget has already been cut by about 15 percent relative to peak levels. Current plans call for further budget reductions, as well as additional cuts in personnel levels, that will leave the community about 23 percent smaller at the end of the decade than it was at the beginning. But a number of observers, including Senator Sam Nunn,

One approach to achieving economies would rely heavily on organizational changes, perhaps similar to those discussed in the bill proposed by Senator David Boren and Representative Dave McCurdy or to the changes in a bill proposed by Senator Daniel Patrick Moynihan. Another approach to restructuring would remain agnostic on detailed organizational changes, but would scale back resources devoted to intelligence activities on the assumption that some of its missions--such as those focusing on economic, environmental, and antinarcotics matters--are not central to U.S. security or are being handled effectively by other parts of the U.S. government or the private sector.

Either way, the CBO alternative assumes that another 5 percent cut in spending could eventually be achieved by organizational restructuring or by eliminating certain missions. A cut of that size would result in a total reduction of perhaps 25 percent since 1990 and save $1 billion per year once the personnel reductions were fully made. CBO assumes, though, that most of the cuts in spending would not occur until the next decade, after the current round of cuts has been completed.

Cutting the intelligence community even more raises a number of concerns. Key U.S. security concerns of the post-Cold War world include stopping the proliferation of weapons of mass destruction, predicting the possible onset of ethnic and regional conflict in time to attempt to avert it diplomatically or with preventive deployments of forces, and tracking the activities of terrorist groups and other extremist political organizations. These concerns are often best addressed preventively, if possible, rather than through the use of military deterrence or military force. Thus, a redundant organizational structure that ensures a competitive dynamic to intelligence work may represent a wise insurance policy, and a relatively cheap one, compared with the spending a new arms race or war might entail.

Pilot Training

The United States invests substantial resources in training its military personnel, in the conviction that well-trained fighting forces are most likely

more coordinated fighting force at a time when the services expect to work more closely together than ever before.

Former Senator Barry Goldwater's irritation about duplication in U.S. air power--that the United States was the only country with four air forces--also seems applicable to organizations for training pilots. Each of the three military departments operates its own schools, facilities, and programs. (Marine Corps and Navy pilots train in the same facilities.) Though operational skills may vary from service to service, Senator Nunn suggested that basic flying skills are similar.

DoD also recognizes this overlap. For example, the Air Force and Navy are developing and buying a common trainer aircraft--the Joint Primary Aircraft Training System (JPATS). And consolidating fixed- and rotary-wing (helicopter) pilot training was one of the few suggestions proffered by Senator Nunn that was endorsed by former Chairman of the Joint Chiefs of Staff Colin Powell. But service plans call for an almost glacial pace in integrating training for fixed-wing pilots: only after substantial deliveries of the JPATS toward the end of this decade will small numbers of students train together. Study results on consolidation of rotary-wing training have yet to emerge from the Pentagon.

Fixed-wing flight training could be consolidated without waiting for JPATS deliveries. Indeed, consolidation would reduce the need to buy JPATS immediately, since having Air Force pilots train initially in the Navy's primary trainer--the T-34--would substantially reduce the use of the Air Force's T-37 primary trainer. The Air Force could then keep its T-37s longer and JPATS procurement could be deferred at least until after the turn of the century. Deferring JPATS would result in savings of about $200 million in 1995 and about $1.3 billion for the 1995-1999 period, though the trainer would still need to be bought in the long term. Rotary-wing training could also be fully consolidated among all of the services. This step would require the Navy to give up its current practice of assigning students to a helicopter track based on their performance during an initial phase of fixed-wing training. Changing

lead to the adoption of the best practices from each service and foster interservice cooperation--increasingly important in a period when DoD is stepping up its reliance on joint operations.

Nonetheless, consolidating pilot training may have disadvantages. Some savings would be offset by higher costs. Such costs would include increased travel costs, higher maintenance costs for the older T-34 and T-37 aircraft, and one-time costs of base closure. Moreover, delaying purchases of JPATS means that the military would forgo the advantages of a new trainer for some years. These advantages include having an ejection seat in training aircraft, a digital cockpit common to aircraft that pilots will later fly, the ability to train at higher altitudes, and a cockpit designed to accommodate smaller female pilots.

Adopting common rotary-wing training--without a fixed-wing introduction--would be unattractive to all services except the Army. Proponents of initial fixed-wing training for all pilots believe actual flying is a better way to screen candidates and to allocate fledgling pilots to fixed-wing aircraft rather than to the less demanding helicopter track. The Navy and the Coast Guard--which receives its initial training from DoD--also have expressed concerns that helicopter pilots would no longer be able to operate fixed-wing aircraft at a later date, or serve a stint as fixed-wing instructors. For its part, the Marine Corps is concerned that helicopter pilots need an initial period of fixed-wing training to fly the V-22 aircraft--the planned replacement for a portion of the Marines' transport helicopter fleet--which takes off like a helicopter and flies like a fixed-wing aircraft.

CONCLUSION

CBO chose the preceding alternatives because they demonstrate one or another of the characteristics described earlier. The options considered were also selected because they represent promising functional changes. Of course, some of the ideas discussed in this paper may be abandoned as further study is devoted to them. Perhaps they save too little, or up-front costs are too

The infrastructure arena will remain central both to the roles and missions debate and to debates on future budgets. Whatever the specific sets of options, DoD and the Congress will need to keep looking for better, more efficient ways of doing business. Finding efficiencies in infrastructure may be the most promising way for the United States to keep credible fighting forces with austere budgets.

BUDGET PRESSURES FOR RESTRUCTURING

Congressional pressures for restructuring spring at least in part from the belief that the U.S. armed forces can become more efficient if they are reorganized and if redundancies are eliminated. Both DoD and the services feel these budget pressures as well and may be more amenable to consolidation or restructuring in today's austere funding climate than they were in times of plentiful funds. Indeed, according to press reports, the Joint Chiefs of Staff under Chairman John Shalikashvili and Vice Chairman William Owens may be wresting more control of DoD's resources from the individual services.[6] A heightened JCS role in the budget process might increase the emphasis on joint programs and activities in future plans. Admiral Owens experienced some success in restructuring naval functions before he came to the JCS.

DoD's budget woes have been widely discussed. An earlier CBO analysis suggested that the funds in the five-year plan should be roughly sufficient to fund Administration force plans.[7] But it identified several potential problem areas that, though small as a percentage of the overall DoD plan, could create a need for further program reductions. Problem areas include:

- Shortages in the Administration's Plan. Secretary of Defense William Perry told the Congress that the Administration's plan was $20 billion short over the five years. He argued that declines in inflation might eliminate some of these shortages. But inflation rates might not prove to be lower than the Administration's estimates, so DoD may instead need to make real reductions in its program. Indeed, the department may already have begun. Recent press reports suggest that DoD's direction on preparing next year's budget involves programmatic cuts of about $10 billion, presumably over the 1996-2000 period.[8]

6. Robert Holzer and Stephen C. LeSueur, "JCS Quietly Gathers Up Reins of Power," and "JCS Chairman's Rising Clout Threatens Civilian Leaders," *Defense News*, June 13-19, 1994, pp. 1 and 29, respectively. The

TABLE 1. SUPPORT AREAS FOR POSSIBLE CONSOLIDATION OR RESTRUCTURING

Issue Raised by Senator Nunn	Action Taken or Recommended by the Chairman of the Joint Chiefs of Staff
Intelligence Activities	Further consolidation of intelligence production centers under a joint intelligence organization. Study additional options for restructuring.
Pilot Training	Consolidate initial fixed-wing training and use a common trainer; study consolidating initial helicopter training. Create four training pipelines for follow-on training.
Medical Corps	Not addressed.
Maintenance Depots	Consider closing 7 or 8 of the 30 depots, relying more on the private sector to provide services.
Weapons Development and Acquisition	Not specifically addressed, though several sections of the report recommend procuring common systems.
Consolidate Chaplain Corps and Legal Services	Do not consolidate since it will harm morale and not save any money.

SOURCE: Congressional Budget Office based on Senator Sam Nunn, "The Defense Department Must Thoroughly Overhaul the Services' Roles and Mission," *Congressional Record*, July 2, 1992, pp. S9559-S9565, and Chairman of the Joint Chiefs of Staff, *Report on the Roles, Missions, and Functions of the Armed Forces of the United States* (February 1993).

NOTE: Senator Nunn also listed a number of combat functions that DoD might consider restructuring. Some of those are discussed in more detail in Congressional Budget Office, "Options for Reconfiguring Service

INSTITUTIONAL BARRIERS TO CHANGE

DoD might be able to realize operating efficiencies even without restructuring and consolidating. Many of the savings from restructuring discussed in this paper stem from eliminating excess capacity created by the smaller demands placed on support functions by the post-Cold War military; others come from paring back functions that are no longer needed. Most of these changes could occur within the current organizational framework, if the Administration and the Congress chose to make the reductions and enforce them.

Institutional barriers, however, make this task difficult. The services have sound reasons for preferring to retain support capabilities under their own control, even at the cost of some loss of efficiency. The functions they fund and control, for example, are more likely to respond to their needs. Also, any gains from efficiency are likely to result in overall budget reductions rather than increased funding for other programs. Moreover, keeping control of a support activity not only increases a service's total budget--perhaps providing flexibility to reallocate resources--but also offers additional command assignments, personnel billets, and other bureaucratic advantages. A service's tendency when faced with budget reductions thus may be to make pro rata cuts rather than risk losing control of a function by cutting it disproportionately.

By contrast, restructuring responsibilities within DoD might break down some of the bureaucratic barriers to change and, as a result, increase the chance of eliminating redundant or obsolete capabilities. Placing responsibility for a support activity in an independent agency, for example, might free managers to choose between competing facilities or providers in DoD and the private sector.

However, political as well as bureaucratic barriers create obstacles to major restructuring. Both the Administration and the Congress may want to preserve bases and programs that have little military utility but that nonetheless benefit specific constituencies. Concerns about the need to cut the defense budget or to provide services more efficiently may be outweighed by

- Pay Raises. The Administration's planned funding for future pay raises is lower than statutory recommendations. Both House and Senate authorization bills for fiscal year 1995 contain pay raises for military personnel of 2.6 percent, 1 percentage point higher than the raise requested by the Administration. Funding this raise in the years beyond 1995 will add to future budgets. Including pay raises at levels suggested in statutory language in future years will heighten budget pressures even more.

- Weapons Programs. Plans for DoD for the next five years include several programs that will enter procurement. Commonly, acquisition costs grow at the start of the procurement phase. If DoD decides not to delay programs or decrease quantities bought, additional funding could be needed for these programs.

- Environmental Cleanup. DoD has historically underestimated the funding needed for environmental cleanup. Funding could rise for these programs if today's planned funding proves to be as optimistic as it has been in the past.

- Base Closure. Savings from the base realignment and closure (BRAC) process could fail to materialize. DoD is currently suggesting that it may be difficult to eliminate all of the bases slated for closure as rapidly as currently planned, much less make another round of reductions in 1995. Ironically, this delay--if it materializes--could be caused by the need to reduce near-term budget pressure, since closing bases adds to costs. In the longer term, however, savings currently included in the estimates will not materialize if the bases remain open.

- Increases for Other Nondefense Programs. Defense could end up paying some share of increases in spending on domestic programs, if the Administration or the Congress feels that domestic programs should receive higher priority. About $20 billion would be needed over the 1995-1998 period to keep domestic discretionary programs from [illegible] health care legislation or

TABLE 2. DEPARTMENT OF DEFENSE FUNDING BY MAJOR PROGRAM
(In billions of 1995 dollars and percentages)

Program Number and Description	Total Obligational Authority[a]						Percentage Change from 1991	
	1991	1995	1996	1997	1998	1999	1995	1999
Forces								
1 Strategic Forces	21	8	8	7	7	7	-60	-68
2 General Purpose Forces	133	89	86	82	84	82	-34	-38
4 Airlift and Sealift	6	9	9	7	8	9	38	37
5 Guard and Reserve Forces	20	18	18	18	17	17	-9	-13
11 Special Operations Forces	3	3	3	3	3	3	5	5
Total	183	127	123	117	119	118	-31	-36
Total After Adjustment for the Undistributed Reduction	183	127	120	115	117	116	-31	-37
Share (Percent)	54	50	50	50	51	51	-7	-5
Infrastructure								
3 Command, Control, Communications, Intelligence, and Space	33	31	31	30	30	29	-7	-12
6 Research and Development	30	26	25	24	22	21	-13	-30
7 Central Supply and Maintenance	35	19	17	16	15	16	-47	-55
8 Training, Medical, and Other General Personnel Activities	49	42	40	39	38	39	-14	-20
9 Administrative and Associated Activities	10	7	8	7	7	7	-27	-30
10 Support of Other Nations	1	1	1	1	1	1	1	-23
Total	158	126	121	117	113	113	-20	-29
Total After Adjustment for the Undistributed Reduction	158	126	118	114	111	111	-20	-30
Share (Percent)	46	50	50	50	49	49	8	6
Total Funding								
Forces and Infrastructure	341	253	244	234	233	230	-26	-32

INFRASTRUCTURE AND SUPPORT

Nevertheless, budget pressures may cause the services to focus on restructuring, which may be less contentious in support programs than in combat areas. Support and infrastructure programs may also receive more attention in the newest of DoD's roles and missions efforts.

The staff of the roles and missions commission used DoD's programmatic structure to provide a rough conceptual breakout between forces and infrastructure. All DoD resources are divided into 11 major programs. (Table 2 provides a listing of the major programs and their resources.) The staff's delineation defines support by what it is not: forces. They characterized forces as those activities receiving funding in the following major programs: Strategic Forces (Program 1), General Purpose Forces (Program 2), Airlift and Sealift (Program 4), Guard and Reserve Forces (Program 5), and Special Operations Forces (Program 11). Funding for force programs totaled $132 billion, or about 51 percent of total DoD funding in 1994. In the Administration's fiscal year 1995 plan, that is scheduled to decrease in real terms to about $116 billion by 1999 (in 1995 dollars).[9]

Using that definition, infrastructure functions constitute the remainder: Command, Control, Communications, Intelligence, and Space (Program 3); Research and Development (Program 6); Central Supply and Maintenance (Program 7); Training, Medical, and Other General Personnel Activities (Program 8); Administrative and Associated Activities (Program 9); and Support of Other Nations (Program 10).[10] Funds for these infrastructure programs total $125 billion, about 49 percent of the DoD budget for 1994. Funding will decline to $111 billion in real terms by 1999 in the current plan, though these programs will keep the same share of the DoD budget.

Funds for infrastructure could be even greater. Indeed, the Bottom-Up Review's estimate of funds for infrastructure in 1994 contained about $35 billion more than funding in the these programs. That additional funding includes payments for depot maintenance and administrative activities that are

BOX 1
THE ECONOMICS OF CONSOLIDATION

Many policymakers assume that consolidating related functional activities will yield savings. But does consolidating activities make economic sense? The answer is not obvious, and will depend on several factors that must be assessed for each individual situation.

The first of these is the economic scale of a single facility. Take automobile manufacturing as an example. The economic scale of an automobile assembly plant appears to be a facility producing 200,000 to 300,000 cars or trucks a year and employing about 3,000 workers. Through experience, manufacturers have found that plants of that size can gain the advantages of increased scale of operations without growing unwieldy. Since the U.S. automobile industry produces about 10 million vehicles a year, around 40 such assembly facilities—as well as thousands of more specialized, and generally smaller, parts manufacturers—are needed to meet the demand.[1] Clearly, given these facts, there is room for several different firms to occupy economically profitable roles within the overall industry, and there is little reason to expect that consolidating firms into one giant entity would offer any savings in production costs (not to mention its negative effect on competition).

This scale factor is most relevant to Department of Defense activities that resemble industrial or commercial functions, such as depots, shipyards, and arsenals, as well as medical facilities, commissaries, and other facilities providing services to military personnel. In general, the economic principle at work is that if some or all of the services do not generate enough work to staff a single facility economically, then consolidation will surely pay. Conversely, however, if their separate work loads already justify multiple facilities—operating at economic scales—then it is not obvious why consolidation should offer savings.

The second major economic principle is the diseconomy of large organizations. As organizations grow, they tend to add managers and support personnel faster than direct (or "touch") labor. In other words, they tend to become less efficient in their use of personnel. That is a well-documented empirical observation for which several explanations have been offered. One explanation is found in network theory—as the number of nodes in a network grows arithmetically, the number of possible interconnections grows geometrically. If the role of managers is to facilitate the exchange of information among workers, then the managers correspond to the interconnections while the direct workers correspond to the nodes. A more practical reason may be that the larger the organization, the harder it is to track the contribution of individual workers or managers to the "bottom line" and therefore the easier it is to add layers of bureaucracy.

This second observation bears most directly on organizations whose "product" is knowledge—the intelligence community is one example drawn from DoD. Where the chief economic activity is the exchange of information and there are no offsetting physical economies of scale to exploit, one may find that large organizations are handicapped relative to smaller ones.

All of the above applies to a "pure" consolidation—in which the exact same level of work

DoD spends an even larger share of its budget on support activities. The term infrastructure can connote centralized activities or activities that are not force-related. But the DoD budget also funds a number of activities that do not contribute directly to combat, but rather support combat activities, and are found in the programs designated as forces in this breakout. For example, a number of activities performed by the guard and reserve are support activities, though they are listed in Program 5. Similarly, some analysts might argue that airlift and sealift support combat, but they too would be designated forces rather than support in the commission staff's definition.

Given the magnitude of the funds--and the sizable share of its budget--that DoD devotes to even the narrowest definition of support activities, any serious look at consolidation or reorganization must consider support functions, though some analysts have reservations about the efficiency of consolidations (see Box 1 for a discussion of some of their concerns). Whatever the reservations, finding savings through consolidating support activities could permit the services to keep combat forces at higher levels or to preserve their readiness.[11] Merging support programs may also coincide with consolidating combat functions.

Emphasis on joint warfighting--having the military services plan and execute missions together--may strengthen arguments for consolidation. U.S. defense strategy in the post-Cold War world seems to place more emphasis on joint warfighting, perhaps reflecting the realities of recent conflicts and the need for the services to work together because of their smaller force levels. Even if service-specific combat missions are not consolidated, joint warfighting may place a premium on consolidating support functions. Services that operate the same systems, receive the same early training, and share common sources of intelligence may fight better together. Consolidating support functions may improve the chances of those outcomes. For example, the services may be somewhat more likely to develop common equipment if there is a unified acquisition command, which suggests that there may be good reason to promote consolidation of certain support missions on grounds of effectiveness as well as efficiency.

not interpret the inclusion of a particular function as a CBO recommendation for restructuring. Nor should readers necessarily interpret exclusion of a particular function as CBO's sanction of the current organization.

Each segment also contains a set of illustrative costs and savings associated with the particular example. Savings and costs are relative to the Administration's plan for fiscal year 1995. Producing these estimates involves making a number of assumptions, not only about how the particular change would be implemented but also about assumptions in the current plan.

Savings associated with the options discussed here are affected by other aspects of the DoD budget process. One complicating factor is the base realignment and closure process. Bases that might have been closed under BRAC might also be closed under consolidation or restructuring, and obviously closing a particular facility can only yield one set of savings. A second consideration is that the Administration's plan contains several undistributed reductions. One is the $20 billion shortfall discussed by Secretary Perry. A further undistributed reduction, however, is included in the allowances section of the federal budget (function 920). That section contains undistributed reductions resulting from procurement reform that, over the 1995-1999 period, total $12 billion (in current dollars). The Office of Management and Budget has allocated only the 1995 savings--about $0.7 billion--to specific agencies, so it is difficult to estimate what DoD's share of the roughly $11 billion remaining might be. But DoD expends a large portion of the procurement funds found in the federal budget and therefore might have to absorb a large share of the cut.

The Administration may need to resort to some of the personnel reductions and base closures discussed in the various options to allocate these undistributed reductions. Some of the costs and savings shown here thus may already be included in the Administration's planned funding.

CHARACTERISTICS OF CANDIDATES FOR CONSOLIDATION OR RESTRUCTURING

It may be helpful to identify characteristics that make some functions better candidates for consolidation than others. There may also be cases where fundamental restructuring might be considered. Support functions that are candidates for consolidation might include those that:

- Involve tasks or activities common to more than one service (for example, medical care and beginning pilot training);
- Have significant excess capacity as DoD decreases the size of its forces (for example, facilities with the capacity to absorb additional work);
- Maintain common equipment, or offer opportunities for savings from buying or developing common systems from anticipated modernization;
- Support combat activities where missions are shifting; and
- Support joint combat activities, where consolidation might improve performance.

Support functions that are candidates for restructuring might include those that:

- Are not uniquely military and are already being performed in the private sector by a competitive industry;
- Although unique to DoD, are not closely tied to warfighting capabilities; and
- Meet requirements that are undergoing significant change.

mentioned several functions that might be candidates for restructuring, such as depot maintenance--for which he recommended increased competition between public and private sectors--and the collection and analysis of intelligence. (Excerpts from Senator Nunn's list are shown in Table 1.)

In response to the Congress, the Department of Defense subsequently provided an analysis of consolidation for potential roles and missions.[4] General Colin Powell, then Chairman of the Joint Chiefs of Staff (JCS), headed this effort, which concluded that in most of the functions described as potential areas of overlap by Senator Nunn the services should continue to meet their needs independently. General Powell asserted the importance of redundancy in combat missions and in many support missions as well.

CONGRESSIONALLY DIRECTED COMMISSION ON ROLES AND MISSIONS

Rejecting the JCS report, the Congress established a new and independent Commission on Roles and Missions.[5] According to the language about the bill that established the commission, "The House bill contained provisions (Title XIV) that would establish a commission on roles and missions of the armed forces. This action stemmed from a dissatisfaction with the scope of the roles and missions reforms recommended by the Chairman of the Joint Chiefs of Staff earlier this year in his triennial report." The commission must produce a report on consolidating roles and missions and restructuring DoD functions within one year of its first meeting.

The first meeting of the commission--which set the clock running--took place on May 24, 1994. The commission's staff discussed a tentative organization for the commission's inquiry in that meeting. That organization suggests that the commission will pursue an analysis of roles and missions for DoD under two areas of inquiry: forces and infrastructure. Many of the infrastructure categories identified by the commission overlap with the support activities of the earlier efforts.

CHAPTER I

INTRODUCTION AND BACKGROUND

In the aftermath of the Cold War, a number of defense experts have argued that the military should be reorganized to reflect new challenges rather than simply shrinking the Cold War establishment. Debate on this issue often takes place under the rubric of "roles and missions," since the issue revolves around reorienting the services' roles and eliminating overlapping missions for which the services have duplicative capabilities.[1]

The term roles and missions may evoke consolidation of combat missions, but more than half of the budget of the Department of Defense (DoD) consists of programs that do not directly pay to acquire or operate combat forces. A number of these support (or infrastructure) functions are performed separately by each service and thus might be reasonable candidates for consolidation. Indeed, the Assistant Secretary of Defense for Strategy and Requirements, Ted Warner, recently suggested that "there could be some major financial benefits [to the consolidation of the services' roles and functions], especially savings associated with consolidation in infrastructure."[2]

Changes in DoD's environment in the roughly 50 years since the department was created may also offer opportunities for restructuring its functions. In addition to being performed separately by more than one service, many DoD support services are performed by firms in the private sector. More emphasis could be placed in the support area on reducing the department's role as a direct producer of services and increasing its reliance on the infrastructure available in the private sector. Geopolitical changes might also permit eliminating or deemphasizing some activities.

Debate on roles and missions is not new, but it has recently intensified. Senator Sam Nunn, Chairman of the Senate Armed Services Committee, made a seminal speech on the topic in 1992, in which he described a number

CHAPTER II

SOME OPTIONS FOR RESTRUCTURING SUPPORT SERVICES PROVIDED TO MILITARY PERSONNEL

The Department of Defense provides a wide range of services for military personnel and their dependents, including child care, schools, commissaries and exchanges, legal services, family housing, and medical care. These services are important components of the total compensation package that the military uses to attract and retain active-duty personnel. Consolidation and streamlining in these areas could mean consolidating responsibility for a particular support activity among the various services. Alternatively, it might mean a reduced role for DoD as a direct producer of such services and increased reliance on the private and public infrastructure that serves the U.S. population as a whole.

This chapter examines options in two support areas: medical care and family housing. In the case of medical care, the duplication of assets among the services and the cost-effective delivery of military medical care are both important concerns. The medical care option would address them by consolidating management responsibility at the DoD-wide level for all aspects of care--whether care is provided at military medical facilities or in civilian health care facilities. In the case of family housing, the primary issue is the trade-off between relying on private-sector housing and continuing to use on-base housing. The options examined here focus on consolidating funding for family housing benefits (both housing allowances and DoD housing units) within each service in a way that will encourage more use of private-sector housing when it is cost-effective.

MEDICAL CARE

Medical care is a key part of the military compensation package for active-duty personnel and their families. It is also a major benefit enjoyed by retirees and their family members. Care is provided or administered by a

System among four separate organizations and reduces the potential for allocating and using medical resources efficiently.

Background: The Military Health Services System

In fiscal year 1994, the Department of Defense will spend about $15 billion to support the Military Health Services System. The MHSS is one of the largest health care systems in the nation. Together, the Army, Navy, and Air Force operate the direct care system, which consists of about 135 medical centers and regional and community hospitals plus more than 500 clinics worldwide. In 1994, more than 55,000 civilian personnel and about 140,000 active-duty military personnel worked for or in support of that system of care.

That substantial military medical establishment has a twofold mission: wartime readiness, which requires having the capability to meet the armed services' wartime medical needs; and the peacetime benefit mission, which means providing medical care during peacetime to uniformed personnel and other eligible beneficiaries, including dependents of active-duty personnel and retirees, their dependents, and survivors.

Historically, the capacity of the military hospitals and clinics (military treatment facilities, or MTFs)--in terms of the number of hospital beds and physicians--has fallen short of requirements for both missions. Wartime requirements during the Cold War, which reflected the scenario of an all-out conventional war in Europe, exceeded the services' ability to care for projected combat casualties and nonbattle disease and injury rates. DoD's plans during that period also included substantial backup hospital capacity for extended care through contingency agreements with the Department of Veterans Affairs and civilian hospitals under agreement with the National Disaster Medical System. Along with those plans, DoD also relied on reserve physicians and still does.

Peacetime demand has also exceeded the capacity of the military [illegible] the Congress in 1966 to establish the

Post-Cold War Requirements for Medical Care

Today, however, the size of the military medical establishment is more than adequate to meet the requirements of the wartime mission. Instead, it is the demand for health care by eligible military beneficiaries during peacetime that drives the size of today's military medical establishment.

These findings for the post-Cold War era are based on a major review of the Military Health Services System recently completed by the Department of Defense. In this so-called "733 Study," mandated by the Congress in Section 733 of the National Defense Authorization Act for Fiscal Years 1992 and 1993, DoD analyzed peacetime and wartime requirements for health care. Two major objectives of the 733 Study were to determine the scale of the wartime mission for military medical care in the post-Cold War era, and to determine independently how to provide cost-effective care in peacetime to eligible military beneficiaries.

The wartime mission was sized to reflect current defense policy, which calls for the capability to fight two nearly simultaneous major regional conflicts. Although the study adopted a number of conservative assumptions, which tended to increase the work-load requirements, the resulting estimates of wartime requirements are substantially lower than those based on Cold War scenarios. Equally significant was the study's finding that the capacity of military treatment facilities is now well above projected wartime requirements, in contrast to the situation that existed during the Cold War.

The reduction in wartime requirements means that the decision to size the military medical establishment should be based on the cost-effectiveness of that system to meet the peacetime demand. DoD concluded that, for individual episodes of treatment, it costs less to provide care in the MTFs than through CHAMPUS. Nonetheless, the study found that improving access to care at the MTFs would increase total medical costs, since savings from recapturing individual cases would be more than offset by increases in the volume of care provided at the MTFs. Key to this finding is that improved access to care at the MTFs would encourage "ghost" beneficiaries (those eligible to use the military health care system who do not do so) to reenter

In sum, DoD cannot provide care more cost-effectively in the military treatment facilities than through CHAMPUS or other civilian plans. That conclusion applies unless DoD can control the demand by beneficiaries for care at the military treatment facilities.

Efforts by DoD to Improve the Cost-Effectiveness of the Military Health Services System

Efforts are now under way by DoD to improve the cost-effectiveness of the peacetime health care delivery system and ensure the readiness of all military medical personnel for wartime. To improve the capability of the Military Health Services System to meet the peacetime mission most cost-effectively, DoD has a new approach, called Tricare, for delivering and financing health care in the military on a regional level. Two of the major components of Tricare are a new management structure and a system of capitated budgeting.

Under the new management structure, DoD has divided the country into 12 health service regions, within each of which DoD has appointed a military medical "lead agent" with responsibility for coordinating the delivery of health care. Each lead agent will be responsible for developing a plan for regional health services in conjunction with the hospital commanders of the military medical facilities within the region. Each plan is expected to outline how the region intends to meet the goals of managed care--particularly how it would set up a civilian provider network and adopt utilization management. The objective of this approach is to ensure both the cost-effective integration of CHAMPUS care with that at the military treatment facilities and a coordinated approach to care by the three military departments.

Capitated budgeting is another major feature of the Tricare program that attempts to improve the efficiency of the Military Health Services System. To give the military departments a fiscal incentive to control costs, DoD introduced a system of capitated budgeting in 1994. Under capitated budgeting, each of the military departments, and in turn each hospital commander, receives a fixed amount per beneficiary for providing all health

Option to Adopt HMO Staffing Patterns at the Military Facilities

In addition to a new method of financing and delivering health care to military beneficiaries, Tricare plans to introduce several of the managed care strategies that are now a part of many civilian plans. These strategies represent positive steps toward improving the cost-effectiveness of the Military Health Services System: for example, extending current guidelines on the appropriateness of inpatient care to the military treatment facilities and establishing "gatekeepers" to control the use of outpatient care.

Nonetheless, introducing mechanisms to improve the cost-effectiveness of the military's health care system may not be sufficient. Delivering peacetime health care most cost-effectively may require a more stringent examination of the level of resources necessary to support the military health care system. As designed, Tricare would essentially preserve the military medical establishment, along with the historical level of resources used to support that system of health care. If inefficiencies are part of the current medical system, Tricare's approach to reform may tend to perpetuate them.

One way to build on the incentives to be introduced under Tricare as well as address one of the demand factors raised in the 733 Study--that is, higher rates of health care by military beneficiaries--would be to encourage providers to deliver care in a more economical manner. DoD could achieve that goal at the military treatment facilities by establishing the requirements for active-duty physicians based on the experience of health maintenance organizations (HMOs). HMOs are generally accepted as a cost-effective way to deliver care to a defined group of enrollees by controlling their use of health care and delivering services as economically as possible. Specifically, this option would require the military treatment facilities to adopt new patterns of physician staffing based on the experience of HMOs. Adopting HMO standards would also be consistent with the department's plans for establishing Tricare--a program of managed care--nationwide.

Civilian HMO staffing patterns would require about 150 physicians per 100,000 beneficiaries.[1] Adjusting for the disproportionately larger number of beneficiaries 65 years or older using the military health care system, DoD

DoD will provide an estimated 185 physicians per 100,000 beneficiaries (roughly 9,500 physicians) in fiscal year 1995.

The estimated baseline ratio of 185 physicians per 100,000 (or 9,500 physicians) reflects several adjustments to the total number of active-duty physicians. In fiscal year 1995, DoD actually plans to have a physician end strength of about 13,000. That number includes all active-duty physicians, medical residents and fellows, and a work force of about 600 civilian physicians. (The total work force of physicians is well above DoD's projected post-Cold War wartime requirement of around 5,000 active-duty physicians.) Not all physicians are available to provide peacetime care. To account for that factor, about 3,500 physicians (reducing the number from 13,000 to 9,500) were excluded from this option. First, CBO excluded two categories of physicians: those assigned exclusively to the wartime mission, such as aviation and undersea specialists; and interns. Second, the option assumes that residents and fellows are only 35 percent as productive as full-time-equivalent physicians. Finally, the option assumes that active-duty physicians are only 95 percent as productive as their civilian counterparts because of the time they devote to readiness training.

Adopting HMO staffing patterns at military treatment facilities could lead to substantial savings, first from reducing the number of physicians and then from reducing the use of health care by beneficiaries that would follow cuts in staffing. Compared with an estimated 185 physicians per 100,000 beneficiaries in the services' 1995 work forces, putting HMO staffing patterns into effect might result in a cut of about 11 percent in total physician end strength. Such a reduction of nearly 1,500 physicians would permit a cut in the total medical budget of about $20 million in 1995 and close to $430 million over the next five years (see Table 3).

Those estimated savings assume that the reductions are in addition to drawdowns already planned for military and civilian physicians. The estimates of savings also assume a three year phase-in of HMO staffing standards. This option assumes no additional savings from reducing the use of health care by

TABLE 3. SAVINGS FROM ADOPTING HMO STAFFING PATTERNS
(In millions of dollars)

	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Budget Authority[b]	20	60	100	120	130	430	110

SOURCE: Congressional Budget Office.

NOTES: Includes savings from reducing physicians. Figures in the 1995-1999 period are in current dollars. HMO = health maintenance organization.

a. Long-term savings estimates are based on savings from the federal government. They are expressed in 1995 dollars.

b. Rounded to the nearest $10 million.

currently provides to its beneficiaries. The Congress might agree that such lower rates of use are desirable for the military. The higher rate of health care use by military beneficiaries compared with HMO rates, however, underscores the differences in practice patterns between military physicians and those who work in civilian HMOs. Unless the way that military physicians practice medicine were to change, reductions in the number of physicians could lead to rationing or poorer service for beneficiaries.

Opponents of this option might also claim that reducing the number of physicians creates only an indirect incentive to improve the efficiency of the Military Health Services System. Military medical facilities could fall short of staff, and CHAMPUS costs might then rise unless the volume of care demanded by beneficiaries declined--two specific problems that would prohibit DoD from reducing the number of health care personnel.[2] A more direct approach would be to decide on the number and size of military medical facilities to deliver care most cost-effectively, and then to develop staffing patterns based on the volume of care required by the population that the facilities would serve. Other, more direct ways to control health care might

A more serious problem that relates directly to the issue of access to care is the possibility that the number of eligible military beneficiaries electing to use the military health care system might exceed the number assumed in this option. In that event, the problems of excess demand, rationing, and declines in the quality of service would be greater than assumed here. Without a system of universal enrollment, DoD can only guess at the number of beneficiaries actually using its health care system, and the number of physicians assumed in this option might not actually be large enough to meet the target of 160 per 100,000 beneficiaries. Another reason staffing patterns could be too low is that more eligible military beneficiaries--many of whom currently rely on their private insurance as their primary source of coverage--might choose to seek care from the military. Denying them access to the free care at the military treatment facilities would almost certainly be viewed as a loss of their health care benefit.

In view of these uncertainties, this option makes the conservative assumption that beneficiaries receive all of their health care at military medical facilities, though they actually receive about 20 percent of their care under CHAMPUS. If the underlying assumption of a beneficiary population of users of about 5.1 million proves to be true, then the HMO-based standard of 160 physicians per 100,000 beneficiaries for the military could be as much as 20 percent higher than an HMO staffing pattern based only on the care delivered at the military treatment facilities.

Implementing New HMO Staffing Patterns Through Changes in Management Authority

Without a doubt, adopting HMO staffing patterns at the military treatment facilities--and cutting almost 1,500 physicians overall--would confront DoD with a major challenge to reshape the size and composition of its active-duty physician work force. Granting centralized management control over allocating all military medical resources to the military treatment facilities--including physicians--might make it easier for DoD to establish HMO staffing patterns. One single manager in charge of allocating all medical resources might be

of Defense for Health Affairs and the Surgeons General of the Army, Navy, and Air Force.

The Assistant Secretary for Health Affairs is the principal advisor to the Secretary of Defense for all health policies, programs, and activities, and is responsible for setting policy and overseeing the wartime and peacetime capability of the Military Health Services System. To uphold these responsibilities, the Assistant Secretary has "authority, direction and control [over] the medical personnel, facilities, programs and funding and other resources within the Department of Defense."[3] Consistent with that centralized approach to management, one of the major responsibilities of the Assistant Secretary is to develop "a unified medical program to provide resources for all medical activities within the Department of Defense."[4] In practice, however, several factors limit the overall authority of the Assistant Secretary to supervise the health and medical affairs of DoD, including the method of allocating resources and the roles of the Surgeons General.

Total medical resources to support the Military Health Services System are allocated among the Assistant Secretary and the three military medical departments. The Assistant Secretary has direct control over only a part of the total medical budget, and thus can effectively develop a unified medical program only for the part of the budget that is controlled by Health Affairs--namely, the Defense Health Program (DHP), which totaled about $9.6 billion in fiscal year 1994. The DHP, which constitutes close to 65 percent of the overall medical budget, consists for the most part of operation and maintenance money covering such things as the salaries and benefits of civilian employees; supplies of X-ray film, food, and drugs; and utility costs in military treatment facilities. Also included are funds for reimbursement to civilian providers under CHAMPUS.

The military medical departments are part of the chains of command of the Army, Navy, and Air Force. (The Marine Corps comes under the purview of the Department of the Navy.) They have control over the portions of the budget not controlled by the Assistant Secretary of Defense for Health Affairs, chiefly compensation and benefits for active and reserve medical personnel. That part of the budget runs close to $5.1 billion, or roughly 35

percent of the total resources available for the Military Health Services System.[5]

Because the military departments retain authority and control over all military medical personnel resources through the budget, as well as through the chain of command, trade-offs that might reduce duplication among the services--and possibly generate savings--are difficult for the Assistant Secretary to make. Similarly, trade-offs between CHAMPUS and the direct care system are more difficult to make under the current structure because the Assistant Secretary cannot require the military departments to share their resources.

Centralizing Authority over the Military Health Services System. Greater opportunities for trade-offs among the military medical departments and between the system of direct care and CHAMPUS--though not necessary for DoD to implement HMO staffing patterns at the military treatment facilities--could help to mitigate any problems of access to care at the MTFs and to ensure that resources are allocated throughout the Military Health Services System most efficiently.

The option discussed here would grant the Assistant Secretary of Defense for Health Affairs control over all military medical resources, including medical personnel resources. In much the same way that the Assistant Secretary allocates Defense Health Program dollars to the three separate medical departments today, the Assistant Secretary would allocate all resources for medical personnel--that is, both dollars and end-strength numbers--to the services in the future. Effectively carrying out this option would also require the Assistant Secretary to control civilian and military medical personnel end-strength numbers, which are now under the control of the services. The Surgeons General would carry on as the senior medical advisors within each service, with continued responsibility for executing policy and providing health care to military beneficiaries.

Advantages of Consolidated Control over Medical Resources. This new structure would have many advantages. Planning and budgeting for the [illegible] medical readiness functions by one single official could lead

reliance on CHAMPUS, and ensure an adequate health care delivery system during wartime.

The increased ability of the Assistant Secretary to make trade-offs among the three military departments and to foster more cross-sharing of resources could also help to reduce any duplication arising from today's unilateral approach to financing health care in the military along service lines. In addition, the Assistant Secretary would be able to make overall trade-offs between the direct care system and CHAMPUS. Together, these improvements in the ability of the Assistant Secretary to allocate resources flexibly would also serve to support the new management structure proposed under Tricare.

Concerns About the Impact of This Option on Wartime Medical Care. Opponents of reducing the number of active-duty physicians--and more broadly, of providing the Assistant Secretary of Defense for Health Affairs with consolidated control over the Defense Health Program and the military personnel resources--might argue that both actions would jeopardize the capability of the Military Health Services System to meet the wartime mission. Specifically, the services--and the Surgeons General--might also be concerned that the Assistant Secretary would give higher priority to the peacetime mission than the wartime one. That fear, however, may not be warranted since the services will remain involved in the budget preparation process.

In fact, the risk of jeopardizing wartime readiness could be much greater in the absence of consolidated management authority for how medical resources are allocated systemwide. Budgetary pressures on the Department of Defense may force the military departments and the Office of Health Affairs to reduce the total medical budget. Maintaining wartime readiness under these circumstances might be impossible unless the services embrace a joint perspective, as noted by the Inspector General of the Department of Defense in the aftermath of the Persian Gulf War. A 1993 report by the Inspector General faulted the services for not sharing their medical assets in the field.[6] In that same report, the Inspector General also indicated that medical personnel receive insufficient training for wartime given the demands of delivering peacetime medical care. In fact, a more centralized approach

FAMILY HOUSING

Each of the services plays a significant role in providing on-base communities for military families. That role dates to the early years of the Cold War, when DoD first confronted the task of supporting a peacetime army that included many married enlisted personnel and was subject to frequent tours of duty overseas. Today, roughly one-third of all military families in the United States live in on-base housing. Base commanders are responsible not only for family housing but "for schools, hospitals, police and fire services, child care centers, banks, roads and public works just like a mayor in any American city."[7]

Much has changed since DoD built its housing inventories in the 1950s and 1960s. Today, most military bases are located near large civilian population centers that could readily support additional military families. Reduced numbers of military personnel overseas may permit longer tours of duty in the United States, making it easier for military families--many of which now include a civilian wage earner--to put down roots in local communities.

Military families in the post-Cold War environment still face unique problems that civilian communities may not be prepared to address, such as the stresses imposed on families when the military member is deployed. Yet the most appropriate way to provide support to military families today may be through outreach programs that serve all military families--active and reserve, on-base and off-base--rather than through on-base housing. The services' role in maintaining on-base communities for military families, a role that may draw attention and resources away from their warfighting mission, may not be necessary in the post-Cold War environment.

Moreover, a reduced DoD role could offer significant savings. Cost analyses suggest that the federal government spends 25 percent more on average to provide housing units on military bases than what military members choose to pay when they obtain housing in the private sector. The [illegible] particularly large in the short run

Barriers to Change in the Military Services' Role

Why do the services maintain their role in family housing despite the potential savings from relying more heavily on housing allowances and private-sector housing? Tradition is one explanation: on-base housing is now an accepted and familiar way of life for military families. Another explanation is that, even though it might be cost-effective to shift DoD resources toward cash housing allowances and away from in-kind housing, such a shift is difficult to make under the current system in which appropriations for cash allowances are separate from those for DoD housing.

Under the current system, funds for constructing, maintaining, and operating family housing are provided in the family housing appropriations for each service. Funds for cash housing allowances, however, are provided in the military personnel appropriations. Management responsibilities are similarly divided. The officials in the services and in the Office of the Secretary of Defense who deal with military installations are responsible for the family housing appropriation, while those who deal with compensation and personnel issues are responsible for the cash housing allowances. Moreover, within the Congressional committees responsible for DoD authorizations and appropriations, the subcommittees that deal with military compensation issues handle housing allowances while the subcommittees that deal with military construction and installations handle DoD family housing.

That division of responsibilities makes it difficult for DoD to consider reducing its role in providing housing. The officials who deal with military compensation and personnel policies are strong advocates for on-base housing. Yet since the current appropriations structure does not permit transfers of resources between on-base housing and cash compensation, they have no incentive to ask whether an additional dollar devoted to on-base housing would contribute as much to the welfare of military families as an additional dollar of cash compensation. Consolidating funding and decisionmaking for allowances and in-kind housing might lead to better decisions and allow the services to maintain a high-quality military force while reducing their role in providing on-base communities.[8]

Alternatives to the Current System

Funding for on-base housing and housing allowances could be consolidated either by means of a revolving fund or by means of a single appropriation for family housing benefits. Either approach could lead to greater reliance on private-sector housing and reduced costs. Depending on how it is carried out, however, the revolving-fund approach could result in a larger DoD role and higher costs than would be seen under the Administration's current plan (see Table 4).

The Revolving-Fund Approach. One way to consolidate funding would be to convert family housing to a nonappropriated activity. Under this approach, which is reportedly being examined by the Army, the military services would pay cash housing allowances to all military families living in the United States, including those living in on-base housing.[9] Members living in on-base housing would then pay their base housing office a rent equal to their allowance. The rents (allowances) would be used to pay operating costs and to make contributions to a sinking fund that, subject to Congressional authorizations, could pay to construct new units or to replace aging units on a periodic basis.

Under the revolving-fund approach, rents would be set equal to housing allowances rather than set at the higher, market-clearing level that would be needed to eliminate the current waiting lists for DoD housing. Waiting lists for DoD housing would persist and could result in pressure to provide more DoD housing. The effect of such a revolving fund on DoD's budget and on DoD's role in family housing would depend crucially on whether or not the Congress would continue to appropriate funds for family housing construction.

A Revolving Fund with Supplemental Appropriations for Investment. DoD's costs would rise by roughly $350 million annually if a revolving fund were implemented but appropriated funds for family housing investment remained at their planned level and were used to supplement the sinking fund. That amount reflects the difference between the total rental receipts that DoD [illegible] (based on current allowance rates) and the cost of operating the

are DoD dependents living in on-base housing. Although school impact payments are also made on behalf of DoD dependents who live off-base, the payments made on behalf of those living on-base are larger. The difference between the two payments is part of the total federal cost of providing on-base housing. Moreover, because the property taxes that support local schools are included in the cost of private-sector housing, it is appropriate to consider Impact Aid when comparing the total cost of DoD housing to the cost of private-sector housing.

TABLE 4. COSTS AND SAVINGS FROM RESTRUCTURING FAMILY HOUSING
(In millions of dollars)

Option	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Revolving Fund							
With supplemental appropriations[b]	-400	-350	-350	-350	-350	-1,800	-350
Without supplemental appropriations[c]	250	450	500	500	550	2,250	450
Family Housing Benefits Appropriations[d]	0	0	0	0	0	0	450

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: Minus signs indicate costs. Figures in the 1995-1999 period are in current dollars.

a. Long-term savings estimates are based on savings for the federal government. They are expressed in 1995 dollars.

b. Total federal costs are greater because of the cost of Treasury borrowing and the cost of school Impact Aid payments made by the Department of Education.

c. Total federal savings are greater because of Impact Aid. DoD savings could be used to increase housing

Such a revolving fund would provide service managers with an incentive to continue to operate and maintain units whenever the cost to DoD was less than the revenue from allowances. That approach is an advantage over the current system where, according to some Army experts, low levels of funding for housing operations could force housing managers to close units even when the cost of operations is less than the cost of paying allowances.

However, such an approach would be likely to encourage the military services to provide government housing even in situations where housing allowances would be less costly. Housing officials within the services are aware that military families who live in the private sector make up the difference between their cash housing allowance and the cost of private-sector housing out of their own pockets. To avoid imposing these costs on service members, housing managers might use the revenue generated by relatively new units with low operating costs to keep older units in operation. Although this approach would reduce the revenue available for the investment sinking fund, DoD could continue to rely on the Congress to appropriate funds for construction. As a result, the sinking fund might be used primarily to pay for projects that the Congress is willing to authorize but for which it would not have appropriated funds.

A Revolving Fund Without Supplemental Appropriations. If no appropriated funds were provided for investment (whether new construction, revitalization, or replacement), DoD savings relative to the fiscal year 1995 budget request would be about $250 million. That savings accrues because the DoD resources devoted to family housing in the United States--operations and investment--exceed the cost of paying housing allowances to the families in those units. Annual DoD savings would rise to approximately $550 million by 1999, assuming that DoD's plans call for a level of investment that is closer to what is required to support its inventory in the long run. Assuming that this decline in resources resulted in a lower DoD inventory, federal savings would be greater.

If a revolving fund without supplemental appropriations were adopted, in the long run, DoD would spend the same amount on both the housing

difficult to ensure that no appropriations would be made and thus that costs would not rise.

In addition, even though this option might reduce DoD's role in providing on-base housing and lead to a more cost-effective mix of cash and in-kind compensation, it would not necessarily limit on-base housing to locations where that housing is worth its cost to the federal government. Because the revolving fund would not have to cover the cost of Impact Aid payments (which are in the budget of the Department of Education) and federal interest charges, it could still permit too much reliance on DoD housing. For example, although the amortized cost of capital for a DoD unit is approximately $4,600 from a federal perspective, a DoD revolving fund could continue to operate indefinitely provided that its receipts covered operating costs plus average annual construction costs of roughly $2,900 per unit. DoD revolving-fund managers would continue to invest in housing so long as the sinking fund could cover the cost of construction; they would have no incentive to ask whether that construction yielded a return that justified its cost.

The omission of interest costs could be resolved by requiring the revolving fund to reimburse the Treasury for the cost of borrowing funds to cover family housing investment. Although no charge would be levied against existing units, DoD would pay an annual interest charge of roughly $1,700 per year during the service life of a unit constructed or revitalized after the revolving fund was established.

It might not be necessary, however, to include all federal costs in the revolving fund in order to ensure appropriate investment decisions. Omitted costs can be counterbalanced by omitted benefits. The omission of Impact Aid payments from the revolving fund, for example, might be offset by the fact that a revolving fund that is supported by housing allowances would also overlook some of the benefits of DoD housing. Some of the benefits would be overlooked because, as waiting lines for DoD housing suggest, DoD housing is worth more to service members than their housing allowances.

Over the long run, a revolving fund without supplemental appropriations

military families and make a cost-neutral shift to a revolving fund by raising housing allowances for families in the United States by an amount that offsets these initial savings. In 1999, those savings would equal approximately $550 million, which would permit an 8 percent increase in housing allowances. With such an approach, there would be no immediate budgetary impact from the shift to a revolving fund, although the long-run savings from achieving a more cost-effective mix of cash and in-kind compensation could amount to roughly $450 million annually.

A Family Housing Benefits Appropriation. Under this alternative, all federal funds currently spent on housing benefits for military families (allowances, family housing operations, family housing investment, and the Impact Aid payments made on the behalf of the school-age children of military personnel) would be consolidated into a single appropriation for family housing benefits. The amount of the appropriation for family housing benefits would be reviewed annually within DoD and the Congress based on the average amount requested for family housing benefits for each military family in the United States and overseas. Investment projects would continue to require Congressional authorization.

The initial average level of family housing benefits would be based on current planned funding for family housing, housing allowances, and Impact Aid. This formula would enable the department to maintain its current plan (with current allowance levels and number of family housing units) if it chose to do so. Discretionary budget authority for the federal government as a whole would not change, although the transfer of responsibility for Impact Aid payments would raise DoD budget authority and lower budget authority for the Department of Education.

In their budget requests, the military services would be permitted to shift funds among allowances, housing operations, and housing investment within a fixed average cost per family in order to achieve their preferred mix of housing benefits. To support U.S. family housing operations and to provide funds for U.S. investment, the military services could choose to rely solely on the housing allowances forfeited by military families living in on-base housing.

Previous Congressional Budget Office analysis suggests that over the long run the costs incurred by the federal government in providing on-base housing exceed the value of that housing to service members.[10] Thus, although the services would be free to pursue their current allocation of housing benefits under this alternative funding system, they would not be likely to do so. Instead, the services' role in providing on-base housing would probably decline under this alternative, since managers would have an incentive to choose the most cost-effective form of compensation.

The immediate savings from more efficient use of resources would go to the benefit of service members (through increased housing allowances) rather than to reduce the DoD budget. The total level of resources devoted to family housing benefits (cash and in-kind) would be the same as it is under the current DoD plan; if the military services found that they could spend those resources in a more cost-effective manner, the quality of life of military families would, on the whole, increase. Over the long run, however, the benefits from DoD's use of a more cost-effective mix of cash and in-kind housing benefits would accrue to taxpayers, since DoD would find it less costly to recruit and retain a high-quality force. These savings could amount to more than $450 million annually.

The time value of money accounts for a significant share of the total resource costs incurred in providing long-lived assets such as family housing. Under this alternative, DoD compensation managers might be expected to take account of that cost when choosing between housing investments that will provide benefits to military families in future years and cash payments that provide immediate benefits. As a result, the impact of this alternative on the number of on-base housing units and the savings resulting from the efficient use of resources could be similar to the impact of a revolving fund without supplemental appropriations and with interest charges.

One disadvantage of this alternative is that providing DoD with the ability to make trade-offs between cash allowances and in-kind housing requires a Congressional appropriation process that focuses on average cost per military family. Although that is arguably a better way to review and control housing benefits, it would require some reallocation of responsibilities within the

the Congressional committees that deal with education issues to the defense committees. Responsibility for budgeting for those payments would shift from the Department of Education to the Department of Defense.

However, the incentives DoD managers would face also have potential weaknesses. For example, because investment funds would not be fenced in a separate account, short-sighted DoD managers might not invest in housing even when it would be justified by the future benefits. That concern may not be valid, however, since the current system in which investment is fenced appears to have resulted over time in too large a DoD role in family housing. Although the impact of any reduction in housing allowances would be spread among all military families, the benefits from investment projects are concentrated in specific locations and can generate strong local support. That support could help to protect housing investment.

CHAPTER III

SUPPORT FOR DoD'S WEAPON SYSTEMS

The United States relies heavily on sophisticated weapons to provide its military with a qualitative advantage over potential opponents. The Department of Defense has sizable stocks of these weapons, including nearly 400 ships, almost 2,700 deployable fighter aircraft, and about 16,000 tanks. Countless missiles, torpedoes, shells, mines, and the like are also bought and maintained to provide combat punch for major weapon systems. In addition, each of the services and several defense agencies employ significant numbers of personnel to investigate new technologies and develop and buy new weapons. Maintenance personnel in a number of depots and at bases worldwide perform daily and periodic maintenance on these weapons to ensure they are available should U.S. defense needs call on their services. This chapter discusses consolidating portions of these acquisition and maintenance work forces.

CONSOLIDATING THE ACQUISITION WORK FORCE

Consolidating and reducing the size of the acquisition work force has saved billions of dollars in recent years. Although DoD has achieved such savings, cutbacks to the acquisition work force have occurred mostly as a part of overall reductions in defense spending that have taken place in recent years. The Administration has introduced several initiatives aimed at consolidating and streamlining the acquisition process in the Department of Defense that could further reduce the size of the work force. In addition, the Congress recently passed the Federal Acquisition Streamlining Act of 1994 aimed at streamlining federal procurement as a whole, which could cut the size of the defense acquisition work force. This option goes beyond DoD's current reform efforts or those included in recent legislation. It establishes a single defense acquisition agency and could save several billion dollars beyond the acquisition savings anticipated by the Administration during the next five

report of July 1970 complained of too many layers of military and civilian staffs producing "excessive paperwork, coordination, delay, duplication and unnecessary expense." In 1986, the President's Blue Ribbon Commission on Defense (the Packard Commission) concluded that too many acquisition personnel--burdened by too many laws, regulations, and layers of review--resulted in a cumbersome and inefficient process. The current Administration created the Office of the Deputy Under Secretary of Defense for Acquisition Reform to address the many bureaucratic and procedural obstacles that continue to burden the procurement process. Although the Administration plans to cut back the size of the acquisition work force as part of its overall force reductions, it does not currently plan to seek efficiencies by undertaking a major reorganization of the acquisition bureaucracy.

Defense Acquisition Organization

The defense acquisition community consists of 10 major organizations and includes small components in a number of agencies. About 450,000 military and civilian workers conduct and manage research, development, production, and support of weapons and equipment within the department. Within the Office of the Secretary of Defense, the Under Secretary of Defense for Acquisition manages the overall acquisition process and serves as the Chairman of the Defense Acquisition Board, which oversees the development and production of DoD's major weapon systems. Within the service secretariats, a Service Acquisition Executive directs each of the services' acquisition programs, and the Vice Chairman of the Joint Chiefs of Staff oversees issues on joint service acquisition.

DoD's major weapon-buying commands include the Army Materiel Command, the Naval Air Systems Command, the Naval Sea Systems Command, the Naval Space and Warfare Systems Command, the Air Force Materiel Command, and the Defense Logistics Agency. The Office of Naval Research, the Army Materiel Command, and the Air Force Materiel Command conduct and manage the services' research and development work in addition to the work managed by DoD's Advanced Research Projects

Force Systems Command, and the Air Force Communications Command--into the Air Force Materiel Command. In 1988, the former major commands employed almost 140,000 military and civilian personnel; the Air Force Materiel Command now employs about 93,000--about 34 percent less than under the old organizational scheme. Estimating the effects on employment of the merger is difficult, since the consolidation took place during a period of major downsizing within DoD. Nevertheless, the reorganization demonstrates the extent to which consolidation can occur while maintaining functional performance. Army and Navy buying commands, however, have remained essentially unchanged during the recent era of acquisition reform.

Savings Through Reforming the Defense Acquisition Process

For at least the past 25 years, defense acquisition has been characterized by major increases in program costs, significant schedule delays, failure to meet operational requirements, and a host of management problems including waste, fraud, and abuse. Nearly every Administration in the past three decades has undertaken steps to reform the acquisition process in order to reduce costs and ensure timely delivery of effective weapons and equipment. The current Administration has proposed a number of initiatives to simplify and streamline the acquisition process that, if carried out, could produce significant savings and efficiencies. The Administration estimates that various acquisition reforms could save billions of dollars.

In general, the Administration's reform program seeks to restructure the acquisition organization and process so that "the fewest number of people are involved in a given process, and the need for reconciliation or coordination is minimized."[1] Various policy reforms are designed to achieve these objectives. For example, DoD seeks to establish performance-based requirements minimizing the need for military specifications unique to DoD. A preference for purchasing commercial items should contribute to cost and schedule efficiencies. DoD has recently completed a comprehensive review of military specifications (milspecs) and has directed that purchasing commercial items replace buying items built to military specifications except in special cases.

reporting requirements to the minimum number necessary to ensure compliance with policy. Data collection would be limited to data that already exist and can be collected without undue additional administrative burdens. Moreover, DoD has proposed simplified contracting procedures, which are expected to save significant time and accelerate the acquisition process.

Those and other proposed reforms serve as the foundation for DoD's Defense Acquisition Pilot Program, authorized by the Congress in 1991. The purpose of the program is to determine the potential effectiveness of proposed reforms in acquisition and waivers of certain statutes and regulatory requirements. The Congress has yet to grant final approval of the package of seven weapons programs that the department proposed in 1993 to be Acquisition Pilot Programs.

Acquisition Work Load and the Size of the Work Force

Since the peak years of defense spending in the mid-1980s, the acquisition work load has been decreasing according to a variety of measures, but it has not been matched by cutbacks in the defense acquisition work force. One measure of the acquisition work load is total spending on research and development, production, and purchases for operations and maintenance. Since 1988, acquisition spending, by this definition, declined by almost 28 percent (outlays in 1995 dollars); the acquisition work force, however, declined by only 23 percent.[2]

During the 1988-1994 period, the acquisition work force--civilian and military--shrank by about 134,000 workers (see Table 5). These cutbacks were not levied specifically on the acquisition work force; rather, they were part of the overall defense drawdown that had occurred during the past five years. (Overall, DoD employment fell by about 21 percent between 1988 and 1994.) Reducing the acquisition work force between 1988 and 1994 will save about $5.5 billion in 1995. If DoD had cut back the acquisition work force by the same percentage as the services and defense agencies reduced acquisition [illegible] roughly 29,000 additional jobs would have been

Other indicators, such as the quantity of weapons being purchased and the number of systems being managed, also suggest that the acquisition work load is decreasing. The services are purchasing considerably fewer weapons than in 1990. This year, DoD requested the Congress to authorize purchasing 6 new ships, down from 20 ships authorized five years ago. This year's budget request for 127 aircraft is down from 511 aircraft authorized in 1990. Construction of tanks has been discontinued altogether, and DoD has cut back the purchase of strategic missiles from 175 missiles in 1990 to 18

TABLE 5. COMPARISON BETWEEN DEFENSE SPENDING AND ACQUISITION EMPLOYMENT, 1988 AND 1994

	1988	1994	Percentage Change
	In Constant 1995 Dollars		
Total Defense Outlays[a]	352.6	273.4	-22
Acquisition Outlays[b]	197.3	143.0	-28
	By Number of Employees		
Total Acquisition Employment	582,100	448,400	-23
Army	128,900	85,800	-33
Navy	238,300	187,900	-21
Air Force	139,600	92,700	-34
Defense Logistics Agency	53,900	60,400	12
Others	21,500	21,600	0

requested for 1995. In addition, fewer major weapon programs are currently in the acquisition development pipeline than in the past. In 1991, the Defense Acquisition Board (DAB) managed (or delegated to the services) 131 major weapon programs; this year, the DAB oversees only 93 major programs. These sorts of reductions in acquisition activity are reflected, at least in part, by a 10 percent drop in the number of contract actions since 1990.

Reductions in the acquisition work force have not been evenly distributed among the services, suggesting that further savings could be achieved through more equitable cutbacks among the military services. For example, although the Army cut acquisition spending by about 45 percent during the 1988-1994 period, it reduced its acquisition work force by only about a third. The Navy cut acquisition spending by about 34 percent, but reduced the number of acquisition positions by only about a fifth. The Air Force cut acquisition spending and its associated work force by about a third.

These reductions to the services' work forces are approximate since many workers were consolidated and transferred from their service assignments to similar functions in defense organizations such as the Defense Logistics Agency (DLA). While DoD was cutting back the services' work forces, the number of acquisition workers in DLA and other DoD organizations actually increased modestly, by about 6,000 positions during the 1988-1994 period.

Potential for Efficiencies

Aside from the potential for savings on the basis of equitable and proportional cuts, historical evidence indicates that consolidation can generate efficiencies and savings. For example, bringing the logistics support functions of the various services into the Defense Logistics Agency in 1961 reduced the number of jobs by 13 percent. Consolidating the mapping, charting, and geodesy functions of the three services into the Defense Mapping Agency in 1970 also achieved efficiencies. More recently, merging the Air Force Logistics Command and the Air Force Systems Command into the Air Force [illegible] the size of the work force of these

acquisition management personnel positions by 25 percent to 30 percent by reducing duplicative headquarters staffs.

The Congress could consider the potential to achieve significant savings in light of the various trends in defense acquisition described above. Management reforms such as simplifying the acquisition process will be carried out over the next several years. Acquisition spending and other measures of the acquisition work load are projected to continue to decline during the next five years. Indeed, according to DoD estimates, outlays for acquisition will decrease by about 10 percent between 1994 and 1999.

If cutbacks to the work force reflected successful reform and consolidation of the acquisition process, the acquisition work force could absorb a major downsizing that would approach the objectives set out by some Members of Congress. For instance, if reorganization reduced the acquisition work force by, say, about 10 percent beyond Administration plans, DoD could save about $3 billion over the next five years (see Table 6).

Advantages and Disadvantages of Consolidation

In general, consolidating all defense acquisition functions into a single agency could promote savings and efficiencies by establishing a management structure

TABLE 6. SAVINGS FROM REDUCING THE ACQUISITION WORK FORCE BY 10 PERCENT (In billions of dollars)

	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Budget Authority	0	b	0.4	0.9	1.5	2.8	2.1

conducive to cross-service purchasing of weapons and equipment. For many years, each service developed its own means to meet similar or identical military requirements and justified the weapons it proposed to buy on the basis of its unique needs and abilities. During the defense buildup of the 1980s when acquisition dollars were plentiful, the services pressed for and received funding for many dozens of new weapon systems. Few requests to start new programs were denied, and virtually no programs were canceled. As a result, a plethora of systems were developed and built to fulfill requirements in given mission areas. A good illustration of this problem is that the services have at least 11 major weapon systems in current inventories designed to meet antiarmor requirements.

Military requirements and budgets have, however, changed significantly; a streamlined single acquisition agency could adequately meet the changing acquisition needs of the post-Cold War era. Fewer new military requirements demand responses comparable to those that characterized the arms race during the past four decades. Equally important, fewer resources are now available or planned to meet even reduced needs. The Bottom-Up Review of September 1993 outlined the department's plan to reduce the size of the force structure significantly by 1999. Fewer divisions, ships, aircraft, and missiles will reduce the acquisition work load considerably below the peak years of the mid-1980s. In addition, the department recently undertook a comprehensive review of service roles and missions in order to eliminate duplication and reduce functional overlap among the services. Much discussion in this review concerns assigning certain military missions to a single service; other discussion focuses on developing weapons for joint service use. These initiatives--the Bottom-Up Review and the review of roles and missions--clearly indicate that the overall size of the acquisition work load will be reduced and rationalized during the decade to come. A unified acquisition agency could be an appropriate response to these changes in acquisitions.

Yet costs and risks associated with consolidating acquisition functions could outweigh the potential benefits, especially in the near term. The initial costs of reorganization and relocation could be significant depending on the [illegible] of centralization undertaken. As a matter of reference,

process. Such an added layer of bureaucracy could increase costs in the short term and delay savings and efficiencies.

Although reorganization could reduce the size of the work force, a single acquisition agency may not be needed in view of the separate characteristics of the services' purchasing needs. The services perform unique missions that justify separate organizational components. Even a single acquisition agency would require components dedicated to developing and procuring land combat vehicles, ships, and aircraft. To the extent that redundancy exists in the current organizational scheme, consolidations could occur without requiring a complete overhaul of the acquisition bureaucracy.

Moreover, reorganization may not be necessary to ensure greater cooperation among services. Management mechanisms such as the Joint Requirements Oversight Council currently exist within the department to encourage development and procurement of weapon systems by joint effort among the services. Provisions of the department's instructions and regulations for acquisition require that the cost-effectiveness of a weapon be compared with other systems performing the same function before the Defense Acquisition Board makes a decision to proceed.

CONSOLIDATING MAINTENANCE DEPOTS

How should DoD maintain its equipment? That is the subject of considerable debate within the Pentagon and the Congress. In fiscal year 1993, DoD spent $15 billion for depot maintenance.[3] About 70 percent of this work was performed at government-owned and operated depots, shipyards, and logistics centers; the remaining 30 percent was contracted out to private firms. Today the services manage a total of 34 major public depots (a major depot is one with more than 400 employees). Although 10 of the 34 are scheduled to close as a result of base realignment and closure decisions, reductions in force structure and in operating tempos will still leave DoD with excess capacity within its government-run depots.

Background

As structured today, the military departments manage their own depots as part of their responsibility to support their forces. Government-run depots exist, in part, to assure that DoD will always have a "ready and controlled source" of skilled workers, equipment, and facilities dedicated to it in the event of conflict.[4] Since each service operates a broad mix (in type and vintage) of weapon systems, public depots work on a wide variety of equipment.

During the Cold War, U.S. military planners prepared for a protracted conflict with the Soviet Union. The structure of government depots was sized accordingly. Depots had larger capacities not only to handle the larger force structure of the Cold War in peacetime, but also so that they could repair damaged aircraft, ships, and ground equipment that would be sent back to the United States during a conflict. Today, military planners are preparing to fight in major regional conflicts similar in scope and size to Operation Desert Storm, which are more likely to be of short duration. Based on U.S. experience during that conflict, the need for government depots would surge in the early stages of a crisis in order to prepare weapon systems, spare parts, and repair kits for mobilization, but few weapon systems would be returned to the United States for repairs before the conflict ended.

Over time, each service has developed a distinct approach to supporting its equipment, even when that equipment is similar. For example, the Navy has relied on inspections to determine when repairs are needed, whereas the Air Force sends its planes to depot for inspection and overhaul on a regularly scheduled basis. Those differences in approach may complicate joint operations.

Because depots today are dedicated primarily to a single service, workers are attuned to the effects of their service's operating environment. For example, the Navy's carrier-based aircraft age differently from land-based aircraft. Navy officials argue that separate ownership of facilities is needed [illegible] for that service's specific

if they are retained at the expense of other activities that enhance readiness or of force structure. Today, the Navy and Air Force operate separate aviation depots. The majority of depot maintenance involves repairs to components (such as engines, communications equipment, and electronics) rather than to their larger platforms, and the services have duplicate capabilities to maintain similar components. Alternatives to separate service depots exist; for example, Navy and Air Force maintenance technicians might operate out of a single facility, or one service might act as a lead agent for another's work load. And, with time, depot technicians might learn to look for the types of damage more common to each service's equipment.

One justification for separate service depots offered by some officials is current law. The requirement that "DoD activities" provide a "ready and controlled source of repair" is often interpreted to mean that each service is responsible for ensuring the readiness and sustainability of its own equipment. The Congress can, of course, amend or clarify that law if it sees fit. But this common interpretation stems from concerns that a service would not be able to control the priority or quality of repairs to its equipment if it relied on another service's depots.

How Much Excess Capacity Exists Among Government Depots?

Conventional wisdom suggests that defense infrastructure has not been cut as dramatically as has force structure. In terms of the number of government maintenance depots, that impression holds true today since none of the 10 major depots identified for closure under previous BRAC rounds has as yet been entirely closed.[5] In terms of personnel, DoD has reduced staff at public depots over the 1990-1994 period by a percentage comparable to cuts made in DoD's inventories of aircraft and ships. It has also taken other measures to reduce capacity, such as laying away excess equipment. However, closing depots may provide a greater opportunity for long-term savings, particularly if those depots are self-contained bases or part of a larger multipurpose base that is itself identified for closure.

DoD currently plans to close the 10 depots identified by previous BRAC

will have declined by about 30 percent. Even after these closings, however, further declines in force structure and operating tempos will leave the services with excess capacity. If additional depots are closed, costs would probably outweigh benefits in the near term. But closings could free up significant amounts of funding beginning early in the next decade.

Capacity is a difficult concept to quantify since it encompasses many characteristics: the size of a facility, the number and type of pieces of equipment within it, the skill level of its workers, and the number of hours they work. Also, some depots have rare or unique features that make them critical to retain--such as large hangars or special facilities to repair nuclear propulsion systems. Despite these complicating factors, it is useful to consider a rough measure of capacity (see Table 7 for estimates of excess capacity using just one metric: millions of direct labor hours, or DLHs).

Direct labor hours represent the number of physical workstations at a facility and the number of productive hours associated with each position in a one-shift, eight-hour day, five-day workweek. That measure may underestimate actual capability, especially in emergency situations, since more capacity is available for a surge in production by adding additional shifts or workdays.

According to the data in Table 7, even after planned BRAC closures, government-operated depots will still have more than 22 million DLHs in excess capacity by 1997. On a service-by-service basis, Army depots, naval shipyards, and Air Force logistics centers account for the majority of that excess. Note, however, that the Congressional Budget Office has not independently evaluated the services' capacity and work-load projections on which the data are based.

Administration Plans May Reduce the Need for Government Depot Capacity

Recent decisions by the Administration could substantially reduce the number and size of government depots needed. Deputy Defense Secretary John [illegible] directed the services to reevaluate what DoD needs to retain as

The services are now in the process of evaluating how much work load they need to maintain core capability for the planning scenarios--two nearly simultaneous contingencies in Southwest Asia and on the Korean Peninsula. Early service calculations suggest, however, that government maintenance depots may only need to perform 40 percent to 50 percent of total current

TABLE 7. EXCESS CAPACITY AMONG MAJOR GOVERNMENT-RUN MAINTENANCE DEPOTS

	Number of Depots		Utilization (Percent)		Excess Capacity (Millions of direct labor hours)		Range of Depot Capacities in 1997 (Millions of direct labor hours)	
	1994	1997	1994	1997	1994	1997	Low	High
Army Depots[a]	8	5	57	72	8.7	5.2	1.9	4.7
Naval Aviation Depots	6	3	74	103	4.9	-0.3	3.1	3.5
Naval Shipyards	8	5	75	76	17.4	10.3	4.6	14.2
Other Major Naval Centers	3	3	83	84	0.9	0.8	0.7	2.4
Marine Corps Logistics Bases	2	2	125	116	-0.6	-0.4	1.2	1.2
Air Force Air Logistics Centers	5	5	86	83	5.8	6.7	7.0	9.2
Other Air Force Centers[b]	2	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total	34	24	n.a.	n.a.	37.1	22.3	0.7	14.2

SOURCE: Congressional Budget Office based on data from the Defense Science Board and the military services.

NOTE: n.a. = not applicable. Values for 1997 exclude all depots identified for closure to date.

peacetime depot work loads, as compared with the current 70 percent. Under this core policy, private industry could perform the remainder.

The Administration's new policy, however, may contradict existing law for some of the services. Since 1991, the Congress has restricted the amount of maintenance that the private sector can perform. The National Defense Authorization Act currently states that the services may not contract out more than 40 percent of their depot work load for performance by nonfederal employees. The House of Representatives' defense authorization bill for 1995 would further increase the share performed by government depots by restricting private contractors to 40 percent of all repair funds. That share would include the value of private-sector contracts for all maintenance and repair services above the unit level, interim contractor support, contract logistics support, and the value of materials purchased by public depots for their maintenance work.

Some Members of Congress are concerned that DoD may give up too much capability under its new core policy. The process used to quantify the work load needed to keep core capability is not very clear, and it may therefore limit the Congress's oversight role. Some Members would prefer that DoD leave decisions about excess capacity to the BRAC process and rely on interservicing among public depots and, to encourage more cost control, competitions for depot work load between the public and private sector. Competition, some argue, might also be used between public depots to identify which facilities are least efficient.

Nevertheless, there is no consensus about the track record of competitions for maintenance work loads. The Air Force believes that it has achieved considerable savings by offering some of its work loads for competition between public depots and private companies as well as through competitions involving government depots run by other services. But the other services have questioned these findings. A recent Defense Science Board Task Force on Depot Maintenance Management (half of which consisted of representatives from the private sector) concluded that competitions cannot be run [illegible] between public and private methods of accounting

the services lies in repairs for fixed-wing aviation, Deutch specifically asked the Navy and Air Force to develop a plan for joint operations.

However, given that each of the services has kept separate repair facilities, encouraging cooperation has not been a simple matter. In recent years, the Office of the Secretary of Defense has directed the services to develop plans to conduct depot maintenance more cost effectively. One way has been for one service to perform another's repairs when they involve common equipment or components. For example, Air Force and Navy versions of the Blackhawk helicopter are now being sent to the Corpus Christi, Texas, Army Depot. The services have also relied on each other to a greater degree for engine repairs, and DoD plans to consolidate all tactical missile maintenance at the Letterkenny, Pennsylvania, Army Depot.

Although the services are consulting each other more about similar work loads, the share of maintenance performed by one service for another remains small: just $430 million in fiscal year 1992. According to a 1993 study on depot consolidation by the Joint Chiefs of Staff, the services could perform much more of each others' maintenance on similar weapon system components. The services may also be particularly reluctant to send more of their work load to another's facility since such actions might make them vulnerable to the next round of BRAC recommendations for closure.

How, then, should the government depot system be managed? In its study, the JCS recommended that DoD establish a Joint Depot Maintenance Command. It concluded that a unified management structure would result in the greatest opportunity for efficiency. However, then Secretary of Defense Les Aspin did not adopt this policy, perhaps in part because such a major management change was unlikely to receive support from the services and the Congress. That wariness was warranted: in last year's defense authorization act, the Congress explicitly prohibited DoD from consolidating the management of depot work load under a single defensewide entity during fiscal year 1994.

The recent Defense Science Board Task Force on Depot Maintenance Management recommended continuing separate management of service

funding decisions--it is unclear how the DDMC will be able to integrate depot operations.

Consolidating Maintenance Depots Among Services

The option explored in this paper, consolidating maintenance depots among the services, would establish a Joint Depot Maintenance Command or a Defense Maintenance Agency that would manage existing facilities, assign similar work loads to single "Center of Excellence" depots, and make recommendations to the Base Realignment and Closure Commission about which facilities to close.

Taking into account service projections of future work load, the option would close seven depots in addition to those already identified by previous BRAC decisions. Work on aircraft and their components would be consolidated among six depots instead of the current nine. Those would include the existing Army and Navy rotary-wing facilities (since neither one has as yet demonstrated the capacity to absorb the work load of the other), along with four fixed-wing aviation depots (selected from among the remaining naval aviation depots and Air Force air logistics centers). Maintenance on ground vehicles and equipment currently performed at Army, Air Force, and Marine Corps facilities would be consolidated among four depots. This option would also close two additional naval shipyards.

Little empirical evidence exists as to whether consolidating depots among services would result in more savings than simply reducing excess capacity within each service. Simple calculations based on capacity and work load as measured in direct labor hours suggest that if a central management agency assigns aircraft maintenance work loads for all services, it may be able to close three fixed-wing aviation depots. Alternatively, two depots could be closed if each service were to reduce its capacity individually. According to these calculations, assigning work loads for ground equipment centrally would not result in enough excess capacity to justify closing additional depots.

layers of management and higher transportation costs to perform repairs at a few larger depots. Two studies by the Center for Naval Analyses found evidence of economies in combining naval aviation and shipyard work loads, respectively, but it is unclear whether these results can be generalized to combining the work loads of all services. In their 1993 study, the Joint Chiefs of Staff recognized the high degree of uncertainty about the effects of consolidation by estimating cumulative net savings over 10 years ranging from $1.8 billion to $9.6 billion (in 1995 dollars) as a result of joint operations. The JCS study found that most of those savings accrued in the latter half of its 10-year estimation period.

Savings from this option were estimated under the assumption that the indirect costs of remaining depots can be spread out over a larger business base. Specifically, the Congressional Budget Office assumed that 30 percent of all indirect workers at the closing depot were separated from the work force. (Indirect workers are those employees often categorized as general and administrative or overhead whose hours cannot be assigned to a specific work order.) That assumption is similar to the one the JCS used for its low estimate of savings from consolidation. In addition, CBO assumed that the depots to which the work load is transferred would only have 50 percent of the other indirect costs associated with that work load (such as utility expenses) compared with the facilities that are closed.

If this option is put in place, CBO estimates that costs would outweigh savings by $490 million (in current-dollar budget authority) during the 1995-1999 period, since DoD would face up-front costs associated with retirements, work-force separations, moving of workers and equipment, and environmental cleanup at depot sites (see Table 8). But over the 2000-2004 period, savings from closing depots under this option would be considerable: approximately $2 billion in budget authority (in 1995 dollars), or about $400 million per year. Other estimates have suggested that depots with several thousand employees each have fixed overhead costs ranging from $50 million to $100 million per year.[7] Using this range, eliminating seven depots would imply long-run savings of roughly $350 million to $700 million per year. Much of these net savings could result under intraservice consolidations as well.

Arguments Against Joint Management of Government Depots

Opponents of this option argue that it is politically and bureaucratically impractical. Given the reluctance of the services to cede control and Congressional constraints on depot operations, DoD is unlikely to have the authority to make such a dramatic change in management structure.

Service representatives argue that a centralized depot structure would be less capable than what exists today. Separate control of public depots provides a close link between the users and suppliers of maintenance services. Duplicate capabilities may exist. But according to this line of argument, some overlap may be necessary to ensure that a ready and flexible source of repair is available, dedicated to each service and knowledgeable about its specific operational needs.

Critics also point to the degree of uncertainty surrounding the magnitude of savings under this option. If economies of scope and scale exist among service work loads, long-term net savings to DoD could be considerable. But some costs for depot operations, such as transportation and administration expenses, could rise. With the exception of aviation depots, consolidation among the services may not necessarily lead to the closing of more depots.

TABLE 8. COSTS AND SAVINGS FROM CONSOLIDATING DEPOTS (In millions of dollars)

	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Budget Authority[b]	0	-410	-350	-40	310	-490	400

SOURCE: Congressional Budget Office.

NOTE: Minus signs indicate costs. Figures in the 1995-1999 period are in current dollars.

Potential Benefits of Joint Depot Operations

Advocates of joint depot operations argue that both intraservice and interservice consolidations would be more likely under a centralized management structure. Given the budget pressures that it faces, DoD must take dramatic steps to promote efficiency among its support activities. If economies of scale and scope exist in aviation and ground equipment repairs, significant savings may be available over the long term to fund other activities that improve the readiness of U.S. forces or modernize their equipment. Under the current system of separate management, the services do not have a strong track record of consolidating similar work loads. A Joint Depot Maintenance Command or Depot Management Agency may offer the best opportunity for dramatic changes among government-owned depots.

Moreover, the services might learn from each other's experiences. For example, as it holds on to its airframes longer, the Navy is planning to take a more preventive approach and might learn from the Air Force's strategy of regularly scheduled maintenance. Furthermore, the Air Force may find that, in the current budget environment, the Navy's more austere approach of inspecting and repairing only as needed has a role for certain types of equipment.

DoD may be better able to make choices about how maintenance resources should be spent with a centralized management structure. By pooling information uncovered in equipment inspections, DoD may gain a better sense of the readiness and reliability of each service's weapon systems. Doing so might, in turn, provide DoD with important information for designing the next generation of weapon systems. Finally, combining service depot operations may also help DoD make better choices about which facilities have the greatest need for new equipment and capital improvements.

CHAPTER IV

STREAMLINE THE INTELLIGENCE COMMUNITY

Press reports and other unofficial sources consistently place the budget for the U.S. intelligence community at roughly $28 billion. Assuming that such estimates are correct, intelligence spending constitutes more than 10 percent of the Department of Defense budget (where almost all of it is hidden). Reflecting their substantial budgetary magnitude, intelligence activities are critical--in determining not only how well the U.S. military performs in wartime, but also when and if it will engage in combat.

Some effort to improve the functioning of the more than 20 intelligence agencies has occurred in recent years, notably in the creation of Joint Intelligence Centers at the level of the military commands. In addition, the intelligence budget, though escaping the early rounds of defense reductions relatively intact, is now taking cuts. According to unclassified accounts, today's $28 billion figure reflects a real decline since 1990 of some $5 billion in the annual intelligence budget. Moreover, further declines in the intelligence budget seem likely to occur in the rest of the decade--as evidenced by existing plans to reduce personnel by about 23 percent in comparison with the peak levels attained around 1990 (those reductions are now roughly halfway complete). Thus, the intelligence community may already be undergoing sufficient reorganization and streamlining--especially given the daunting tasks it continues to face in attempting to monitor and understand terrorism, nuclear proliferation, and other potential threats to U.S. security.

But a number of observers, including Senator Sam Nunn, Chairman of the Senate Committee on Armed Services, remain interested in the possibility that greater efficiencies--and real savings--may result from further changes in intelligence activities and organizations. This chapter, building on the ideas of lawmakers with expertise acquired on Congressional committees that oversee intelligence, discusses several such possible changes.

economic, environmental, and antinarcotics matters--are not central to U.S. security and can be handled at least as effectively through other parts of the U.S. government or the private sector.

Either way, the Congressional Budget Office has assumed that another 5 percent cut in spending--making for a total reduction of perhaps 25 percent since 1990, and translating into at least $1 billion a year--could eventually be achieved by the measures discussed in this chapter. But most of the cuts in spending would not occur until the next decade, after the current round of cuts has been completed.

The principal elements of the intelligence community include several major independent or quasi-independent organizations: the Central Intelligence Agency (CIA), created in 1947, with an annual budget reported to be about $3 billion and a staff of nearly 20,000; the National Security Agency, created by secret Presidential decree in 1952, with a reported budget of around $4 billion and a staff of more than 30,000; the National Reconnaissance Office, with a budget of perhaps $7 billion dominated by hardware costs for rockets and satellites; and the Defense Intelligence Agency (DIA), created by the Secretary of Defense in 1961, with an annual budget of around half a billion dollars and a staff of some 5,000.[2]

The other half or so of the intelligence community includes the intelligence arms of the individual military services--each of which reportedly employs on the order of 10,000 to 15,000 people and spends perhaps $2 billion to $3 billion a year--as well as the intelligence staffs of the military's warfighting organizations such as the Central Command. Smaller intelligence programs are found in the Departments of the Treasury, Energy, and State.

Among these organizations, the Central Intelligence Agency is the major independent organization in the U.S. government charged with following developments in other countries. The product of an earlier era of defense restructuring, it was created by the 1947 National Security Act that also gave rise to the Air Force and the Joint Chiefs of Staff. The CIA is intended to

cutting intelligence spending discussed in this chapter might also result in substantial savings in CIA spending, but could in addition substantially affect the scope and budgets of other intelligence agencies.

In many ways, U.S. intelligence and the Director of Central Intelligence have successfully played the role of independent voices in the U.S. government, providing a wealth of data and analysis about the economies, military forces, and political structures of many other countries. By so doing, they have provided the basis for negotiating arms control treaties, responding quickly and effectively to crises, and ensuring that a surprise attack against the United States was not under way.

In addition, the apparent redundancies within the intelligence community have provided policymakers with different points of view that have enriched the policy debate. For example, the CIA's estimates of Soviet military spending and arms acquisitions were consistently lower than those of Department of Defense intelligence (and both agencies' estimates were available to policy makers); the views of the National Security Agency about the likelihood of a Mideast war in 1973 proved more accurate than the less alarmist views of other intelligence agencies; and the beliefs that the then Director of Central Intelligence, John McCone, conveyed to President Kennedy in 1962--that the Soviet Union had placed missiles in Cuba--were correct, though the Director's analysts had doubted it.

However, the intelligence community often has not fit the idealized model of a set of information gatherers and classified think tanks that transcend politics and engage in dispassionate, illuminating debate. Partly because of its culture of secrecy and thus insularity, partly because of its strong links with the military, and partly because its Director is chosen by the President, the intelligence community has often shown just as much proclivity to reflect partisan and prevailing geopolitical biases as other parts of the U.S. government.

Even when not biased, its conclusions have frequently been wrong. Of course, infallibility would be an unreasonable standard for any organization. But during the Cold War, the intelligence community's analyses often

remains that many basic assessments provided by the intelligence community over the years have been flawed.

Moreover, the intelligence community contains elements that go beyond collecting and analyzing information. In particular, the CIA is actually three functional organizations in one--and one of those organizations does not consistently fit the mold implied by the title Central Intelligence Agency. Directorates of intelligence and of science and technology do focus on acquiring and analyzing data, but the directorate of operations presides over work that sometimes is less neutral and dispassionate. It includes the important and sometimes underrated gathering of "street-level" information abroad, including the use of spies (so-called human intelligence or HUMINT). But it has often included covert activities--including a hand of some sort in the overthrow of leaders in Guatemala, Zaire, Iran, and Vietnam early in the postwar era; the organization of the 1961 Bay of Pigs invasion and subsequent efforts to topple the Castro regime; the overthrow of Salvador Allende in Chile in 1973; and the mining of Nicaraguan harbors and arms-for-hostage dealings with Iran in the 1980s. Most of these activities were conducted in extreme secrecy, without the knowledge of the Congress and with the knowledge of only a very few in the Administration. In the latter two examples, the Congress was kept in the dark despite the existence of laws requiring that the intelligence committees be notified in advance.[4]

PROPOSALS FOR RETHINKING INTELLIGENCE

Citing the mixed results of past intelligence efforts, the new challenges of the post-Cold War world, or the need to reduce budgets without sacrificing key elements of intelligence, a number of influential policymakers have recommended changes in the basic way in which the United States organizes the intelligence community and its operations.

Reportedly, today's intelligence budget is still considerably larger in real terms than during the Carter or early Reagan years, when annual budgets

personnel and spending will have declined to about two-thirds of typical Cold War levels (taking 1990 as a typical year).[6] But according to press reports, intelligence personnel and spending levels will have declined by only about 20 percent from levels of the late 1980s and early 1990s. It is probably inappropriate that cuts in the intelligence community--which might be considered the nation's insurance policy of sorts--be strictly proportional to the reductions occurring in military forces. But further cuts in the intelligence community of several percent--as discussed in this chapter--may be reasonable in an era when the United States no longer has a major military rival.

Plans That Would Change the Structure of the Intelligence Community

A number of plans to change the structure of the intelligence community have been proposed over the years.

One idea for consolidating intelligence activities, put forth by the Pike Committee in the 1970s, proposed the elimination of the Defense Intelligence Agency. The DIA is essentially a mini-CIA serving the Secretary of Defense and Chairman of the Joint Chiefs of Staff. Such an approach would offer savings of one-quarter to one-half the magnitude of those discussed in this chapter. Thus, in isolation, it would not be sufficient to achieve the magnitude of savings discussed here, but could be part of a broader effort.

Another plan, that of Senator Daniel Patrick Moynihan, formerly Vice Chairman of the Senate Select Committee on Intelligence, would eliminate the CIA. Under the Moynihan approach, the CIA's formal advisory responsibilities would pass to the State Department. (Those parts of its analytic and data-gathering arms that the country chose to retain might be divided up largely between the State and Defense departments.)

Other ideas--including those of recent Chairmen of the House and Senate Intelligence Committees, Senator David Boren and Congressman Dave McCurdy--would make equally fundamental changes in U.S. intelligence. Two new agencies, organized along somewhat different lines than today's National Security Agency and National Reconnaissance Office, would be created to

residual CIA would focus its attention on human intelligence activities only; a new central organization would focus exclusively on analysis.[7]

The Boren and McCurdy approaches would not necessarily lead to any reductions in intelligence personnel or budgets. But under such a major restructuring, the opportunity for streamlining might naturally present itself. Under the Moynihan approach, cuts in personnel seem implied. However, some current CIA personnel might be relocated in order to buttress the staffs of the Defense Intelligence Agency and the State Department's Office of Intelligence and Research.

The impetus for reforming U.S. intelligence is not limited to Democrats. Ideas for restructuring the community were considered during the tenure of Robert Gates, Director of Central Intelligence during the Bush Administration. At present, Senator John Warner, former ranking minority member of the Senate Armed Services Committee and current ranking minority member of the Senate Intelligence Committee, as well as former Senator Warren Rudman, now vice chairman of the President's Foreign Intelligence Advisory Board, have lent their weight to a rethinking of the intelligence community's basic shape and structure. Former President Bush's national security advisor, General Brent Scowcroft, has recently described the intelligence community as "way overblown."[8]

Plans That Would Change the Missions of the Intelligence Community

Whether or not organizational changes would improve the functioning of the intelligence community, they are not guaranteed in and of themselves to produce budgetary savings. A more direct way to reduce the taxpayer's burden without doing damage to core intelligence missions is to reduce attention to those missions that might be deemed less important.

But what might those less critical missions be? One possible answer to this question would proceed from the premise that the overriding goal of U.S. intelligence activities is to contribute to the direct and traditional national

given the potential for organized crime in Russia to wreak havoc with that country's excess weaponry, and given the weakness in its central government, U.S. intelligence may need to devote greater resources to monitoring export controls and weapons security in a country that remains a nuclear superpower.

Nevertheless, focusing on the goal of national security, fairly narrowly defined, might allow one to downgrade a host of missions not directly related to actual security concerns. Those missions might include collecting and analyzing data on national economies, trade, narcotics production, environmental matters, and trends in human health.[9]

All of these issues are important, some critically so, to the future of the United States and indeed to the world at large. But does that mean they must remain within the province of the intelligence community? Civilian organizations such as the National Oceanographic and Atmospheric Administration and the National Aeronautics and Space Administration already focus on satellite surveillance of environmental conditions. International financial institutions and the private sector spend a great deal of time and resources tracking global economic trends and transactions (though the U.S. intelligence community may be better positioned to follow illicit economic activities). Technical research centers and universities may be just as well equipped as intelligence agencies to understand the long-term economic and military effects of technological innovation. Medical research centers and organizations such as the National Institutes of Health and the World Health Organization are probably much better able to monitor human health indicators. Drug war efforts, although useful, do not necessarily hold out enough promise to justify the concerted attention of several elements of the intelligence community.

Even the mission of political forecasting may have its proper limits. Over the decades, the intelligence community has misread the political strength and the policy goals of many important foreign leaders--both friends and adversaries. It was too optimistic in judging the political staying power of allies such as the Shah of Iran and President Diem of South Vietnam.[10] To be sure, trying to predict the unpredictable is unlikely to be a consistently successful undertaking. But if some events and trends are difficult to foresee

intelligence resources really should be devoted to such efforts. General political analysis conducted at universities and the Department of State may be every bit as useful--and more likely to be properly caveated and subject to critical scholarly review.

Given these other sources of information and analysis, it is not clear that an organizational structure designed to preserve and enhance U.S. national security should continue to focus on all of its current missions. Unfortunately, CBO does not have access to data that would provide a basis for estimating the potential savings associated with eliminating them from the intelligence community's portfolio. But those savings are likely to be significant, reaching or perhaps exceeding the illustrative $1 billion a year level discussed in this chapter.

COUNTERARGUMENTS TO RESTRUCTURING AND STREAMLINING THE INTELLIGENCE COMMUNITY

Whatever the flaws of the intelligence community, and however mixed its historical record may be, policymakers considering reforms and budget cuts would need to be very careful that they were not making pursuit of the best into the enemy of keeping a relatively efficient and effective organizational framework.

Some of the following considerations apply only to one or two of the possible ways in which the intelligence community might undergo restructuring or streamlining of its roles and missions. Others are of general applicability.

The Need to Avoid the "Monday Morning Quarterback" Mentality

To be sure, the intelligence community has often failed to foresee important events or understand important realities and trends in foreign states. But how does one understand the mind of a tyrant in a secretive state to determine [illegible] attack? How does one measure GDP

Soviet missile gap, for example, where they may have contributed to an arms competition--they have helped policymakers maintain a viable deterrent against major potential adversaries. Sometimes, as in its assessments of Soviet economic growth, the intelligence community has made mistakes but later discovered and corrected for them.

The Need to Keep a Vigorous Intelligence Community

Although the intelligence budget remains large today, that may be appropriate. Arguably, the key U.S. security concerns of the post-Cold War world are stopping proliferation of weapons of mass destruction, predicting the possible onset of ethnic and regional conflict in time to try to avert it diplomatically or with preventive deployments of forces, and understanding the nature of Islamic fundamentalism and other powerful political movements. In contrast to the Soviet threat of recent decades, these problems are often best addressed in their early stages--rather than through the use of large-scale military deterrence or military operations.

Given such circumstances, any tampering with U.S. intelligence should be undertaken only if very well conceived and likely to lead to improved results. A slightly redundant organizational structure that ensures a competitive dynamic to intelligence work should perhaps be seen not as wasteful but rather as a wise insurance policy.

In this regard, an annual intelligence budget that totals roughly $5 billion a year less than recent Cold War levels--as today's reportedly does--may be sensible. The end of the Cold War has meant little change in the intelligence community's responsibilities in places such as the Middle East, the Indian subcontinent, and other areas of the developing world. Although the end of global geopolitical conflict has reduced the need to track every move of Moscow's in those countries, the risks of ethnic conflict, proliferation, and terrorism arguably remain at least as severe as before. This conclusion is supported by data on the prevalence and intensity of conflict around the globe, a survey of trends in the proliferation of weapons of mass destruction, and the ferocity of global terrorist incidents. And reconnaissance and analysis

North Korea or other trouble spots. If we have a crisis with North Korea or a repeat of the World Trade Center bombing, with ugly chemicals used instead of explosives, the same people who now are asking why we need the CIA will be asking why we didn't have better intelligence."[11]

The historical record also provides ample evidence of what intelligence can do well. For example, the intelligence community's analyses of trends in other countries' militaries, though not always accurate, have accomplished the critical goal of ensuring that policymakers not be surprised by the military buildup of a potential adversary. Its monitoring capabilities have made possible arms control treaties that led to substantial reductions in Soviet military forces in Europe and that helped stop and turn back the nuclear arms race. Its early-warning sensors have ensured that the United States would not be caught entirely unprepared by a surprise attack--in the process perhaps helping to deter such a surprise attack. The intelligence community has also helped the United States provide assistance to allies, be it military reconnaissance during conflict or reassurance to potential belligerents that they were not under attack from each other (as in the aftermath of Mideast wars).[12] It has played supporting roles in other domains as well, a good example being the assistance it provided to Colombia in 1993 in tracking drug kingpin Pablo Escobar.

In wartime, the intelligence community is critically important to U.S. military forces, especially so in an era of warfare characterized largely by precision-guided munitions. Its capabilities provided targeting information to U.S. military forces in operations such as Desert Storm. They also facilitated the famous "left hook" by which U.S. ground forces ran around Iraqi positions and quickly reached the flanks and supply lines of those forces.

The Importance of Objective Intelligence and Analysis

An independent intelligence agency--and its independent director, unencumbered by policy responsibilities and reporting directly to the President--can promote objectivity in intelligence gathering. Today, the Director of Central

the President, the Vice President, the Secretary of State, and the Secretary of Defense). Thus, he is not only independent but has direct access to top-level policymakers.

The Moynihan proposal would spell the end of an independent and influential top intelligence officer. Congressman Bud Shuster, also a one-time member of a Congressional intelligence committee, opposed Senator Moynihan's idea several years ago chiefly for this very reason and pointed out its drawbacks. In his words, "Giving the Secretary of State chief responsibility for intelligence raises the specter of 'cooking' intelligence to support a preconceived policy. The separation of intelligence-gathering and foreign policy is a fundamental principle."[13]

The Boren and McCurdy approaches would retain a top-level intelligence chief. However, at least under CBO's interpretation of their approach--which could leave the head of national intelligence with a significantly smaller analytic agency under his immediate control--the chief of national intelligence might be weakened bureaucratically in some ways.

If the problem today is that the Director of Central Intelligence is not independent enough, one might argue that it makes more sense to enhance his independence rather than to eliminate or reduce it. And there may well be ways to do so without eliminating the CIA. For example, an appointment process for the CIA director more akin to that for the board of directors of the Federal Reserve could be expected to reduce the politicization of the agency. At the Federal Reserve, the term of the Chairman does not coincide with that of the President, and the President does not have the authority to fire the Chairman once appointed and confirmed.

The current CIA model--especially in cases where the director is relatively nonpartisan and highly professional--may be more likely to generate objective intelligence than a model placing the Secretary of State at the top of the intelligence community. The latter individual might be more tempted to slant intelligence findings to support the policies of the incumbent Administration. In fairness, however, it should be noted that a stronger intelligence unit within the State Department might in some cases help

might be greeted with skepticism until more intensely scrutinized for their likely impact on the role of the nation's top intelligence official.

The Need to Allocate Resources Optimally

How many imaging satellites does the United States need? Given the constraints of a tight budget, should it buy more of them--and if so, what kinds? Or should it channel more of its resources to specialists in Arabic, or to new sensors for tactical aircraft responsible for reconnaissance in theaters of potential combat, or to improved satellite detectors for missile launch?

Those types of questions must be addressed effectively. They involve, however, complicated matters of advanced technology, intelligence operations, warfighting analysis, and the like. Wrestling with them is probably well beyond the capability of an already-busy Secretary of State who is unlikely to be highly competent in matters of intelligence gathering and analysis anyway. Thus, under the Moynihan approach, key decisions about allocating resources for intelligence probably would fall to a lower-ranking and less prominent individual. Addressing such issues may not be beyond the capabilities of a director of national intelligence as envisioned in the Boren and McCurdy bills. But if charged with all such budgetary responsibilities for the intelligence community, such an individual might need to spend a disproportionate amount of time studying the arcana of technical systems at the expense of providing broader political analysis on a wide array of topics to the President, other parts of the executive branch, and the Congress.

Similar concerns would apply to decisions about how to employ scarce resources during crises and other demanding scenarios. For example, suppose that a crisis occurred in the Persian Gulf while widespread fighting with horrific humanitarian implications was occurring in some other part of the world. To the extent that the geography of these crises placed mutually exclusive demands on satellites, who would choose how to allocate them? Presumably, all top-level officials would choose to dedicate at least some resources to the crisis with the most acute relevance to U.S. national security.

DoD budget and, in all likelihood, better understood by military officials than by diplomats.

Organizational Issues

Restructuring the intelligence community would provide little guarantee in advance that new structures would work any better--or even as well. For example, consolidating analysts more centrally might reduce the healthy competitive dynamic that exists between analysts at different agencies in the community today. Separating analysts from hardware specialists and data "collectors" might lead to poor decisions about how data should be collected and weaken analysts' understanding of the quality and reliability of various data.[14] While changes were being put in place, moreover, the performance of intelligence agencies might well suffer as new procedures and lines of command were worked out.[15]

PRACTICAL ISSUES: TIMING AND BUDGETS

This option, if carried out strictly by reducing the intelligence community's personnel level, would thin its ranks by about 8,000 individuals above and beyond what current plans dictate. Intelligence personnel are being reduced in number by perhaps 3,000 people a year at present. This additional cut, if implemented at that pace, would require about three years beyond 1999 to complete.

At the slightly accelerated pace envisioned in this chapter, however, additional reductions would begin in 1999. They would continue, at a somewhat faster pace, in the years 2000 and 2001. (Organizational structures, top-level chains of command, and missions could, however, change more quickly if desired, perhaps in the next two to three years.)

Under this specific option, some individuals would be leaving their agencies in response to financial incentives--perhaps one-time payments

comparable to a year's salary--that would delay the realization of significant cost savings by about a year. The government's savings--initially, the difference between their salaries and their retirement pensions--would thus be fully realized beginning in the year 2002 (see Table 9).

TABLE 9. COSTS AND SAVINGS FROM RESTRUCTURING THE INTELLIGENCE COMMUNITY (In billions of dollars)

	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Budget Authority	0	0	0	b	b	b	0.9

SOURCE: Congressional Budget Office.

NOTES: Minus sign indicates costs. Figures in the 1995-1999 period are in current dollars.

a. Average annual savings over the 2000-2004 period, expressed in 1995 dollars. Annual savings rise to $1.0 billion when option is fully phased in.

b. Less than $50 million.

CHAPTER V

CONSOLIDATING PILOT TRAINING

The Department of Defense emphasizes keeping military personnel trained to high levels in the conviction that well-trained fighting forces are most likely to win wars quickly with the lowest loss of life. Training takes place both in institutional or classroom settings and in operational units (for example, in air wings or battalions or on ships). Classroom or individual training is designed to provide operational forces with personnel who are ready to carry out their duties effectively.

DoD trains almost 200,000 students in classrooms on an annual basis, equal in number to about five large state universities. Each of the services relies on large administrative agencies to provide this classroom or individual training, which includes both beginning and advanced training as well as refresher training that continues throughout the military service member's career. DoD trains its personnel in a wide variety of skills, including how to provide basic first aid, operate and repair weapons, exercise military leadership, and a myriad of other skills that contribute to a successful fighting force.

A number of experts believe that large segments of this training could be consolidated. For example, Senator Sam Nunn suggested that both basic and advanced training might be areas for consolidation. Many people believe that consolidation could both save money at a time when funds for defense are increasingly difficult to find and produce a more coordinated fighting force at a time when the services are emphasizing joint operations more than ever before. This chapter considers an illustrative option that would consolidate undergraduate pilot training for the four services.

RATIONALES FOR CONSOLIDATING PILOT TRAINING

Former Senator Barry Goldwater's remark that the United States is the only

fighters for the Navy or the Air Force. At the same time, he noted that consolidation would also be justified for basic helicopter training for the same reasons. In fact, Senator Goldwater, himself a helicopter pilot, strongly advocated consolidating helicopter training to then Secretary of Defense Caspar Weinberger in 1983, suggesting that "as long as the thing stays up and hovers or goes where you want it to, there is no difference whether you are over water or land. . . . [Hence, separate Navy and Army helicopter training programs are] not only expensive and redundant, but a complete waste of equipment and personnel."[1]

As further evidence of the potential for consolidation, Senator Nunn observed that the Air Force and Navy had decided to develop and buy a common trainer aircraft--the Joint Primary Aircraft Training System (JPATS). Consolidating pilot training was also one of the few suggestions by Senator Nunn that was endorsed in the report on roles and missions by the former Chairman of the Joint Chiefs of Staff, General Colin Powell.[2] In March 1993, then Secretary of Defense Les Aspin called on the services to develop a plan to carry out the recommendations in the JCS report.

Despite these recommendations, current service plans call for the Navy and Air Force each to exchange (rather than consolidate) one squadron of primary aviation students and their instructors by 1998. By that time, this program would affect only 200 students each year, less than 10 percent of the total undergraduate pilot trainees at that time. The current plan envisions gradually expanding the program as the JPATS trainer aircraft are delivered between 1998 and 2010. Based on initial estimates, the services did not anticipate that adopting joint primary fixed-wing pilot training would yield any significant savings. After more than a year, the most recent evaluation of the contentious issue of consolidating helicopter training throughout the services--the 18th study effort conducted over the last 30 years--remains in limbo with no study results reported thus far. Despite this very gradual and cautious approach to joint training adopted so far by the services, they may now be ready to consider moving more quickly because of the precipitous drop in pilot training requirements.

Pilot Requirements Have Dropped in the Last Decade

With the drawdown in force structure, all the services need far fewer pilots than previously. Collectively, total flight training loads--a measure of training that takes into account the length of a course--dropped from 7,500 in 1983 to 3,840 in 1995, a reduction of almost 50 percent.[3] Undergraduate flight training loads, which make up the bulk of flight training, dropped by similar percentages, from almost 5,500 to 2,700 in the same period.[4] Over the last decade, the services have reduced the number of bases on which flight training is conducted from 15 to 12, reducing capacity to train students by about 20 percent.[5] Consolidating flight training could reduce the number of flight training bases, which clearly has not kept pace with the precipitous drop in the need to train pilots.

Based on current estimates of their "steady-state" requirements in 1997--when the drawdown is currently scheduled to be completed--the services believe they will need to train about 2,700 new pilots each year, about the same as today's level. (Total flight training requirements--including navigators and advanced training as well as undergraduate training--are also projected to be at today's level.) Based on the amount of training conducted in the past at the 12 flight training bases in use today, the services together have almost twice as much capacity to train pilots as they will need.

Even without consolidation, this drop in the number of pilots to be trained suggests that the services need far fewer flight training bases than exist today. The Navy, in fact, included one flight training base in its 1993 recommendation for base closure that the 1993 Defense Base Closure and Realignment Commission deleted. Consolidation, however, could well permit the services to close additional bases, since after consolidation some bases otherwise would be only partially used. As part of the ongoing review of base infrastructure for the 1995 Defense Base Closure and Realignment Commission, DoD is looking at consolidating pilot training and options for closure.

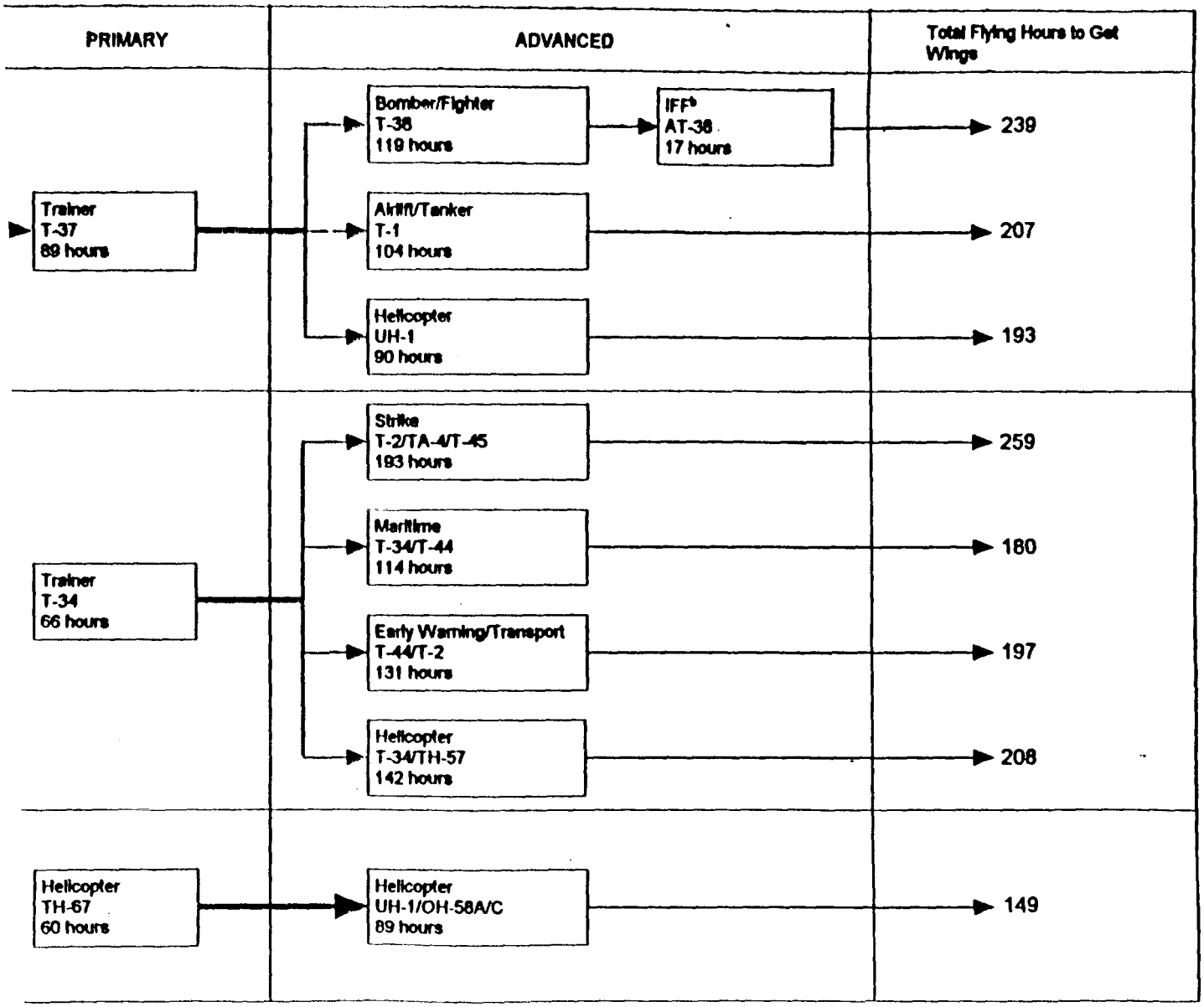
Undergraduate Flight Training Is Similar

What opportunities exist to consolidate flight training and what would be gained? According to DoD's 1992 Trainer Aircraft Master Plan, undergraduate training systems among the services "resemble each other to a remarkable degree" even though the services use a variety of different trainer aircraft.[6] All Army pilots and more than one-third of Navy and Marine Corps pilots learn to fly rotary-wing helicopters, and almost all Air Force pilots train to operate fixed-wing aircraft. All the services rely on a primary phase of general or "core" training, followed by specialized training in a particular type of aircraft. At the end of training, pilots earn their "wings" and generally are assigned to a special squadron where they may receive additional training on the specific aircraft that they will fly in a unit. (Army helicopter pilots are assigned to an operational squadron immediately after receiving their wings.) Consolidating fixed-wing training and consolidating rotary-wing training in this primary phase could yield significant savings.

There are, however, some differences in flight training among the services. The length of undergraduate flight training varies from 39 weeks for Army helicopter pilots to a year and a half for Navy strike pilots. Syllabus length is also measured by the number of practice flight hours that students receive. The number of hours varies by the type of aircraft, the complexity of the training, and the amount of on-the-job training that students receive in operational squadrons. For undergraduate training, syllabus flight hours vary from 149 hours for an Army helicopter student to 259 hours for a Navy strike pilot (see Figure 1). All trainees in both the Navy and the Air Force participate in a primary phase of fixed-wing training; Navy student pilots fly first in the relatively simple T-34 prop aircraft, and Air Force students primarily in the T-37 jet trainer. When the new JPATS trainer is delivered starting in 1998, the Navy and Air Force are anticipating that this primary phase will be the same length and in the same aircraft.

At the end of this primary phase, pilots are selected for further training in either a particular type of fixed-wing aircraft--including the most demanding [illegible] as a helicopter. Navy (and Marine Corps) students

RAINING PATHS IN THE AIR FORCE, NAVY, AND ARMY
aircraft)



Department of Defense data
lacing the T-41.

Almost all Air Force pilots fly fixed-wing aircraft. Until this year, the Air Force simply preselected its few helicopter pilots, rather than following the Navy practice of using primary training as a screen for selection.

All helicopter students also receive a primary phase of training that is similar among the services. Air Force and Navy helicopter trainees, however, receive about 25 percent more hours altogether than Army helicopter pilots (see Figure 1). Part of this difference may be explained by variations in requirements for instrument training among the services and part may reflect the Navy and Air Force practice of relying on initial fixed-wing training as a way to select those pilots who will be assigned to the more demanding fixed-wing versus the helicopter track.

Such flight training is expensive. The cost of this lengthy, complex, and capital-intensive training ranges from almost $300,000 to produce an Army helicopter pilot to almost $1 million to produce a Navy strike pilot. These figures include not only the cost of the training itself but also a proportionate share of overhead training-base costs and the salaries of those military personnel who conduct or undergo the training. Overhead costs per student would be lower if training were consolidated on fewer bases.

Investment in New Trainer Aircraft Would Be High

The Department of Defense is in the process of developing, procuring, and fielding several new aircraft to be used for undergraduate pilot training. The Air Force and Navy are developing a new trainer aircraft, the JPATS. Consolidating undergraduate training among the services would allow DoD to delay as well as reduce the size of the JPATS purchase. The JPATS will take the place of the Air Force's T-37 dual engine, side-by-side, jet trainer and the Navy's T-34 prop trainer. The Navy and Air Force plan to buy more than 700 aircraft. The cost of the Air Force's program, including purchase of 372 airplanes, totals about $4 billion. The Navy plans to buy almost the same number of aircraft but has not as yet provided a detailed cost estimate to the

The Army is buying 137 TH-67 or New Training Helicopters--a variation of a commercial helicopter--to replace its current trainer, the UH-1, an old Vietnam-vintage helicopter. The new TH-67 is similar to the single-engine, dual-seat TH-57B/C helicopter currently used for Navy training.

CONSOLIDATING UNDERGRADUATE PILOT TRAINING NOW

Both fixed- and rotary-wing training are candidates for consolidation. Navy and Air Force fixed-wing pilots could train together for at least a portion of their undergraduate curriculum. All undergraduate training for Army, Marine Corps, Navy, Air Force, and Coast Guard rotary-wing, or helicopter, pilots might also be combined.

Air Force and Navy Could Adopt a Common Core in Fixed-Wing Training

Fixed-wing flight training could be consolidated without waiting for delivery of the new JPATS trainer. Capitalizing on similarities in the skills learned during the initial phase of fixed-wing flight training, this option assumes that all Navy and Air Force fixed-wing pilots would undergo common core training using the T-34 aircraft. That step would maximize training in the T-34 aircraft, which is cheap to operate and should be available in roughly sufficient numbers to train both Navy and Air Force pilots at least through the middle of the next decade.[7] Based on a service life of 18,000 hours, large-scale retirements of T-34 aircraft might begin around 2004. But according to informal conversations with the Navy, T-34s could last considerably longer since they have no structural problems. One service could conduct this initial phase of primary training at two bases compared with the four bases used now.

Under this option, the Air Force and Navy would no longer train all pilots--including those who are selected to become helicopter pilots--in fixed-wing aircraft. Instead, both services would assign students to either a fixed-wing or a helicopter track based on initial flight aptitude and other tests, as was the Air Force practice until this year. This option would enable DoD to

Each service could then conduct its own specialized training that would vary by mission and service (for example, fighter/strike or airlift/tanker). During this phase, Navy and Air Force fixed-wing students would continue training in mission-specific aircraft. (The services are currently also considering consolidating specialized follow-on, navigator, and advanced training, but these consolidations are not examined in this option.) Both services would use the JPATS for this primary training when it becomes available; in the interim, both the Air Force and the Navy would use the T-34 aircraft. By relying on the T-34 aircraft for most of primary training, the Air Force would fly its T-37 aircraft far less and would no longer face pressure to buy the JPATS to replace the T-37 aircraft, of which large-scale retirements would begin by 2005. Eventually, probably toward the end of the first decade of the 21st century, the services would need to buy the JPATS to replace the T-34 aircraft used for joint core training.

Services Could Conduct Helicopter Training Jointly

The Navy, Air Force, and Coast Guard's basic helicopter training could also be consolidated under one service and in one location. As with fixed-wing training, this option assumes that primary helicopter training is largely comparable among the services. Instead of the Navy conducting its primary training in the T-34, all Navy and Army students would train in either the Navy's TH-57 or the Army's TH-67 helicopter in one location. The two aircraft are similar, since both helicopters are derivatives of the same commercial model, and aircraft from one service could be transferred to the training base that is selected. Because the number of helicopter students is so much lower than anticipated before the drawdown, DoD is unlikely to need to purchase any additional helicopters to accommodate the Navy pilots who currently train in the T-34 fixed-wing trainer.

After this initial phase of consolidated training, pilots receive additional training in the use of instruments and the specific combat skills required for their mission. For example, Army helicopter pilots must rely primarily on [illegible] "map of the earth"--and must learn to pop up and down

trained as fixed-wing and as helicopter pilots without the benefit of reviewing initial student flying performance. If it no longer provided fixed-wing training to its helicopter pilots, however, the Navy could buy about 120 fewer JPATS aircraft, reducing its purchase by about one-third and probably saving more than $500 million.[8] This consolidation would probably entail some rearrangement of the syllabus so that common types of training (for example, familiarization and aerobatics) are conducted first, and service-specific training in the second phase.

ADVANTAGES AND DISADVANTAGES OF CONSOLIDATION

Consolidating both fixed-wing and helicopter training would result in significant total savings of $1.3 billion between 1995 and 1999 from delaying the research and development and purchase of JPATS aircraft (see Table 10). Purchase of JPATS aircraft could be delayed because the T-34, the Navy's current trainer, would take over most of the Air Force's fixed-wing training, thus relieving pressure on the Air Force's current trainer, the T-37, the aircraft closest to the end of its service life. Since the T-34 has many remaining years of service life and the Navy has a sufficient inventory, purchasing the JPATS would not be necessary until the first decade of the next century. In addition, at that time, DoD would need to purchase about 120 fewer JPATS aircraft altogether because personnel designated as helicopter pilots would no longer initially train in fixed-wing aircraft.

Operating and Support Costs Could Be Lower

Consolidating fixed-wing and helicopter training could also increase the efficiency of the current training infrastructure by reducing training overhead, since all training of a particular type would be conducted at one or two bases. Consolidation would permit the services to close three and possibly four flight training bases, eventually saving about $180 million each year after initial closedown costs based on recent experience (see Table 10).[9] In addition,

conducting the initial primary training jointly with a common syllabus could lead to adopting "best practices" from each service. Consolidation could also foster interservice cooperation, which is increasingly important when joint operations are the most likely way for the United States to respond to crises.

Such savings could be partially offset by higher costs resulting if additional students moved between the primary and later phases of training. Moreover, the Air Force and Navy could face higher maintenance costs as the older T-34 and T-37 aircraft continued in service. The Navy also argues that using the T-34 for initial training of its helicopter pilots is cost-effective because the T-34 may cost about $100 less per hour to operate than the Army's new TH-67 helicopter. Although substituting helicopter for T-34 flight hours would be more costly, this additional cost could be partly offset by the economies realized from centralizing and shortening helicopter training. The current Navy syllabus could be shortened by eliminating flight hours that are not relevant to helicopter pilots. Moreover, the higher costs of training in the

TABLE 10. COSTS AND SAVINGS FROM CONSOLIDATING UNDERGRADUATE PILOT TRAINING (In millions of dollars)

	1995	1996	1997	1998	1999	1995-1999	Long-Term Annual Savings[a]
Acquisition Savings[b]	160	230	270	300	330	1,290	0
Support Savings[c]	-40	-60	60	130	220	310	190
Total	120	170	330	430	550	1,600	190

SOURCE: Congressional Budget Office based on data from the Department of Defense.

NOTE: Minus signs indicate costs. Figures in the 1995-1999 period are in current dollars.

TH-67 total less than $1 million annually. The cost to train Air Force fixed-wing pilots would also be lower because the T-34 costs about $200 less per flying hour than the T-37, saving about $10 million annually.

Some additional one-time costs of $10 million to $20 million could accrue when the Navy or Army is required to move helicopters to the common helicopter training base. These one-time costs, however, are far lower than either the short-term savings in the next five years from the delay of JPATS or the long-term savings from the smaller JPATS purchase and base closures. In addition, base-support costs per student would fall as the remaining bases operate closer to their capacity.

However, delaying purchase of JPATS would mean that the Air Force and Navy would not reap the advantages of using a new trainer until a later date. These advantages include having an ejection seat operable at ground level, a digital cockpit common to aircraft that pilots will later fly, the ability to train at higher altitudes, cockpit redesign to accommodate smaller female pilots, and tandem or back-to-front seating.[10] The Air Force also considers the T-34 aircraft unacceptable for its training needs.

Selecting Fixed-Wing Pilots Could Be More Difficult

The Navy, Air Force, Marine Corps, and Coast Guard would all object to adopting common helicopter training because they prefer that their helicopter pilots receive initial training in a fixed-wing aircraft. This preference reflects the Navy's belief that an initial period of fixed-wing training improves its ability to select the highest-quality pilots for such training, as well as Marine Corps and Coast Guard interest in developing pilots who can fly either fixed- or rotary-wing aircraft. The Coast Guard might have more of a problem with giving up training in both fixed- and rotary-wing aircraft because a higher proportion of Coast Guard pilots than pilots in the services fly both types of aircraft. Consolidation, however, is likely to save additional funding and could more than offset any additional costs the Coast Guard might need to incur to provide additional training at a later date to those pilots who need fixed-wing skills.

wing aircraft. Additional training, with the associated costs, could be provided for those helicopter pilots who make a transition at a later date to a fixed-wing aircraft.

Most problematic to the Navy would be giving up the opportunity to use initial fixed-wing training to select those most qualified for strike aircraft, the most demanding training requiring the highest-quality students. A recent study by the Center for Naval Analyses (CNA) suggests that relying solely on preflight aptitude tests to select strike students could slightly reduce the quality of pilots available for fixed-wing assignments. A drop in quality could then increase attrition in follow-on training, thereby raising total costs. (At the same time, it could presumably also increase the quality of helicopter pilots, reducing attrition in that pipeline.) If the Navy wanted to maintain the current quality of fixed-wing students, the number of students entering initial flight training would need to be greater to offset any increase in attrition. A larger pipeline and higher attrition would increase training costs.

Although the CNA study estimated that assigning students based solely on initial test scores would be slightly less accurate than the current practice of relying on initial flight performance, the difference in the quality of students appears to be small.[11] To offset any potential drop in the quality of strike pilots, however, the Navy could adopt selection procedures to maximize the number of high-quality students assigned to the strike track, where quality is most important. For example, the Navy could assign all high-quality students to strike aircraft training even if they voiced a preference for other, less demanding fixed-wing aircraft. (Some Navy student pilots already do not get their first or even their second choice in specialization.)[12] The Navy could also choose to train students with slightly lower initial aptitude scores in strike aircraft, since the quality of students is currently quite high. Alternatively, the Navy could increase its intake of students by a small amount to offset any potential drop in quality, which would slightly increase costs.[13]

Despite these potential drawbacks, consolidation is likely to result in considerable savings, reduce the size of the support infrastructure, and

increase cooperation among the services, which is becoming more essential as DoD draws down military forces and lives within a limited budget.

United States General Accounting Office

GAO

Fact Sheet for the Honorable
Vic Fazio, House of Representatives

September 1990

MILITARY BASES

Information on Air Logistics Centers

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-240995

September 10, 1990

The Honorable Vic Fazio
House of Representatives

As you requested, we obtained selected data on the performance and capacity for depot maintenance operations at the five Air Force Air Logistics Centers (ALC). The five ALCs are Ogden ALC, Hill Air Force Base, Utah; Oklahoma City ALC, Tinker Air Force Base, Oklahoma; Sacramento ALC, McClellan Air Force Base, California; San Antonio ALC, Kelly Air Force Base, Texas; and Warner Robins ALC, Robins Air Force Base, Georgia.

Results in Brief

Each ALC is assigned responsibility for maintaining, modifying, and repairing specific types of aircraft, engines, and reparable parts. The ALCs have different missions and facilities and consequently cross comparisons between them are of limited value, according to Air Force officials.

Some indicators of performance are the number of aircraft on which maintenance is completed, the number of engines and other items repaired, and labor hours expended annually on depot maintenance. For example, in fiscal year 1989, the number of aircraft on which maintenance was completed ranged from 62 at the San Antonio ALC to 291 at the Ogden ALC; however, the type of aircraft were different, and the nature and extent of maintenance performed may have varied. Only two ALCs repair aircraft engines. In fiscal year 1989, 5,029 engines were repaired at the San Antonio ALC and 1,372 were repaired at the Oklahoma City ALC.

Some indicators of capacity are the size of maintenance facilities and the depot maintenance work force. For example, the square footage of facilities, such as hangars, machine shops, and test facilities, ranged from 2.7 million at the Warner Robins ALC to 3.9 million at the San Antonio ALC.

1, 1990. One option being considered is to increase the work performed by one military service for another. The Air Force is considering the possibility of reducing or perhaps removing all depot maintenance activity from one ALC. Air Force Logistics Command officials told us that performance is not a major factor in their analysis of options to reduce or possibly remove aircraft maintenance work from one ALC.

Scope and Methodology

The data contained in this fact sheet were obtained at the Air Force Logistics Command in Dayton, Ohio. We did not verify or analyze the data or question the methodology used to compile it. Because of our limited objective, we did not determine the reasons for, or the significance of, changes or trends in data. Based on discussions with Air Force Logistics Command officials and our review of documentation, we judgmentally selected which indicators of performance and capacity on which to collect data. We conducted our work during August 1990.

Because of the short time available to complete our work, we did not obtain written agency comments on this fact sheet. However, Office of the Secretary of Defense and Air Force officials did review our draft and cautioned us about comparing ALCs based on performance data. Air Force Logistics Command officials stated that they do not generally make direct comparisons because of the unique work loads, operations, and specialized facilities of each Center. For example, officials said it is difficult to compare the B-1B and F-16 aircraft on selected performance indicators because of inherent differences in systems, the types of maintenance problems encountered, and the years of available maintenance experience. These officials noted that while comparing a Center's actual performance against its plan is an appropriate management tool for the Center Commander, it may not be meaningful to compare centers that maintain different systems.

Appendix I provides data on indicators of production, productivity, quality, resources and capacity, and financial information. Appendix II briefly describes the depot maintenance missions assigned to the five

Please contact me at (202) 275-8412 if you or your staff have any questions concerning this fact sheet.

Sincerely yours,

Donna M. Heivilin
Director, Logistics Issues

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Depot Maintenance Data for Air Force Air Logistics Centers

This appendix presents selected performance and capacity data on depot maintenance operations at the five ALCs. The data show the maintenance work accomplished by ALC personnel. Data does not include work accomplished by contractors and through interservice agreements. Air Force officials cautioned against making direct comparisons among the ALCs on individual performance indicators because of differences in work loads and specialized operations assigned to each ALC.

Production

Table I.1 shows the number of aircraft on which maintenance work was completed. Maintenance work includes programmed depot maintenance, inspections, and modifications.

Table I.1: Aircraft Work Completed

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	445	492	340	256	291
Oklahoma City	173	215	191	148	126
Sacramento	295	264	243	224	222
San Antonio	67	71	81	64	62
Warner Robins	296	207	158	125	189

Table I.2 shows the number of reparables on which work was completed. Reparable items are subsystems and components of weapon systems and equipment, such as avionics, life support equipment, and flight control instruments. The Air Force also refers to reparables as exchangeables.

Table I.2: Reparable Work Completed

Items in thousands

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	152	160	165	128	119
Oklahoma City	287	291	276	212	195
Sacramento	201	193	184	150	155

Table I.3: Engine Work Completed

Air Logistics Center	Fiscal year 1985	1986	1987	1988	1989
Oklahoma City	1,271	1,573	1,250	1,093	1,372
San Antonio[a]	7,031	7,034	6,697	5,575	5,029

[a]San Antonio engine work load includes engine modules and gas turbine engines.

Table I.4 shows the actual hours of direct labor expended annually on depot maintenance.

Table I.4: Direct Production Hours

Labor hours in thousands

Air Logistics Center	Fiscal year 1985	1986	1987	1988	1989
Ogden	8,512	8,888	8,370	7,412	7,980
Oklahoma City	9,780	10,560	10,361	8,873	8,657
Sacramento	7,578	7,905	7,686	6,771	6,710
San Antonio	9,281	9,637	9,566	8,542	9,107
Warner Robins	7,693	7,914	7,752	7,037	7,837

Productivity

Table I.5 shows the extent to which each ALC completed scheduled maintenance on time. It compares the number of aircraft completed on schedule to the total number worked on. We were unable to readily obtain data for fiscal years 1985 and 1986.

Table I.5: Percent of Aircraft Maintenance Completed on Time

Air Logistics Center	Fiscal year 1987	1988	1989
Ogden	100	100	99
Oklahoma City	100	97	99
Sacramento	95	96	100
San Antonio	82	40	35
Warner Robins	88	34	46

Table I.6: Average Daily Hours of Direct Labor Per Maintenance Employee

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	3.91	4.00	3.96	3.86	3.79
Oklahoma City	3.48	3.60	3.94	3.84	3.78
Sacramento	4.12	4.08	4.11	3.84	3.92
San Antonio	3.87	4.13	4.20	3.87	3.96
Warner Robins	3.92	4.00	4.05	3.90	3.94

Table I.7 shows the ALC-reported productivity savings resulting from a number of programs, including employee quality teams, work methods improvements, and capital investments to incorporate new technologies.

Table I.7: Estimated Productivity Savings

Dollars in millions

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	$33	$35	$42	$52	$80
Oklahoma City	33	37	40	13	21
Sacramento	21	39	47	29	49
San Antonio	141	66	117	162	144
Warner Robins	33	58	55	69	66

Quality

Table I.8 shows the number of reparables reported defective by the customer (user) expressed as a percent of total units repaired during the fiscal year.

Table I.8: Customer Quality Complaint Rates

	Fiscal year			
Air Logistics Center	**1986**	**1987**	**1988**	**1989**
Ogden	1.72	1.66	1.65	1.66
Oklahoma City	.81	.72	.84	.88
Sacramento	1.46	1.60	1.44	1.31
San Antonio	.50	.44	.61	.59

Table I.9: Maintenance Facilities

Dollars in millions

Air Logistics Center	Buildings/area (Square feet in millions)	Average age of facilities (Years)	Replacement cost
Ogden	302/3.6	34	$316
Oklahoma City	45/3.3	33	806
Sacramento	128/3.8	28	634
San Antonio	65/3.9	34	400
Warner Robins	68/2.7	28	207

Table I.10 shows the average age and estimated replacement cost of the industrial plant equipment used in maintenance. Equipment includes such machinery as spot welders, drilling machines, lathes, grinders, and special test equipment.

Table I.10: Maintenance Equipment

Dollars in millions

Air Logistics Center	Average age of equipment (Years)	Replacement cost
Ogden	11	$585
Oklahoma City	16	477
Sacramento	13	435
San Antonio	11	460
Warner Robins	11	545

Table I.11 shows the total number of workyears expended on depot maintenance during fiscal year 1989. The work force includes mechanics, machinists, welders, and electricians as well as managers and administrative staff.

Table I.11 Fiscal Year 1989 Depot Maintenance Work Force

Air Logistics Center	Civilian	Military	Total
Ogden	6,696	177	**6,873**
Oklahoma City	8,085	[illegible]	[illegible]

Financial Information

Table I.12 shows total revenues from depot maintenance performed by ALC personnel and related expenses for each Center. Operating result (gain or loss) is a reflection of how closely an ALC met its financial plan.

Table I.12: Fiscal Year 1989 Financial Operating Results

Dollars in millions

Air Logistics Center	Revenues	Expenses	Net operating result
Ogden	$349	$368	($19)
Oklahoma City	530	577	(47)
Sacramento	367	377	(10)
San Antonio	478	530	(52)
Warner Robins	395	436	(41)

Note: Numbers in parentheses indicate operating deficit.

Depot Maintenance Missions Assigned to the Air Logistics Centers

Ogden ALC, Hill Air Force Base, Utah	The Ogden ALC repairs and modifies the F-4, F-16, and C-130 aircraft (a recent addition). The Center also maintains Air Force missile systems and components, including the Peacekeeper, Minuteman, Maverick, and Sidewinder. Ogden is the technology repair center[1] (TRC) for weapons, air munitions, landing gears, reconnaissance/photographic equipment, and training and simulation equipment.
Oklahoma City ALC, Tinker Air Force Base, Oklahoma	Oklahoma City ALC is the source of repair for the B-1B, B-52, C-135, and E-3 aircraft. The Center has also been assigned repair responsibility for the B-2 Stealth bomber. It is also one of the two Centers (San Antonio is the other) that repairs and overhauls jet engines. Oklahoma City is the TRC for automatic flight controls, airframe and engine-related components, engine instruments, and oxygen components.
Sacramento ALC, McClellan Air Force Base, California	Sacramento ALC is the designated source of repair for the F-111, A-7, and A-10 aircraft. The Center recently began F-15 modification work and has been assigned repair responsibility for the Advanced Tactical Fighter. Sacramento is the TRC for electrical components, flight control instruments, tactical shelters, and ground communications-electronics equipment.
San Antonio ALC, Kelly Air Force Base, Texas	The San Antonio ALC maintains and repairs the B-52 and C-5 aircraft. The Center has been designated the source of repair for the C-17 aircraft. The Center also repairs and overhauls a large number of engines and engine modules. The Center is the TRC for electronic aerospace ground equipment, electro-mechanical support equipment, nuclear components, and automatic test equipment.
Warner Robins ALC, Robins Air Force Base, Georgia	Warner Robins ALC repairs and modifies the F-15, C-141, and C-130 aircraft. The Center is the TRC for life support systems, propellers, and airborne electronics. The airborne electronics work load includes more than

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Fact Sheet for the Honorable
Vic Fazio, House of Representatives

September 1990

MILITARY BASES

Information on Air Logistics Centers

FRANK A. CIRILLO, JR., P.E.

GAO

Fact Sheet

Vic Fazio, H

September 1990

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(1) Bob

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(5) AF Team File

This is the GAO Report Secured by Roger Hawk as part of the Inter-Agency Team 21 May 93 presentation and referred to in the recent OKC City News Article

Frank

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-240995

September 10, 1990

The Honorable Vic Fazio
House of Representatives

As you requested, we obtained selected data on the performance and capacity for depot maintenance operations at the five Air Force Air Logistics Centers (ALC). The five ALCs are Ogden ALC, Hill Air Force Base, Utah; Oklahoma City ALC, Tinker Air Force Base, Oklahoma; Sacramento ALC, McClellan Air Force Base, California; San Antonio ALC, Kelly Air Force Base, Texas; and Warner Robins ALC, Robins Air Force Base, Georgia.

Results in Brief

Each ALC is assigned responsibility for maintaining, modifying, and repairing specific types of aircraft, engines, and reparable parts. The ALCs have different missions and facilities and consequently cross comparisons between them are of limited value, according to Air Force officials.

Some indicators of performance are the number of aircraft on which maintenance is completed, the number of engines and other items repaired, and labor hours expended annually on depot maintenance. For example, in fiscal year 1989, the number of aircraft on which maintenance was completed ranged from 62 at the San Antonio ALC to 291 at the Ogden ALC; however, the type of aircraft were different, and the nature and extent of maintenance performed may have varied. Only two ALCs repair aircraft engines. In fiscal year 1989, 5,029 engines were repaired at the San Antonio ALC and 1,372 were repaired at the Oklahoma City ALC.

Some indicators of capacity are the size of maintenance facilities and the depot maintenance work force. For example, the square footage of facilities, such as hangars, machine shops, and test facilities, ranged from 2.7

1, 1990. One option being considered is to increase the work performed by one military service for another. The Air Force is considering the possibility of reducing or perhaps removing all depot maintenance activity from one ALC. Air Force Logistics Command officials told us that performance is not a major factor in their analysis of options to reduce or possibly remove aircraft maintenance work from one ALC.

Scope and Methodology

The data contained in this fact sheet were obtained at the Air Force Logistics Command in Dayton, Ohio. We did not verify or analyze the data or question the methodology used to compile it. Because of our limited objective, we did not determine the reasons for, or the significance of, changes or trends in data. Based on discussions with Air Force Logistics Command officials and our review of documentation, we judgmentally selected which indicators of performance and capacity on which to collect data. We conducted our work during August 1990.

Because of the short time available to complete our work, we did not obtain written agency comments on this fact sheet. However, Office of the Secretary of Defense and Air Force officials did review our draft and cautioned us about comparing ALCs based on performance data. Air Force Logistics Command officials stated that they do not generally make direct comparisons because of the unique work loads, operations, and specialized facilities of each Center. For example, officials said it is difficult to compare the B-1B and F-16 aircraft on selected performance indicators because of inherent differences in systems, the types of maintenance problems encountered, and the years of available maintenance experience. These officials noted that while comparing a Center's actual performance against its plan is an appropriate management tool for the Center Commander, it may not be meaningful to compare centers that maintain different systems.

Appendix I provides data on indicators of production, productivity, quality, resources and capacity, and financial information. Appendix II briefly describes the depot maintenance missions assigned to the five ALCs. Appendix III lists the major contributors to this fact sheet.

Please contact me at (202) 275-8412 if you or your staff have any questions concerning this fact sheet.

Sincerely yours,

Donna M. Heivilin
Director, Logistics Issues

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Depot Maintenance Data for Air Force Air Logistics Centers

This appendix presents selected performance and capacity data on depot maintenance operations at the five ALCs. The data show the maintenance work accomplished by ALC personnel. Data does not include work accomplished by contractors and through interservice agreements. Air Force officials cautioned against making direct comparisons among the ALCs on individual performance indicators because of differences in work loads and specialized operations assigned to each ALC.

Production

Table I.1 shows the number of aircraft on which maintenance work was completed. Maintenance work includes programmed depot maintenance, inspections, and modifications.

Table I.1: Aircraft Work Completed

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	445	492	340	256	291
Oklahoma City	173	215	191	148	126
Sacramento	295	264	243	224	222
San Antonio	67	71	81	64	62
Warner Robins	296	207	158	125	189

Table I.2 shows the number of reparables on which work was completed. Reparable items are subsystems and components of weapon systems and equipment, such as avionics, life support equipment, and flight control instruments. The Air Force also refers to reparables as exchangeables.

Table I.2: Reparable Work Completed

Items in thousands

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	152	160	165	128	119
Oklahoma City	287	291	276	212	195
Sacramento	201	193	184	150	155
San Antonio	186	230	257	167	133

Table I.3: Engine Work Completed

Air Logistics Center	Fiscal year 1985	1986	1987	1988	1989
Oklahoma City	1,271	1,573	1,250	1,093	1,372
San Antonio[a]	7,031	7,034	6,697	5,575	5,029

[a]San Antonio engine work load includes engine modules and gas turbine engines.

Table I.4 shows the actual hours of direct labor expended annually on depot maintenance.

Table I.4: Direct Production Hours

Labor hours in thousands

Air Logistics Center	Fiscal year 1985	1986	1987	1988	1989
Ogden	8,512	8,888	8,370	7,412	7,980
Oklahoma City	9,780	10,560	10,361	8,873	8,657
Sacramento	7,578	7,905	7,686	6,771	6,710
San Antonio	9,281	9,637	9,566	8,542	9,107
Warner Robins	7,693	7,914	7,752	7,037	7,837

Productivity

Table I.5 shows the extent to which each ALC completed scheduled maintenance on time. It compares the number of aircraft completed on schedule to the total number worked on. We were unable to readily obtain data for fiscal years 1985 and 1986.

Table I.5: Percent of Aircraft Maintenance Completed on Time

Air Logistics Center	Fiscal year 1987	1988	1989
Ogden	100	100	99
Oklahoma City	100	97	99
Sacramento	95	96	100
San Antonio	82	40	35

Table I.6: Average Daily Hours of Direct Labor Per Maintenance Employee

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	3.91	4.00	3.96	3.86	3.79
Oklahoma City	3.48	3.60	3.94	3.84	3.78
Sacramento	4.12	4.08	4.11	3.84	3.92
San Antonio	3.87	4.13	4.20	3.87	3.96
Warner Robins	3.92	4.00	4.05	3.90	3.94

Table I.7 shows the ALC-reported productivity savings resulting from a number of programs, including employee quality teams, work methods improvements, and capital investments to incorporate new technologies.

Table I.7: Estimated Productivity Savings

Dollars in millions

	Fiscal year				
Air Logistics Center	**1985**	**1986**	**1987**	**1988**	**1989**
Ogden	$33	$35	$42	$52	$80
Oklahoma City	33	37	40	13	21
Sacramento	21	39	47	29	49
San Antonio	141	66	117	162	144
Warner Robins	33	58	55	69	66

Quality

Table I.8 shows the number of reparables reported defective by the customer (user) expressed as a percent of total units repaired during the fiscal year.

Table I.8: Customer Quality Complaint Rates

	Fiscal year			
Air Logistics Center	**1986**	**1987**	**1988**	**1989**
Ogden	1.72	1.66	1.65	1.66
Oklahoma City	.81	.72	.84	.88
Sacramento	1.46	1.60	1.44	1.31
San Antonio	.50	.44	.61	.59

Table I.9: Maintenance Facilities

Dollars in millions

Air Logistics Center	Buildings/area (Square feet in millions)	Average age of facilities (Years)	Replacement cost
Ogden	302/3.6	34	$316
Oklahoma City	45/3.3	33	806
Sacramento	128/3.8	28	634
San Antonio	65/3.9	34	400
Warner Robins	68/2.7	28	207

Table I.10 shows the average age and estimated replacement cost of the industrial plant equipment used in maintenance. Equipment includes such machinery as spot welders, drilling machines, lathes, grinders, and special test equipment.

Table I.10: Maintenance Equipment

Dollars in millions

Air Logistics Center	Average age of equipment (Years)	Replacement cost
Ogden	11	$585
Oklahoma City	16	477
Sacramento	13	435
San Antonio	11	460
Warner Robins	11	545

Table I.11 shows the total number of workyears expended on depot maintenance during fiscal year 1989. The work force includes mechanics, machinists, welders, and electricians as well as managers and administrative staff.

Table I.11 Fiscal Year 1989 Depot Maintenance Work Force

Air Logistics Center	Civilian	Military	Total

Financial Information

Table I.12 shows total revenues from depot maintenance performed by ALC personnel and related expenses for each Center. Operating result (gain or loss) is a reflection of how closely an ALC met its financial plan.

Table I.12: Fiscal Year 1989 Financial Operating Results

Dollars in millions

Air Logistics Center	Revenues	Expenses	Net operating result
Ogden	$349	$368	($19)
Oklahoma City	530	577	(47)
Sacramento	367	377	(10)
San Antonio	478	530	(52)
Warner Robins	395	436	(41)

Note: Numbers in parentheses indicate operating deficit.

Depot Maintenance Missions Assigned to the Air Logistics Centers

Ogden ALC, Hill Air Force Base, Utah	The Ogden ALC repairs and modifies the F-4, F-16, and C-130 aircraft (a recent addition). The Center also maintains Air Force missile systems and components, including the Peacekeeper, Minuteman, Maverick, and Sidewinder. Ogden is the technology repair center[1] (TRC) for weapons, air munitions, landing gears, reconnaissance/photographic equipment, and training and simulation equipment.
Oklahoma City ALC, Tinker Air Force Base, Oklahoma	Oklahoma City ALC is the source of repair for the B-1B, B-52, C-135, and E-3 aircraft. The Center has also been assigned repair responsibility for the B-2 Stealth bomber. It is also one of the two Centers (San Antonio is the other) that repairs and overhauls jet engines. Oklahoma City is the TRC for automatic flight controls, airframe and engine-related components, engine instruments, and oxygen components.
Sacramento ALC, McClellan Air Force Base, California	Sacramento ALC is the designated source of repair for the F-111, A-7, and A-10 aircraft. The Center recently began F-15 modification work and has been assigned repair responsibility for the Advanced Tactical Fighter. Sacramento is the TRC for electrical components, flight control instruments, tactical shelters, and ground communications-electronics equipment.
San Antonio ALC, Kelly Air Force Base, Texas	The San Antonio ALC maintains and repairs the B-52 and C-5 aircraft. The Center has been designated the source of repair for the C-17 aircraft. The Center also repairs and overhauls a large number of engines and engine modules. The Center is the TRC for electronic aerospace ground equipment, electro-mechanical support equipment, nuclear components, and automatic test equipment.
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Depot Maintenance Missions Assigned to the Air Logistics Centers

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Warner Robins ALC, Robins Air Force Base, Georgia	Warner Robins ALC repairs and modifies the F-15, C-141, and C-130 aircraft. The Center is the TRC for life support systems, propellers, and airborne electronics. The airborne electronics work load includes more than 300 avionics systems and almost 10,000 parts and components.

ISTALLATION TYPE	STA	MAJOR CO	RESOURCES	MAJOR UNITS ASSIGNED	BRAC CATEG	JOINT CROSS-SERVICE GR
Base	AK					
iance Station	AK					
r Base	AK	PAF	18-F16C/D, 12-OA10A,	354th Fighter Wing, Cope Thunder,	Key Excluded	
r Base	AK	PAF	54(51?)-F15/F15E, 10-C	3d Wing, Hq 11 Air Force, Hq, Ala	Key Excluded	
fense Station	AK					
fense Station	AK					
iance Station	AK					
Station	AL					
Base	AL		18-RF4C >8KC135R (L			
Base	AL		15-F16(G), 1-C26(G)	187th Fighter Group (ANG)		
ıg Station	AL					
Station	AL					
cal Training Base	AL	AETC	Schools8-C138(R), 4-C2	42d Air Base Wing, Air University,	Key Excluded	
Station	AR					
12/92 (91 Round)	AR	AFBCA			N/A	
'Training Base	AR	ACC	C130	314th Airlift Wing (c130 Training)	Large AC(A)	
r Base w/"Bone Yard"	AZ	ACC	57-A10, ?-OA10, 16-EC	355th Wing, Hq 12th Air Force, 41s	Small AC *	Depot
	AZ					
r/Training Base	AZ	AETC	122-F16, 31-F15E(-33),	56th Fighter Wing, 944th Fighter Wi	Small AC	
Base	AZ		8-KC135(G)	161st Air Refueling Group(ANG)		
Station	AZ	NGB			ANG	
9/93 (91 Round)	AZ	AFBCA			N/A	
ıaissance Base	CA	ACC	U-2,9-KC135(R),7-T38	9th Reconnaissance Wg,7th Space W	Large AC(T)	
9/95 est (91 Round)	CA	AFBCA			N/A	
ft Test Base	CA	AFMC			Joint Only	Test & Evaluation, Laboratories
Base	CA					
12/92 (88 Round)	CA	AFBCA			N/A	
& Missile Systems Center (	CA	AFMC		Hq Air Force Space and Missile Syst	Joint Only	Laboratories
ned 3/96 est (93 Round)	CA	AFRES			AFRES	
9/93 (88 Round)	CA	AFBCA			N/A	
gistics Center	CA	AFMC	10-KC135(R)Temporary	Sacramento ALC, 77th Air Base Wg	Joint Only	Depot, Test & Evaluation, Labo
Station	CA					
3/94 (88 Round)	CA	AFBCA			N/A	
Center	CA	AFSPC				
Station	CA					
Coast Mobility Base	CA	AMC			Mobility	
Station	CA					
Launch Support Center	CA	AFSPC			Key Excluded	
Base	CO	NGB			ANG	
D Command Center	CO					
Operations Center	CO	AFSPC			Key Excluded	
9/94 (91 Round)	CO	AETC			N/A	
ıce Command Hq Base	CO	AFSPC			Major Hq *	Depot, Laboratories
ion Base	CO	USAFA			Key Excluded	
Station	CT					
Station	CT					
al Capitol Region Support B	DC	AFDW			Key Excluded	

NSTALLATION TYPE	STA	MAJOR CO	RESOURCES	MAJOR UNITS ASSIGNED	BRAC CATEG	JOINT CROSS-SERVICE GR
ft Base	DE	AMC			Large AC(A)	
Station	DE					
aining Range	FL					
Launch Support Center	FL					
e Special Operations Statio	FL					
ighter Base	FL	AFMC			Small AC *	Test & Evaluation, Laboratories
ned 3/94 (93 Round) / Rese	FL	AFRES			AFRES	
ecial Operations Command	FL	AFSOC			Key Excluded	
Station	FL					
ned 9.95 est (91/93 Round)	FL	ACC			Major Hq	
ı Center Support Base	FL	AFSPC			Key Excluded	
/Training Base	FL	AETC			Small AC *	Test & Evaluation
e Base	GA	AFRES			Large AC(T)	
Station	GA					
ınd Composite Wing	GA	ACC	40-F16C, 40-A/OA10, 8	347th Wing, 71st Air Control SQ	Composite	
Airlift Base	GA	AFMC			Large AC(T) *	Depot, Test & Evaluation, Labo
Station	GA					
AF Hq Base	HI	PAF			Key Excluded	
Station	HI					
Air Field	HI				Transferred to A	
Station	IA					
Station	IA					
Station	ID	NGB			ANG	
ervention Composite Wing	ID	ACC			Composite	
Station	IL					
9/93 (88 Round)	IL	AFBCA			N/A	
Station	IL					
Station	IL	AFRES			AFRES	
bility Command Hq Base	IL	AMC			Major Hq	
Station	IN					
9/94 (91 Round) / Reserve	IN	AFRES			AFRES	
Station	IN					
Station	KS					
nker Base	KS	AMC			Large AC(T)	
tation	KY					
/Training Base	LA	ACC			Large AC(B)	
2/92 (91 Round)	LA	AFBCA			N/A	
tation	LA					
tation	MA					
	MA					
ory and Systems Center	MA	AFMC	No Flying Mission	Hq Electronic Systems Center, Geop	Joint Only	Laboratories
ase	MA	NGB			ANG	
ation	MA					
Base	MA	AFRES			AFRES	
ation	MA					
tial/Congressional Airlift	MD	AMC			Key Excluded	
ation	MD	NGB			ANG	

NSTALLATION TYPE	STA	MAJOR CO	RESOURCES	MAJOR UNITS ASSIGNED	BRAC CATEG	JOINT CROSS-SERVICE GR
Station	ME					
l 9/94 (91 Round)	ME	AFBCA			N/A	
Station	ME					
l 9/95 est (93 Round)	MI	ACC			N/A	
Base	MI	NGB			ANG	
Station	MI					
Station	MN					
e Station	MN	AFRES			AFRES	
Station	MO					
Station	MO	NGB			ANG	
9/94 (91 Round) / Reserve	MO					
Station	MO					
r Base	MO	ACC			Large AC(B)	
Station	MS					
Training Base	MS	AETC			Joint Only	Undergraduate Pilot Training
Station	MS					
cal Training Base	MS	AETC			Tech Trng	
Station	MS					
Station	MT					
/Missile Base	MT	AMC			Large AC(T)(M)	
Station	NC					
Station	NC					
d Composite Wing	NC	ACC			Composite	
Base	NC	ACC			Small AC	
upport Station	ND					
anker/Missile Base	ND	AMC			Large AC(T)(M)	
Station	ND					
/Missile Base	ND	ACC			Large AC(B)(M)	
Station	NE					
rategic Command Hq Base	NE	ACC			Major Hq	
	NH					
tation	NH	AFBCA			N/A	
tation	NJ					
ast Mobility Base	NJ	AMC			Mobility	
Base	NM	ACC			Small AC	
Base	NM	ACC			Small AC *	Test & Evaluation
/Helocopter Training Bas	NM	AFMC			Joint Only *	Test & Evaluation, Laboratories
	NV					
e Weapons Center/Fighte	NV	ACC			Key Excluded *	Test & Evaluation
tation	NV					
	NV					
d 9/95 est (93 Round) / R	NY	ACC			Joint Only (Rom	Laboratories
ation	NY					
Station	NY	AFRES			AFRES	
/95 est (93 Round)	NY	AMC			N/A	
ation	NY					
ation	NY					

NSTALLATION TYPE	STA	MAJOR CO	RESOURCES	MAJOR UNITS ASSIGNED	BRAC CATEG	JOINT CROSS-SERVICE GR
Station	NY	NGB			ANG	
Station	NY					
Station	OH					
l 12/96 est (93 Round)	OH					
Station	OH					
l 9/96 est (93 Round)	OH	AFMC			N/A	
l/"Reopened" (91/93 Round	OH	NGB			ANG	
Station	OH					
Station	OH					
aterial Command Hq Base	OH	AFMC			Major Hq *	Laboratories
Tanker/Training Base	OK	AETC			Large AC(T)(A)	
Reconnaicance Base	OK	AFMC	22-E3, 3-E/C135, #-E6(	72d Air Base Wing, 552d Air Contr	Large AC(T) *	Depot, Test & Evaluation, Labo
Station	OK					
Training Base	OK	AETC			Joint Only	Undergraduate Pilot Training
Station	OK					
Station	OR					
Station	OR	NGB			ANG	
Station	PA	AFRES			AFRES/ANG	
Station	PA					
e Station	PA					
Station	RI					
Station	RI					
Station	RI					
Operations	SC	AMC	13-C17, 32-C141	437thAirlift WING, 315TH aw(afres	Large AC(A)	
Base	SC	NGB			ANG	
3/93 (91 Round)	SC	AFBCA			N/A	
Base	SC	ACC	54-F16, 21-A10	20th Fighter Wing, 9th Air Force, 7	Small AC	
Base	SD	ACC	32-B1, 4-HH1	28th Bomb Wing	Large AC(B)	
Station	SD					
h/Lab Base	TN	AFMC			Joint Only	Test & Evaluation
Station	TN					
Station	TN					
Station	TN					
9/93 (91 Round) / Reserve	TX	AFRES			AFRES	
ory Base	TX	AFMC			Joint Only	Laboratories
9/93 (91 Round) / Naval R	TX	AFRES			AFRES	
Base	TX	ACC	36-B1, 42-C130	7th Wing, 39th & 40th Airlift Squad	Large AC(B)	
	TX					
tation	TX					
tation	TX					
al Training Base	TX	AETC			Tech Trng	
ir lift Base	TX	AFMC	ALC, 15-F16(G), 14-C5(	San Antonio ALC, 76th Air Base W	Large AC(A) *	Depot, Test & Evaluation, Labo
tation	TX					
al Training Base	TX	AETC			Tech Trng	
raining Base	TX	AETC	46-T37,49-T38, 39-T1A	47th Flying Training Wg	Joint Only	Undergraduate Pilot Training
ning & Education Comma	TX	AETC			Joint Only	Undergraduate Pilot Training
raduate Pilot Training	TX	AETC	35-T1, 50-T37, 59-T38	64th Flying Training Wg	Joint Only	Undergraduate Pilot Training

STALLATION TYPE	STA	MAJOR CO	RESOURCES	MAJOR UNITS ASSIGNED	BRAC CATEG	JOINT CROSS-SERVICE GR
:al Training Base	TX	AETC			Joint Only	
;istics Center & Fighter Op	UT	AFMC	ALC, 55-F16, 18-F16(R)	Ogden ALC, 545th Test Group(Utah	Small AC *	Depot, Test & Evaluation, Labo
Station	UT	NGB			ANG	
nbat Command Hq/Fighter	VA	ACC			Major Hq	
Station	VA					
Station	VT					
anker Base	WA	ACC	60-KC135, 3-UH1, 7-C1	92d Air Refueling Wing, 336th Cre	Large AC(T)	
Station	WA					
: Base	WA	AMC			Large AC(A)	
Station	WA					
Base	WI					
: Station	WI	AFRES			AFRES	
Station	WI					
Station	WV					
Station	WV					
Station	WY					
Base	WY	AFSPC	MMIII, Pease Keeper M		Key Excuded	
nge	TT					
Combat Staging Base	GU	PAF			Key Excluded	
Station	PR					
Station	CA					
Base	AK					
5/93 (91 Round)	MI	AFBCA			N/A	
Station	OH	AFRES			AFRES	
ory	AZ	AFMC			Joint Only	Laboratories
Logistics Agency Support	MI	AFMC			Key Excluded	

Air Force Materiel Command

Headquarters Wright-Patterson AFB, Ohio

Established July 1, 1992

Commander Gen. Ronald W. Yates

Air Force Materiel Command

Headquarters, Wright-Patterson AFB, Ohio

Commander
Gen. Ronald W. Yates

Development

Space and Missile Systems Center
Los Angeles AFB, Calif.
Phillips Laboratory, Kirtland AFB, N. M.

Electronic Systems Center
Hanscom AFB, Mass.
Rome Laboratory, Griffiss AFB, N. Y.

Aeronautical Systems Center
Wright-Patterson AFB, Ohio
Wright Laboratory
Wright-Patterson AFB, Ohio

Human Systems Center
Brooks AFB, Tex.
Armstrong Laboratory, Brooks AFB, Tex.

Test

Air Force Flight Test Center
Edwards AFB, Calif.

Air Force Development Test Center
Eglin AFB, Fla.

Arnold Engineering Development Center
Arnold AFB, Tenn.

Operational Support

Ogden Air Logistics Center
Hill AFB, Utah

Oklahoma City Air Logistics Center
Tinker AFB, Okla.

Sacramento Air Logistics Center
McClellan AFB, Calif.

San Antonio Air Logistics Center
Kelly AFB, Tex.

Warner Robins Air Logistics Center
Robins AFB, Ga.

Specialized Support

Aerospace Guidance and Metrology Center
Newark AFB, Ohio

Aerospace Maintenance and Regeneration Center
Davis-Monthan AFB, Ariz.

Cataloging and Standardization Center
Battle Creek, Mich.

Air Force Security Assistance Center
Wright-Patterson AFB, Ohio

MISSIONS

Manage the integrated research, development, test, acquisition, and sustainment of weapon systems
Produce and acquire advanced systems
Operate "superlabs," major product centers, logistics centers, and test centers
Operate the USAF School of Aerospace Medicine and USAF Test Pilot School

FORCE STRUCTURE

Four major product centers
Four superlaboratories
Three test centers

An engine maintenance specialist operates a high-speed grinder at Kelly AFB, Tex., in overhauling a TF39 engine for the C-5 airlifter fleet. The San Antonio Air Logistics Center at Kelly is one of five Air Force Materiel Command ALCs providing life-cycle repair and maintenance for

UNIT	BASE
Aeronautical Systems Center	Wright-Patterson AFB, Ohio
Electronic Systems Center	Hanscom AFB, Mass.
Human Systems Center	Brooks AFB, Tex.
Space and Missile Systems Center	Los Angeles AFB, Calif.
Armstrong Laboratory	Brooks AFB, Tex.
Phillips Laboratory	Kirtland AFB, N. M.
Rome Laboratory	Griffiss AFB, N. Y.
Wright Laboratory	Wright-Patterson AFB, Ohio
Arnold Engineering Development Center	Arnold AFB, Tenn.
Air Force Development Test Center	Eglin AFB, Fla.
Air Force Flight Test Center	Edwards AFB, Calif.
Ogden Air Logistics Center	Hill AFB, Utah
Oklahoma City Air Logistics Center	Tinker AFB, Okla.
Sacramento Air Logistics Center	McClellan AFB, Calif.
San Antonio Air Logistics Center	Kelly AFB, Tex.
Warner Robins Air Logistics Center	Robins AFB, Ga.
Aerospace Guidance and Metrology Center	Newark AFB, Ohio
Aerospace Maintenance and Regeneration Center	Davis-Monthan AFB, Ariz.
Air Force Security Assistance Center	Wright-Patterson AFB, Ohio
Cataloging and Standardization Center	Battle Creek, Mich.

COMMAND NOTES

Air Force Materiel Command delivers warfighting capability to the Air Force, providing resources and people to research, acquire, and sustain weapon systems. The Air Force Office of Scientific Research directs the service's basic science and engineering research program. Four superlabs further develop technologies for four product centers that develop and acquire the weapon systems. AFMC evaluates the systems in three test centers. Five Air Logistics Centers provide life-cycle weapon system sustainment, maintenance, and repair. Specialized centers handle other development and sustainment tasks. Aircraft and missiles are retired and recycled at AFMC's Aerospace Maintenance and Regeneration Center.

AFMC operates forty-three types of aircraft. It supports USAF's 10,500 aircraft and approximately 32,000 engines. The command's investment in research, test, and manufacturing capability would cost more than $33.7 billion to replace.

Air Force Space Command

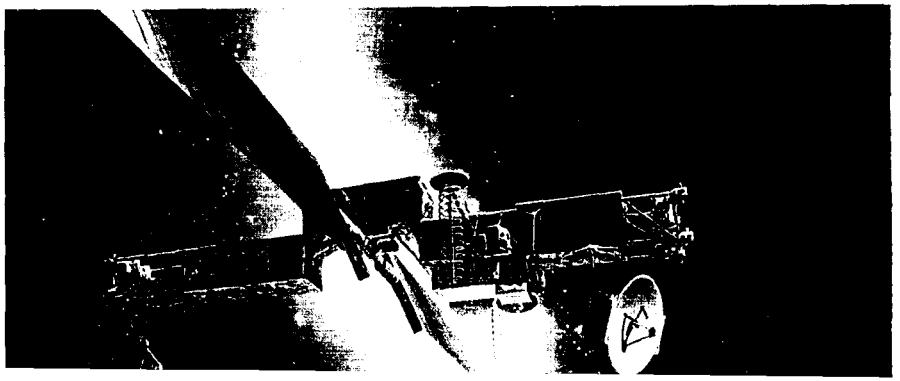
Headquarters Peterson AFB, Colo.

Established September 1, 1982

Commander Gen. Charles A. Horner

MISSIONS

Operate and test USAF ICBM forces for US Strategic Command
Operate groundbased missile warning radars, sensors, and satellites
Operate national space-launch facilities and operational boosters
Operate worldwide space surveillance radars and optical systems
Provide command and control for DoD satellites
Provide ballistic missile warning to NORAD and US Space Command



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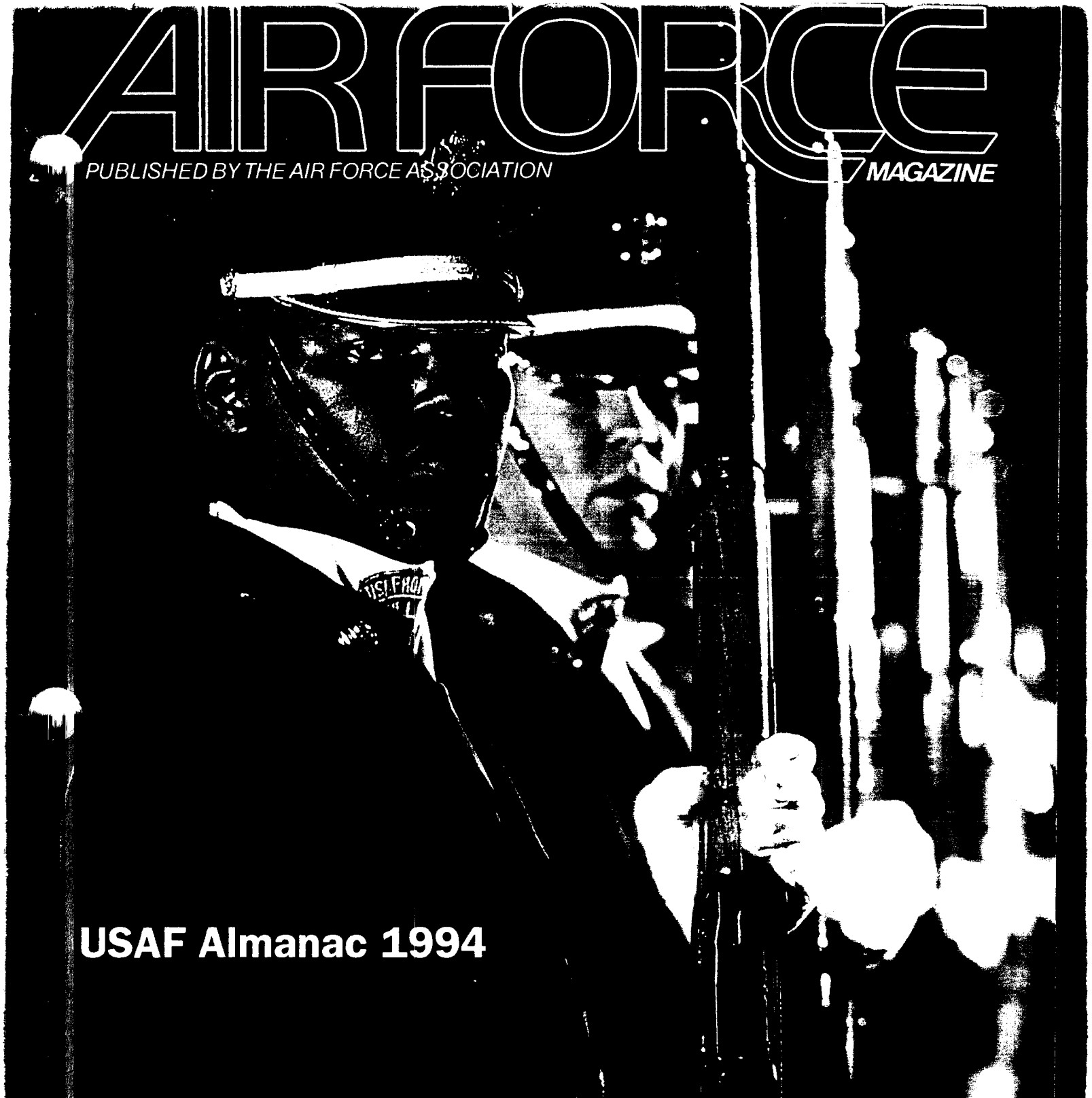
PUBLISHED BY THE AIR FORCE ASSOCIATION



USAF Almanac 1994

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: January 30, 1995

TIME: 3:45 p.m.

MEETING WITH: B.Gen. Paul Roberson USAF (Ret.)

SUBJECT: Military bases in San Antonio

PARTICIPANTS:

Name/Title/Phone Number:

B.Gen. Paul Roberson USAF (Ret.)
Helen Ayala, City Council Member
J. Rolando Bono, Assistant City Manager

Commission Staff:

Ben Borden, Director, Review & Analysis
Ed Brown, Army Team Leader
Frank Cirillo, Air Force Team Leader
Bob Cook, Interagency Issues Team Leader
Jim Owsley, Cross-Service Team Leader
Ann Reese, Cross-Service Team
Dick Helmer, Cross-Service Team
Les Farrington, Cross-Service Team
Steve Bailey, Army Team
Bob Miller, Army Team

Paul stated that previous environmental and water-use concerns will be resolved by the time a potential regional hearing would be held. A local group will be elected to oversee use of the aquifer. In the interim, the City Council has guaranteed 300,000 acre feet of water, which will more than satisfy Kelly's water requirements.

Paul asked the Commission Staff to be aware of the severe economic impact that the closure of Kelly would have on the Hispanic employment levels in San Antonio. The closure of Kelly would increase the Hispanic unemployment in San Antonio by 73 percent.

Paul asked about the schedule for the 95 Commission process. Frank responded there will not be a firm schedule for quite sometime but reviewed, in general terms, the timing of upcoming events.

KELLY AFB DRAFT DATA SHEET

30-Jan-95

MAJOR COMMAND:	AFMC
BRAC CATEGORY:	Large AC(A) *
JOINT CROSS-SERVICE GROUP:	Depot, Test & Evaluation, Laboratories
STATE:	TX
NEAREST CITY:	San Antonio
INSTALLATION TYPE:	Depot/Air lift Base
RESOURCES:	ALC, 15-F16(G), 14-C5(R)
MAJOR UNITS ASSIGNED:	San Antonio ALC, 76th Air Base Wg, Air Intelligence Agency, Air Force Electronic Warfare Center, Joint Electronic Warfare Center, Defense Commissary Agency, 433rd Airlift Wg(AFRES), 149th Fighter Group(G)
INSTALLATION MISSION:	Air Logistics Center & Reserve Airlift OperationsIntegrated Weapon System Management ofC5A/B, C17, C9, T37, T38,Foreign - OV10, A37, F5, C47, Overhauls F100, TF39 and T58 engines, nuclear Weapons
AUTHORIZED MILITARY:	4,599
AUTHORIZED CIVILIAN:	14,251
AVERAGE NUMBER OF STUDENTS:	
FY 93 OPERATING COSTS:	
NATIONAL PRIORITY LIST SITE:	No
TOTAL ACRES:	4,660
TOTAL BUILDING SQUARE FOOTAGE:	
FAMILY HOUSING UNITS:	1,487
UNACCOMPANIED OFFICER HOUSING UNITS:	
UNACCOMPANIED ENLISTED HOUSING SPACES:	
AREA COST FACTOR:	
RUNWAY LENGTH:	

DRAFT

KELLY AFB DATA SHEET

14-Nov-94

MAJOR COMMAND:	AFMC
BRAC CATEGORY:	Large AC(A) *
JOINT CROSS-SERVICE GROUP:	Depot, Test & Evaluation, Laboratories
STATE:	TX
NEAREST CITY:	San Antonio
INSTALLATION TYPE:	Air Logistics Center & Reserve Airlift Operations
RESOURCES:	ALC, 15-F16(G), 14-C5(R)
MAJOR UNITS ASSIGNED:	San Antonio ALC, 76th Air Base Wg, Air Intelligence Agency, Air Force Electronic Warfare Center, Joint Electronic Warfare Center, Defense Commissary Agency, 433rd Airlift Wg(AFRES), 149th Fighter Group(G)
INSTALLATION MISSION:	Integrated Weapon System Management ofC5A/B, C17, C9, T37, T38,Foreign - OV10, A37, F5, C47, Overhauls F100, TF39 and T58 engines, nuclear Weapons
AUTHORIZED MILITARY:	5,078
AUTHORIZED CIVILIAN:	15,966
AVERAGE NUMBER OF STUDENTS:	
FY 93 OPERATING COSTS:	
NATIONAL PRIORITY LIST SITE:	No
TOTAL ACRES:	4,660
TOTAL BUILDING SQUARE FOOTAGE:	
FAMILY HOUSING UNITS:	1,487
UNACCOMPANIED OFFICER HOUSING UNITS:	
UNACCOMPANIED ENLISTED HOUSING SPACES:	
AREA COST FACTOR:	
HOSPITAL BEDS:	
IMPACT OF PREVIOUS BRAC:	

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: January 28, 1994

TIME: 9:00 a.m.

MEETING WITH: San Antonio Chamber of Commerce

SUBJECT: Courtesy Call

PARTICIPANTS:
Name/Title/Phone Number: 210-229-2147

Paul Roberson; Senior V.P. Military Affairs Project Director

Commission Staff:

Matt Behrmann; Staff Director
Ben Borden; Director of R&A
Mary Woodward; Congressional Liaison
Frank Cirillo; Air Force Team Leader
Bob Cook; Issues Team Leader

MEETING PURPOSE: Staff briefed Mr. Roberson on the Commission process and milestones and informed him of the content and availability of the library. We discussed all military installations in the San Antonio area to include a brief chat with Ed Brown regarding Ft. Sam Houston. A lot of discussion involved our expectations on the '95

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: May 10, 1994- UnSched

TIME: 9:30 AM

MEETING WITH: Paul Roberson

SUBJECT: Telephone setup w/Ben

PARTICIPANTS:

Name/Title/Phone Number: 210-229-2147

Paul Roberson; San Antonio Chamber of Commerce
Lyle Larson; City Councilman
Helen Ayala; City Council member
Rolando Bono; Asst City Mngr

Commission Staff:

Ben Borden; Dir R&A
Frank Cirillo; Air Force Team Leader
Bob Cook; Interagency Issues Team Leader

MEETING PURPOSE:

CITY OF SAN ANTONIO

J. ROLANDO BONO
ASSISTANT CITY MANAGER

P.O. BOX 839966
SAN ANTONIO, TEXAS 78283-3966

CITY HALL
(210) 299-7082
(210) 270-4217 (FAX)

URE & REALIGNMENT COMMISSION
MOORE STREET, SUITE 1425
TON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: May 10, 1994- UnSched

TIME: 9:30 AM

MEETING WITH: Paul Roberson

SUBJECT: Telephone setup w/Ben

PARTICIPANTS:

Name/Title/Phone Number: 210-229-2147

Paul Roberson; San Antonio Chamber of Commerce
Lyle Larson; City Councilman
Helen Ayala; City Council member
Rolando Bono; Asst City Mngr

Commission Staff:

Ben Borden; Dir R&A
Frank Cirillo; Air Force Team Leader
Bob Cook; Interagency Issues Team Leader

MEETING PURPOSE:

General discussions as in past meetings. Ben reviewed the Process presentation and

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: July 12

TIME: 4:30 PM

MEETING WITH: Paul Roberson

SUBJECT: Telephone setup w/Mary

PARTICIPANTS:

Name/Title/Phone Number: 210-229-2147

Paul Roberson; San Antonio Chamber of Commerce

Commission Staff:

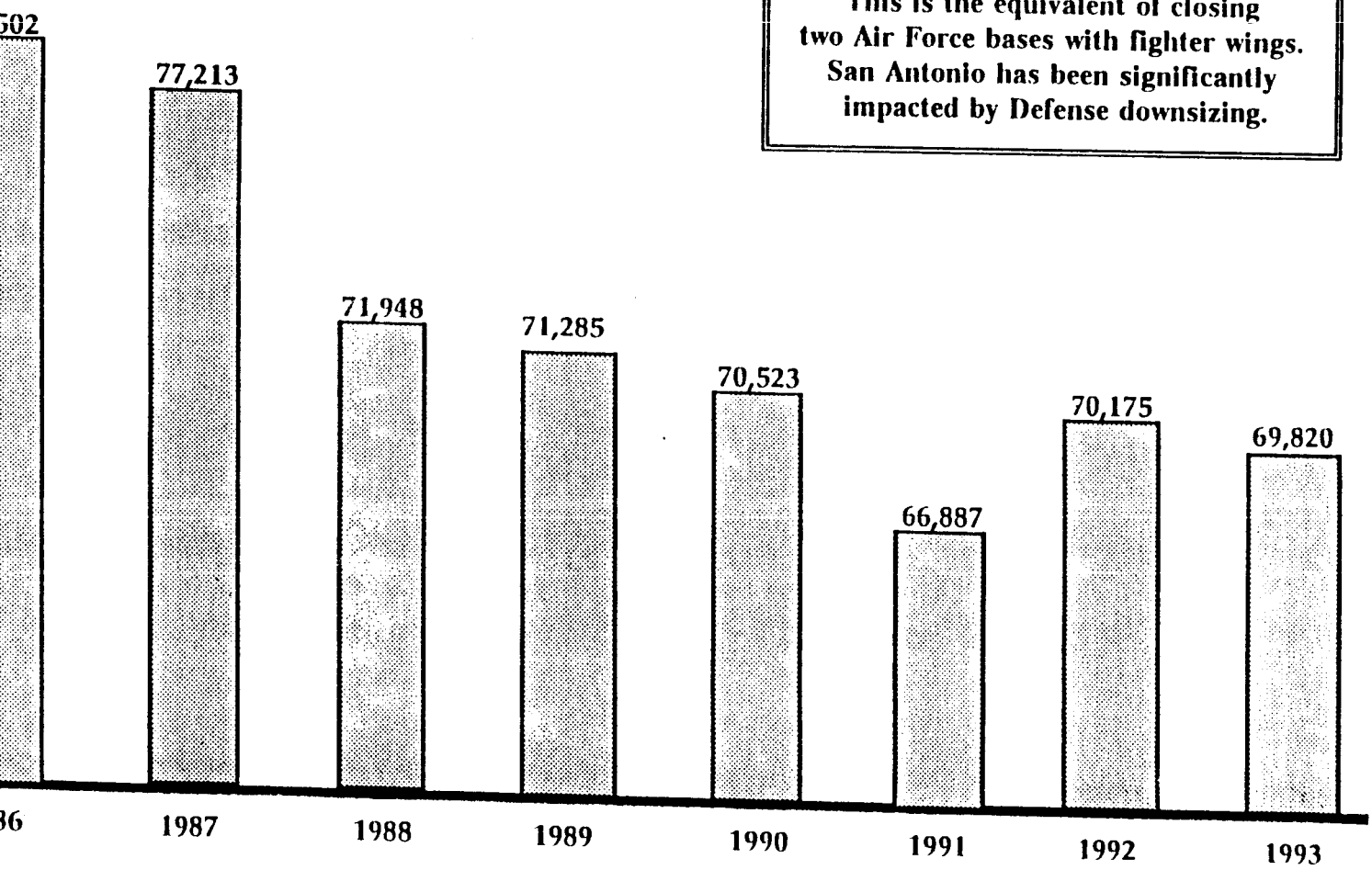
Ben Borden; Dir R&A
Frank Cirillo; Air Force Team Leader
Bob Cook; Interagency Issues Team Leader
Mary Ann Hook; General Counsel

MEETING PURPOSE:

General discussions as in past meetings. Paul presented two charts as attached that represent the military personnel total reductions over the last 8 years and the Hispanic

San Antonio
Military Base Personnel Totals

Personnel (military and civilian) assigned to San Antonio's five bases has declined by 7,682 since 1986. This is the equivalent of closing two Air Force bases with fighter wings. San Antonio has been significantly impacted by Defense downsizing.



KELLY AFB - HISPANIC WORKFORCE

SAN ANTONIO/KELLY AFB HAVE A SPECIAL RELATIONSHIP

•San Antonio's Hispanic traditions and multiculturism make it a unique city
•Kelly AFB and San Antonio's Hispanic community have formed a strong alliance that contributes to the city's cultural identity and economic well-being

KELLY'S WORKFORCE IS 61% HISPANICE; 44.8% OF ALL HISPANICS IN THE AIR FORCE ARE AT KELLY AFB

•Kelly's Hispanic workforce as a percentage of Hispanics assigned to:

Air Force Material Command	67.1%
Air Force	44.8%
DOD	13.5%

SAN ANTONIO RANKS 10TH INPOPULATION, BUT 40TH IN WEALTH

•Many of San Antonio's Hispanics are counted among the poor and disadvantaged in terms of job opportunities, income, healthcare, housing and education
•Average per capita income is 25 percent below state and national averages - and many Hispanics are in this category

HISPANICS LOOK TO KELLY FOR:

•Employment, upward mobility, skill training

KELLY IS KEY TO HISPANIC MIDDLE CLASS

•Forty percent of San Antonio's Hispanics earning $25,000 or more are employed at Kelly or Kelly related jobs
•Kelly's Hispanics average 25% above the San Antonio's average worker's income
•Kelly has been primary vehicle for advancement for generations of San Antonio's Hispanics

IMPACT OF CLOSING KELLY AFB

•San Antonio has only 8,500 precision manufacturing jobs
  •modest growth, low turnover
  •no capability to absorb Kelly workforce
•Currently one of five Hispanics in San Antonio is unemployed

Bill Mock

Vice President
Military Affairs

The Chamber.
100 YEARS OF SERVICE

The Greater San Antonio Chamber of Commerce
602 E. Commerce P.O. Box 1628 San Antonio, Texas 78296-1628
210/229-2148 FAX 210/229-1600

DEFENSE BA *MISSION*
1700 *5*

MEMORANDUM OF MEETING

DATE: Aug 25, 1994

TIME:10:00 AM

MEETING WITH: Paul Roberson

SUBJECT: Telephone setup w/Mary

PARTICIPANTS:

Name/Title/Phone Number: 210-229-2147

Paul Roberson; San Antonio Chamber of Commerce
Leo Gomez; San Antonio Hispanic Chamber of Commerce
Bill Mock; Vice President, Military Affairs

Commission Staff:

Frank Cirillo; Air Force Team Leader
CeCe Carman; Congressional Liaison

MEETING PURPOSE:

General discussions as in past meetings. Paul brought two participants as shown. He did share one rumor concerning an MOA between USAF and USN on Depots with 5 Points: 1) One multi Service Depot would be established, 2) USMC would retain one Rotary Wing/VTOL Depot, 3) One dedicated Navy Depot, 4) One dedicated Air Force Depot, 5) The rest of the Depots up for

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: October 4, 1994

TIME: 10:00

MEETING WITH: The Greater San Antonio Chamber of Commerce and the San Antonio Hispanic Chamber of Commerce

SUBJECT: Military Installations in San Antonio

PARTICIPANTS:

Name/Title/Phone Number:

See Attached list

Commission Staff:

Tom Houston: Staff Director
Cece Carman; Congressional & Intergovernmental Affairs
***Frank Cirillo; Air Force Team Leader**
Bob Cook; Interagency Issues Team Leader
Alex Yellin; Navy Team Leader
Ben Borden; Director of R&A
Ed Brown; Army Team Leader

MEETING PURPOSE:

DEFENSE BASE CLOSURE & REALIGNMENT COMMISSION
1700 NORTH MOORE STREET, SUITE 1425
ARLINGTON, VIRGINIA 22209
(703) 696-0504

MEMORANDUM OF MEETING

DATE: November 17, 1994

TIME: 4:15

MEETING WITH: Paul Roberson

SUBJECT: San Antonio defense presence

PARTICIPANTS:

Name/Title/Phone Number:

BGen Paul Roberson; San Antonio Chamber of Commerce

Commission Staff:

David Lyles; Staff Director
Frank Cirillo; Air Force Team Leader
Bob Cook; Interagency Issues Team Leader

MEETING PURPOSE: General discussion on process. Paul asked possibilites of meeting with the Chairman. Mr. Lyles noted the best time would be after the list was recommended and then the priority would be to bases on DoD's list. fc

8/94

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SUMMARY

Background

The impact of downsizing the Armed Forces has had a divergent effect on the Services' ability to deploy a maintenance capability. Department of Defense (DOD) maintenance is part of the overall Operations and Maintenance (O&M) appropriation which will total $77 billion for FY 1994, excluding costs associated with peacekeeping operations and repairs to major weapon systems utilized during the Persian Gulf war. Since FY 1985, force downsizing has resulted in a reduction of over 500,000 active duty personnel, with an additional 183,000 slated to be released by FY 1999.

All Services continue to perform their equipment maintenance at organizational, intermediate, and depot levels. However, maintenance practices at the organizational and intermediate levels are being modified because of fewer personnel to maintain assigned equipment. These modifications involve innovative changes to existing structure, and experimenting with new concepts that have fewer levels of maintenance.

U.S. Army

In recent years, the Army has undergone reductions in force structure. While attempting to retain as much maintenance capability at the division level as possible, substantial reductions in maintenance support have been realized. For example, most of the active duty general support units are being deactivated with the responsibility for the work load transferred to reserve components. At the installation and division levels, downsizing has had a collateral effect of depleting the ranks through special taskings which focus on critical military skills and often result in the absence of key personnel from their unit for periods exceeding 6 months.

Downsizing has also impacted the civilian work force in logistics support functions, as well as base support and Morale, Welfare, and Recreation activities. To compensate, Army maintenance companies and other enlisted personnel must now perform these functions as an additional work load. Currently, Army units are able to achieve only about 12 to 15 hours of maintenance production a week from assigned maintenance personnel

Integrated Sustainment Maintenance

Weaknesses in the Army's maintenance structure were identified during Operation Desert Storm. The Army found its current structure could neither adequately support nor sustain rapid force deployment or worldwide power projection. A recent U.S. Army III Corps exercise disclosed the Corps would have to deploy: (1) active support units that are not part of or under control of III Corps, (2) active support units that have dual deployment missions, (3) reserve components with questionable readiness capabilities, and (4) support units that currently do not exist. The Army's Strategic Logistics Agency (SLA) was tasked to develop new maintenance concepts which would improve maintenance support to combat units.

SLA proposed a fundamental change in the way the Army operates by changing the areas of responsibility for maintenance matters. Accordingly, the Integrated Sustainment Maintenance concept was developed with the intent to consolidate all maintenance above the direct support level under a single Army Materiel Command manager.

U.S. Navy and Marine Corps

Navy officials advised force restructuring was accomplished through decommissioning a significant number of surface vessels and submarines, and eliminating aircraft types. Personnel billets associated with those decommissionings were removed from fleet authorizations. The ships and aircraft remaining retained their organic maintenance capabilities. From 1989 through 1994, 147 ships and 1,154 aircraft were removed from the Navy's assets. Among the ships, submarine and destroyer tenders experienced the most dramatic reductions. For example, by 1999, tenders in the fleet are expected to drop from a high of 23 to 4. Currently, there are 15 tenders in the Navy's inventory.

Once downsizing is completed, only 2 tenders will be assigned to each of the fleets: Atlantic and Pacific. However, Navy officials advised this dramatic reduction will not adversely affect maintenance during peacetime, but they believe it will be inadequate to support the Navy's involvement in two nearly simultaneous major regional conflicts.

Marine Corps officials stated the reduction in forces has not significantly affected their ability to deploy sufficient maintenance capability. However, these deployments often suffer spot skill shortages and imbalances, and it is necessary to have

that Marine Expeditionary Units are currently subjected to an increased operational tempo, both deployment and personnel, because of increased commitments and fewer personnel.

Navy and Marine Corps Maintenance Initiatives

The Navy and Marine Corps contend that downsizing has not affected their ability to deploy their maintenance capability. Still, initiatives have been taken that will impact the manner in which the Navy and Marine Corps perform their maintenance requirements. In 1990, the Navy began employing Battle Force Intermediate Maintenance Activities in selected battle groups. This initiative involves identifying maintenance capabilities within the group and developing and distributing a tailored data base for deploying assets. Navy officials believe BFIMA has shown positive results, but that its maximum capability has yet to be realized.

A more dramatic initiative to meet future naval maintenance requirements is Regional Naval Maintenance. This concept is intended to eliminate "stovepipe" approaches to maintenance and adopt a seamless functional/programmatic support system. Once implemented, the concept will encompass policies, programs and systems, as well as organizational integration, and will merge these functions in both electronics and avionics ashore.

In the Marine Corps, some initiatives are underway to reduce maintenance workload at the organizational and intermediate levels. The first method, Force Administrative Storage Program enables conservation of limited maintenance resources by removing selected equipment from use for extended time periods.

A second initiative is the Marine Expeditionary Force Dehumidified Program. This program is a comprehensive force-wide effort to reduce maintenance requirements and enhance operational readiness by using state-of-the-art dehumidification technology to maintain a controlled environment for both active status and administratively stored tactical equipment. Marine Corps officials advised these two initiatives are presently limited in scope, but the prospects of greater application remain strong.

U.S. Air Force

In the early 1990's, DOD began its efforts to reduce the Armed Forces by initiating Defense Management Review Directives

because the Air Force decided to implement a second DMRD, the two-level maintenance concept. This concept directly contradicted the intent of stock funding depot level reparable items.

Two-Level Maintenance Concept

Under the two-level maintenance concept, intermediate level maintenance at Air Force installations would be reduced or eliminated and the repair work would be performed at Air Force repair depots. Air Force projected 6,500 intermediate level maintenance personnel could be cut from the force structure and their workload would be absorbed by the repair depots.

Two test programs involving avionics components and propulsion systems have been conducted. Successes were realized in the repair of avionics, but little or no improvements were accomplished when two-level maintenance was applied to propulsion systems. As a result, the Air Force has concluded that only those systems with a high degree of reliability can be transferred to two-level maintenance without jeopardizing support to flying missions.

Some Air Force officials believe the deployment model used in testing the two-level maintenance concept may have been flawed. The model assumed no constraints on manpower, spare parts, or transportation resources. These officials believe such planning to be too optimistic.

When the two-level maintenance program was being formally tested, one Air Logistics Center provided an incentive for Air Force activities to endorse and participate in the two-level program by artificially reducing repair costs. Air Force customers paid the actual repair cost and a reduced surcharge for two-level maintenance items. However, in FY 1994, the reduced surcharge practice was discontinued and concurrently, the Air Force increased the surcharge rate. As a result, Air Force activities experienced major price increases. For example, the exchange price charged to Air Force activities on one item increased from $33,351 in FY 1993 to $79,837 in FY 1994. Installations have now had to request additional funds from their major command to continue operating. As of April 1994, one major Air Force command needed $39 million in additional funds to offset the price increases for two-level maintenance avionic items, and the command was not sure where the funds would be obtained.

Air Force officials are disinclined to say two-level main-

before the engines are returned to the depot. Even with these sources, spare parts shortages are outpacing the ability of Air Force maintenance personnel to obtain sufficient spare parts to support aircraft systems.

Two-level maintenance has resulted in changes in deployment strategies. Currently, there are no plans to deploy intermediate maintenance functions from the repair depots to support deployed avionic systems. This new strategy significantly reduces the deployment footprint and increases mobility capability for those activities under two-level maintenance. Deployment strategies for propulsion systems have not changed, and it is anticipated two-level maintenance personnel at the depot facility may have to deploy with the aircraft to maintain combat operations.

I. INTRODUCTION

A. Directive

The Committee's letter of January 25, 1994, directed an inquiry of the management and operation of the Department of Defense (DOD) inventory and maintenance operations to assure these activities support the readiness of the U.S. Armed Services.

Folder A

B. Scope of Inquiry

Interviews were conducted with officials of the Office of the Secretary of Defense (OSD), the Department of the Army, the Department of the Navy, and the Department of the Air Force.

Discussions were held at Headquarters, U.S. Army Forces Command (FORSCOM); Headquarters, U.S. Army Materiel Command (AMC); Headquarters, Naval Air Systems Command; Headquarters, Naval Sea Systems Command; Headquarters, Marine Corps; Headquarters, Air Logistics Command, Ogden, and the Strategic Logistics Agency.

Field visits were made to interview officials at Fort Hood, Texas; Fort Riley, Kansas; Headquarters, Atlantic Fleet, Norfolk, Virginia; Headquarters, Pacific Fleet, San Diego, California; Headquarters, 1st Marine Expeditionary Force, Camp Pendleton, California; 2nd Marine Expeditionary Force, Camp Lejeune, North Carolina; Headquarters, Air Combat Command, Norfolk, Virginia and Nellis Air Force Base, Nevada.

See Record of Interviews and Itineraries

C. Background

Downsizing of military forces is proceeding in accordance with the DOD 1993 Bottom-Up Review. According to the Secretary of Defense, the size of the active military during the Cold War (FY 1985) was 2.15 million. As of May 31, 1994, the number of full-time military personnel on active duty was 1.64 million. In FY 1995, the active duty strength is expected to drop to 1.5 million. The Bottom-Up Review active duty strength goal is 1.46 million and is expected to be reached in FY 1999. The reduction in active duty military strength has affected all types of units, that is, combat, combat support, and combat service support.

F-3
F-4
F-5
F-4
F-3
F-4

The Services have implemented their downsizing goals through

See

static. However, under certain circumstances, mobile support teams are sent from the depots to assist deployed organizations.

The Services are modifying maintenance practices at the organizational and intermediate levels to maintain assigned equipment with fewer personnel. Some are making the changes within their current maintenance structure while others are planning to modify their maintenance organizational structure by consolidating their maintenance efforts at fewer levels.

See section II III IV

Maintenance in DOD is part of the overall Operations and Maintenance Appropriation that totaled $77 billion in FY 1994, an increase of $3 billion over the FY 1993 appropriation. DOD is requesting $82 billion in Operations and Maintenance funds for FY 1995.

HASC FY95 HEARING O&M

II. IMPACT OF DOWNSIZING ON U.S. ARMY MAINTENANCE ACTIVITIES

A. Traditional Army Maintenance Concepts

The Army currently uses five levels of maintenance:

-- Operator/Crew level is the lowest level of maintenance performed and includes preventive maintenance checks and services.

-- Organizational level includes scheduled maintenance, limited troubleshooting and component replacement.

-- Direct Support (DS) level performs body work, component and major assembly replacement, and some component rebuild.

-- General Support (GS) level has specialized repair capabilities, especially electronics, and major component rebuild including vehicle overhaul programs and some depot level repair capability. Depot repair work accomplished at the GS level must be approved by the Army Materiel Command.

-- Depot level has unique national repair capabilities which can be as extensive as total rebuild of major weapon systems to minor repair and return to Army customers.

A code for each reparable item designates at which level the repair will be performed. During deployment, all maintenance levels, with the exception of the depot level, deploy with the units.

G-1 p.4

G-6 p.1

G-7 p.7

G-8 p.4

B. Changes in Maintenance Practices Resulting from Downsizing

Army officials stated significant changes have occurred in the Army's method of performing maintenance. In the late 1970's and all through the 1980's, the Army's maintenance structure was established to complement the Army of Excellence (AOE) concept. This AOE concept envisioned fast moving Army units in a field of combat where maintenance was relegated to a remove and replace

MFR #33 p.1

In the early 1990's, the Army replaced the AOE concept with Stock Funding of Depot Level Reparables which requires each level of maintenance to repair all of the items coded for their level of repair. However, the TO&E's and the MTO&E's were not changed to add the necessary personnel to repair components at the organizational or the DS level. Army officials noted that downsizing has complicated the issue because most of the active duty GS units either have been or will be deactivated and the responsibility for the workload is being transferred to reserve components. According to some Army field commanders, the changes in maintenance concepts coupled with the massive downsizing of active duty GS maintenance personnel have left the Army in a vulnerable situation if they must be deployed. They stated that the Army could not duplicate another Operation Desert Storm with its current philosophy.

MFR #33 p.2

1. Downsizing Impacts on Army Commands

FORSCOM provided the following data showing the degree to which maintenance units are being reduced.

G-1

Reductions in Active Components
U.S. Army Forces Command

	FY 1993	FY 1994
Direct Support Companies ----------	20	17
Direct Support Teams* ----------	140	61
General Support Companies ----------	9	4
General Support Platoons ----------	47	18
General Support Mechanics ----------	1,159	451

G-1

*Augmentation teams for repairing track, turrets, communication equipment, radar, etcetera.

The above table shows DS maintenance capability has remained generally protected from force structure changes. However, force structure changes have had a rather dramatic impact on GS maintenance capabilities in normal maintenance functions and will have major impacts on supportability and sustainment if a corps has to deploy.

2. Downsizing Impact on Army Corps

however, divisions cannot fight without support and the support elements have been severely reduced in the downsizing initiative. For example, he noted in a corps deployment, a forward corps support group should be assigned for each division with a rear corps support group supporting the forward activities. In today's environment, III Corps has only one corps support group to support two divisions.

Recently, the 13th Corps Support Command assessed the impact on support units resulting from a corps deployment with a two division (heavy) structure. The exercise disclosed a number of shortfalls. Notably, the corps would have to deploy: (1) active support units that are not part of or under the control of III Corps, (2) active support units that have dual deployment missions, (3) reserve components with questionable readiness capabilities, and (4) support units that currently do not exist.

MFR #28

In the exercise, approximately 74,000 personnel (two heavy divisions, an armored cavalry regiment, corps artillery, a cavalry brigade, and support troops) were involved in the deployment. The Corps assessment showed that of the 75 companies needed to support the deployed force:

- -- III Corps would be able to fill only 29 percent of the support requirement from assigned assets by deploying 22 support companies.
- -- Thirty companies, or 40 percent of the needed support, would have to be obtained from other FORSCOM activities.
- -- Twenty companies, or 26 percent, would have to be obtained from reserve components.
- -- The remaining three companies needed for support could not be identified anywhere in the Army and are currently unresourced.

3. <u>Downsizing Impacts on Army Installations and Divisions</u>

At one installation, Army officials stated the division was being depleted by special taskings. Taskings are defined as assignments outside the purview of the division's regular mission. These assignments often involved the deployment of indi-

MFR

short of these critical skills if deployment occurred in their absence.

Army officials noted force structure changes subsequent to Operation Desert Storm have impacted the civilian work force in the Directorate of Logistics (DOL), as well as contract operated functions. To accommodate the vacated workload, Army GS maintenance companies are being assigned the missions.

Force structure changes have also eliminated low cost civilian jobs which provided base support and Morale, Welfare, and Recreation (MWR) activities. In the past, civilians were hired for minimum wage to serve as lifeguards, mow the grass, operate MWR activities, etcetera. However, because of changes experienced in the last several years, military enlisted personnel now perform these functions. It is not unusual to find highly skilled mechanics for weapon systems such as the AH-64 Apache helicopter, M1A1 Abrams tank, or the M-2 Bradley fighting vehicles being detailed for 3 months as lifeguards to the installation swimming pools and not performing the maintenance work for which they are trained. The workload that these detailed individuals are not addressing must be performed by those few personnel remaining in the unit. Army officials noted that under normal conditions, they were able to get about 20 to 25 hours of hands-on production a week from Army mechanics because of all of the details and other functions, such as training, they must perform. Because of special taskings and details they are now able to get only about 12 to 15 hours a week from assigned personnel.

MFR #29

This situation is graphically demonstrated at Fort Riley where the installation has contracted for its DOL maintenance operations. Unlike GS maintenance functions operated by Army units, the contract DOL is able to achieve maximum productivity by obtaining an 8-hour work day from each worker. To illustrate the impact of the difference between civilian (contract) and military productivity, installation officials pointed to an upcoming deactivation of a GS company. The company is currently assisting the DOL with its GS workload but will deactivate in FY 1995. Installation officials stated they need to add only 15 civilian personnel to the DOL contract to offset the work being done by the 156 man GS company.

MFR #33 p. 1

4. <u>Integrated Sustainment Maintenance</u>

Army officials stated that lessons learned from Opera-

during Operation Desert Storm including delayed support responses; nonsynchronized deployment; multiple, overlapping and duplicative contractor support; improperly utilized GS maintenance units; and excessive reliance on transportation to evacuate reparable assets. MFR #27

The problem, according to some Army officials, is field commanders are required to manage logistics operations while also fighting the war. Traditionally, the Army's force structure is organized so field commanders have total control and management responsibility over not only the war-fighting, but also manage all of the logistics required to fight the war. Accordingly, the Army has always been organized so the Army retail logistics system (controlled by the field commanders) is separate and distinct from the Army's wholesale system which is managed by AMC. MFR #27

The Army's Strategic Logistics Agency (SLA) was tasked to develop new maintenance concepts which would improve maintenance support to combat units. SLA proposed the Army adopt the Integrated Sustainment Maintenance (ISM) concept to fundamentally change the way the Army operates by changing areas of responsibility for logistics matters. The ISM concept integrates maintenance under a single national manager. The objective is to create a seamless one stop shop system for maintenance at echelons above DS. All maintenance resources, both military and civilian, are to be controlled by the ISM manager. Under the original plan, the ISM program was to be controlled and managed by AMC. However, SLA officials noted that the Army field commands have not fully agreed to relinquish control over logistics. Instead, the Army has agreed to test ISM on a limited basis at the corps level to determine if the concept will improve logistics support to Army units. MFR #27

The Army approved a proof of principle test of ISM in FY 1992 with III Corps as the predominate test site. Three III Corps installations were selected for testing ISM: Fort Hood with the 1st Cavalry and the 2nd Armored Divisions, Fort Carson with the 4th Infantry Division (mechanized), and Fort Riley with the 1st Infantry Division (mechanized). SLA officials, using DOL maintenance activities, identified the specific workload at each location. They found that Fort Hood's DOL maintenance activity was repairing 405 individual National Stock Numbers (NSN) annually. Fort Carson's DOL was repairing 177 NSN's annually, and Fort Riley's DOL was repairing 339 NSN's each year. Further evalua- G-1 G-4 MFR #27

attempted to create Centers of Excellence (COE) for repair. A COE would be responsible for the repair of all assets generated from the three installations. For the purpose of the proof of principle, Fort Hood was designated the COE for 34 NSN's, Fort Carson the COE for 18 NSN's and Fort Riley was the COE for 13 NSN's. Of the original 65 items selected for the proof of principle test, about half of the items were repaired at all three locations. G-5

Although the proof of principle test is continuing, SLA officials are disappointed with the initial results. SLA officials noted the ISM concept will not provide significant improvements unless the program is managed by the wholesale logistics system. They pointed to a number of instances where ISM has fallen short of expectations simply because the program is currently being managed at the corps level. For example: MFR #27

-- The ISM concept projected a $4.4 million cost avoidance for items in the test. However, the projection was based on an assumption that the volume of repairs at the COEs would match the previous years demand rate. This has not occurred. Of the projected annual workload of 4,971 items, only 902 items, or 18 percent, have been sent to the COEs for repair. G-1

-- Army field maintenance activities do not have visibility over the Army's total world-wide inventory and often use Operation and Maintenance, Army (OMA) funds to repair items that are in a long supply or excess inventory status. SLA officials noted in the initial proof of principle test, 5 items assigned to COEs had to be dropped because the corps included items that were in excess in the Army's inventory. The corps was informed of these excess items when a special test program initiated by the Army's Chief of Staff for Logistics was implemented. The purpose of this test program was to determine if the Army's long supply and excess inventory could be reduced if a one-time price reduction was offered. The special test program, called the Reduced Price Initiative, contained a small number of items (134) which were excess to the Army. Price reductions for the items of up to 85 percent were offered as an incentive to Army units to purchase the items rather than to continue to repair them at the installa- G-8 G-8

repaired at less cost than buying replacements. SLA officials referred to this problem as in issue between the "Big Army" (more economical to use long supply items and excess serviceable assets than to repair) versus the "Little Army" (repair anytime cost is less than replacement).

-- SLA officials noted that if ISM is implemented Army wide with AMC as the manager instead of a corps, the cost avoidance could amount to many millions of dollars annually. However, since only a few NSN's are involved and only three III Corps installations are participating, the benefit does not apply Army-wide from the ISM concept. Also, as long as the corps is responsible for managing the program, the repairing of long supply items or items excess to the Army's wholesale logistics system will continue to be a problem.

MFR #27

C. Future Maintenance Plans and Concepts

According to an Army study, any future maintenance system must be fluid in operations and structure to meet mission demands. The "force projection Army" must be able to rapidly alert, mobilize, deploy and operate anywhere in the world, across the entire spectrum of conflict. The future maintenance system will continue to support heavy, light, and special forces and will employ both civilian and military personnel. Although civilian and military personnel will be deployable, the movement of civilians to forward areas will be limited. Due to the decrease in active duty military personnel, there will be an increased need for civilian personnel, both Army civilian and contractor, and an increased reliance on reserve components.

G-9 p.3

The Army is trying to develop a seamless logistics system which will enable projected forces full access to the assets needed for support. This will make the need for time-consuming and inefficient relaying of action requests through echelons unnecessary. Austere force deployment will increase reliance on joint and coalition forces. The Army will often provide command and control for such forces, and accordingly, have combat service support responsibility. Thus, maintenance systems of the future must have capabilities to support joint and coalition requirements. Mobility will continue to be the main strategy of survivability of combat service support assets.

p.4

maintenance facility becomes a routine basing strategy as it affords an optimal blend of fixed capability and mobility.

III. IMPACT OF DOWNSIZING ON U.S. NAVY AND MARINE CORPS MAINTENANCE ACTIVITIES

A. Organization for Maintenance in Navy Combatant Units

1. Navy Ships

Navy officials at various levels advised that the Navy continues to accomplish equipment maintenance in the same manner as it did prior to force restructuring. That is, maintenance is performed at three levels: organizational, intermediate and depot. Organizational maintenance involves routine preventative maintenance and limited corrective maintenance, and is accomplished by user personnel. Intermediate maintenance involves primarily corrective maintenance. For deployed surface vessels, intermediate maintenance is performed by members of the ship's force trained in various technical specialties, such as calibration, computers, pipefitting, and wiring. Additionally, intermediate maintenance and limited depot level maintenance support is provided to the surface fleet and submarines by support vessels called "tenders." The tenders have the most extensive intermediate maintenance capability afloat in the fleet. The submarine tenders are the only surface vessels that can exchange contaminated water in deployed nuclear-powered submarines. Depot maintenance involves major repairs, such as hull damage, refueling nuclear-powered vessels, and complete overhauls. This level of maintenance, according to Navy officials, is usually accomplished at Navy or commercial shipyards for surface vessels and submarines.

MFR #23 #25 H-13 H-14 H-11 H-14

2. Navy Aircraft

Aircraft maintenance follows the same general pattern. Navy aviation officials stated that Navy and Marine Corps aviation units deploy with their shore-based organizational and intermediate maintenance support. Additionally, deployed Navy and Marine Corps aviation units receive intermediate maintenance support from the crew of the host vessels. Depot level maintenance for Navy and Marine Corps aircraft is accomplished at shore based naval aviation depots.

H-14

B. Marine Corps Organization for Maintenance

Officials at Marine Corps headquarters and two of the three

MFR

are performed by unit personnel on all unit equipment. Intermediate maintenance involves third and fourth echelon maintenance. These levels of maintenance are usually performed by personnel assigned to the Force Service Support Group (FSSG). The FSSG provides a variety of services and support functions for a marine division, such as maintenance, transportation, medical, engineering and communications. Fifth echelon maintenance is performed by personnel assigned to the depots. #26

Officials advised that the Marine Corps deploys forces as Marine Expeditionary Units (MEU's) rather than as a division. The deployed MEU's vary in size and composition. Currently, the MEU's are deployed with all required service and support. Marine Corps aviation units are deployed aboard Navy carriers and their organic maintenance personnel accompanies the units. Once aboard ship, Marine Corps aviation units receive available intermediate maintenance support from the ship force in the same manner as naval aviation elements. Depot maintenance for Marine Corps aircraft is provided by naval aircraft depots. MFR #23 #26

C. Approach to Downsizing in the Navy and Marine Corps

1. Navy

At least two levels of maintenance, organizational and intermediate, are organic to all Navy combatant vessels and aviation units. For ships, the extent of intermediate maintenance capability varies by type of vessel. Submarines have less of an organic intermediate maintenance capability than larger ships, and tenders have the most extensive intermediate maintenance capability. H-11 H-13 H-14 H-15

Information provided by Navy officials reflected the Navy chose to accomplish mandatory force restructuring by decommissioning a significant number of surface vessels, submarines and aircraft types. When a vessel is decommissioned or an aircraft type is removed from the Navy's inventory the personnel billets associated with the specific vessel or aircraft type are also removed from the fleet personnel authorizations. The ships and aircraft types remaining in the fleet retain their organic maintenance capabilities. MFR #23 #26 H-4 H-6

Documents provided by Navy officials show a reduction in ships from 566 in 1989 to 388 in 1994. During the same period, the number of aircraft dropped from 5,487 to 4,333. Among the various classes of ships, the submarine and destroyer tenders experienced the most dramatic reductions. The number of H-4 H-3 H-6 MFR #23

in deployable maintenance capability will not adversely affect fleet maintenance during peacetime. One official stated, "tenders are less efficient during peacetime." However, officials in both fleets believe two tenders per fleet will be inadequate to support the Navy's involvement in two nearly simultaneous major regional conflicts. MFR #23 #25

Discussions with Navy officials revealed the workload of the rapidly disappearing tenders is being absorbed by Shore Based Intermediate Maintenance Activities (SIMA) for surface ships and submarines homeported in the United States and abroad. The SIMA's have a greater intermediate maintenance capability than the tenders; however, they will require improvements in their capability to handle hazardous materiel. MFR #23 #25

Responding to increased commitments with fewer resources is cited by Navy officials as a major concern. Greater workloads and longer deployments eventually will result in lower morale, lower retention rates and fewer new recruits. One official stated, MFR #25

> "the most important organic asset of a shop is its crew. If manning decreases or schoolhouse training is shortened, this will have a direct impact on shipboard maintenance, self sufficiency and overall mission effectiveness." H-12

2. Marine Corps

Downsizing in the Marine Corps is directed primarily at the Force Service Support Group (FSSG) in the divisions, according to officials in the field. The FSSG is comprised of combat support and combat service support units. Documents provided by officials at one division reflected shortages in 19 technical skills for the FSSG ranged from 23 percent to 54 percent. The number of on-board personnel in the FSSG dropped from a high of 8,033 in FY 1991 to 6,538 in FY 1994. A similar drop in the number of on-board personnel was reported for the FSSG at a second division. The maintenance battalion at one FSSG experienced a 25.9 percent decline in on-board enlisted strength during the past four years. There were 1,099 enlisted on-board in 1990 and 814 on-board in 1994. MFR #24 #26 I-7

days. Personnel OPTEMPO is defined as the percentage of time an individual supports operations and training away from the barracks, home base, or station for a period of time greater than 24 hours. At one location, officials reported Marines in some specialties are away from home base 12 out of 18 months. Officials attribute the increased OPTEMPO to increased commitments and fewer people. I-5 I-6

Officials at Marine Corps headquarters reported the reduction in forces has not significantly affected the capability to deploy sufficient maintenance capability. They pointed out that spot skill shortages and imbalances do occur throughout all technical specialties, but judicious attention is given to all skill areas for management and balance. I-1

Discussions with officials at two of the three Marine Corps active divisions revealed that Marine Corps organizations do deploy their maintenance capability. This is often accomplished, however, with shortages in technical skills in the deploying unit being filled by personnel from nondeploying elements of the division. MFR #24 #26

Over the long run, officials believe the increased OPTEMPO will adversely affect recruitment, retention and training. Since the service and support personnel were most subjected to downsizing, officials believe the increased OPTEMPO will quickly affect the reenlistment rate of first termers and careerists possessing highly marketable technical skills. I-5

D. Future Maintenance Plans and Concepts

1. Navy

Some initiatives have been taken that will drastically change the way the Navy performs its maintenance requirements in the future.

a. Battle Forces Maintenance Activities

Prior to scheduling the decommissioning of naval tenders, the Navy began employing Battle Force Intermediate Maintenance Activities (BFIMA) in selected battle groups. The concept was formalized in 1990, and is not related to the downsizing of naval forces. E-25 ATTACHMENT p.2

According to Navy officials, BFIMA is an initiative designed to better organize assets in a manner that maximiz- E-25

naval tenders, but it does not replace them in supporting maintenance requirements. Nor is BFIMA intended to be an afloat intermediate maintenance activity. The carriers of the battle groups handle many of the repair functions that are also performed by the maintenance activity aboard tenders. However, because of fewer functions, personnel skills, equipment and space, they cannot assume the tender's role.

Memo E 25 p.3 ATTACHMENT 2 p 5

Navy officials indicated the results of BFIMA thus far have been positive. In one battle group there has been an increased access to technical repair data, advanced training for selected technical personnel, as well as greater interaction with the naval tenders. These officials state that under this arrangement, the average carrier is performing 2,000 repair jobs per deployment as compared to an average of 70 jobs that were accomplished in the 1970's. In one deployment of the USS NIMITZ, over 700 maintenance items for other deployed assets were accomplished. Included were boiler repairs, motor rewinds, centrifugal pump overhauls, and on-site combat systems technical assists. These officials point out that BFIMA is a continuous process and the maximum capability in terms of repair jobs has yet to be realized.

E-25 ATTACHMENT 1 p. 10

E-25 ATTACHMENT p. 10

E-25 ATTACHMENT p. 7

E-25 Memo p. 12

b. Regional Naval Maintenance

Another new approach toward meeting future naval maintenance requirements is Regional Naval Maintenance. This initiative is intended to eliminate the "stovepipe" approach to maintenance and adopt a seamless functional/programmatic support system. Once fully implemented at the end of the decade, the Navy believes the new concept will create a "paperless" maintenance system for use at sea as well as onshore.

E-21 p. 2

One common tenet of this concept is to merge electronics and avionics ashore. According to Navy officials, the concept did not come about as a result of any downsizing of forces. They noted it is "a technology that we have been developing to optimize maintenance resources to better support the operations from the sea." Currently, submarine, surface and aviation, as well as Marine Corps organizations, are stovepiped in executing maintenance policies and operations. Organizations or units that foster duplication in planning, execution and management are to be replaced by integrated intermediate maintenance activities. This initiative will provide an industrial capability and capacity which would specify infrastructure, set priorities, assign workload, and manage supply support. The

E-21 p. 3

E-21 ATTACHMENT 1 p. 3

E-21 ATTACHMENT 1 p. 6

and will establish maintenance centers of excellence prototypes, such as aviation, motor rewind, etcetera. Additionally, the integration and consolidation of intermediate maintenance activities, rightsizing engineering technical support, and regionalizing integrated supply operations, known as Fleet Industrial Supply Centers, will be initiated. As part of the integration and consolidation, fleet maintenance officers will insure the optimum intermediate level of interoperability is accomplished, while maintaining reversibility. Also, analyses of prototype cases will be developed and reported.

E-21 ATTACHMENT 1 p.9

The second phase is scheduled for the 1996 to 1997 time frame and involves the integration and consolidation of intermediate and depot level maintenance, and creation of regional maintenance centers. During this phase, the Navy will address the financial management issues that include developing the funding process for intermediate and depot level maintenance, the organizational structure, and information management issues of a single maintenance process. Beginning in 1997, a third phase would implement the single maintenance process, the common business practices, and integration of information management systems.

E-21 ATTACHMENT 1 p.9

2. Marine Corps

No changes in the maintenance concept in the Marine Corps are anticipated. The Marine Corps, however, is employing various methods to reduce the maintenance workload at the organizational and intermediate maintenance level. Two of the methods used to remove equipment offline and keep it in good operational condition include the Force Administrative Storage Program (FASP) and the Marine Expeditionary Force Dehumidified Program (MEFDEP).

E-24 p.1,2 E-24 p.5 E-24 ATTACHMENT 2 p.6

The FASP concept enables conservation of limited maintenance resources by removing selected equipment from use for extended time periods. The driving force behind administrative storage of vehicles and equipment, for example, is the reduction in manpower experienced by the Marine Corps.

E-24 ATTACHMENT 2 p.6 E-24 p.7

Major subordinate commands have the ability to establish FASP at the unit level and maintain the equipment locally for rapid recall. Once placed in administrative storage, the equipment must remain for a minimum of 6 months, but cannot remain longer than 18 months. During storage, the equipment is preserved, maintained, exercised where necessary, and periodically inspected.

E-24 ATTACHMENT 2 p.1 E-24 p.6 ATTACHMENT 1 p.2.

be performed, reduces preventive maintenance, makes planning and scheduling a priority, reduces loss and wear of consumables, and extends equipment life.

E-24 ATTACHMENT 1 p. 1

The MEFDEP is a comprehensive, force-wide program designed to reduce maintenance requirements and enhance operational readiness by using state-of-the-art dehumidification technology to maintain a controlled environment for both active status and administratively stored tactical equipment. The program is being implemented in four phases. The first two phases, research and assessment, have been completed. Currently, the third phase demonstration is underway. In this phase, long term demonstrations of dehumidification are being performed and analyzed. The final phase will involve full scale implementation of those demonstrations completed in phase three which have shown the greatest potential for maintenance cost and manpower savings. Preliminary observations indicate this method is proving beneficial in preventing corrosion, a major problem for equipment maintenance.

E-24 ATTACHMENT 2 p. 7

Marine Corps officials related these two methods of reducing maintenance workload are presently limited in scope, especially the MEFDEP, but the prospects for greater application remain strong.

IV. IMPACT OF DOWNSIZING ON U.S. AIR FORCE MAINTENANCE ACTIVITIES

A. Traditional Air Force Maintenance Concepts

Air Force policy has traditionally embraced three levels of maintenance to support its aircraft and weapon systems. The three levels of maintenance--organizational, intermediate level, and depot--each represent increasing degrees of maintenance capability.

J-4 p.1 p.6

Air Force flight line personnel comprise the first level of maintenance (organizational). They diagnose item failures, replace failed items with serviceable spares, and turn the broken item in to the second level of repair, the intermediate repair facility. The intermediate repair facility, which is usually co-located with the aircraft at the operating base, repairs the broken item by replacing faulty subassemblies. However, if the failure is beyond the facility's repair capability, the item is shipped to an Air Force depot, the third level of maintenance. Depot repair actions can be either relatively simple (repair and return) or can be more complex repairs meant to restore the failed item to a "good as new" condition.

J-4 p.6

Traditionally, Air Force combat units deploy with their organizational and intermediate levels of maintenance. Consequently, the Air Force established its peacetime maintenance operations to accommodate the need to deploy, if necessary. For example, Air Force intermediate maintenance activities are consolidated on Air Force operational bases and support all assigned squadron peacetime flying operations. However, the consolidated intermediate maintenance facility is organized with separate "strings" of automated test equipment so that as each combat squadron is deployed, an intermediate maintenance capability with test equipment and spare parts packages can be deployed simultaneously and immediately support combat operations in the deployed area.

J-1 p.4

B. Changes in Maintenance Practices

In the early 1990's, diminished worldwide military threats and shrinking budgets forced DOD to reduce the size of the military force and search for ways to become more efficient in maintaining the force. DOD began to address these issues with the publication of Defense Management Review Directives (DMRD)

J-16 p.1

1. Transferring Depot Level Reparable Items to the Stock Fund

Prior to October 1992, Air Force units received reparable items from the wholesale system at no cost. However, in October 1992, Air Force units began using OMAF to buy reparable replacement items from the wholesale logistics system. Air Force officials noted the change resulted from DOD's decision to transfer management of reparable items from appropriation accounts to DOD stock funds. J-16 p.2

According to Air Force officials, in the early 1980's the Navy was accumulating unserviceable items at its installations and ships while the wholesale system continued buying the same item. In 1981, the Navy decided to procure reparable items at the wholesale level with stock funds rather than procurement funds and to require its shipboard units to use OMN to purchase these items. The rationale was, if units had to pay for replacement items, the units would be more inclined to repair the items locally and to return those which could not be repaired locally to wholesale level repair depots. According to DOD officials, the Navy's experience with stock funding reparables improved Navy units' management and control of reparable items. Further, the Navy's return rate of unserviceable items to depots increased and demand and procurement at the wholesale level decreased. J-16 p.2

Air Force officials stated the success of the Navy's experience led DOD to direct the Air Force to implement a similar practice. Accordingly, in October 1990, the Air Force began procuring its reparables at the wholesale level with stock funds and, in October 1992, Air Force units were required to use OMAF funds to purchase items.

Initially, Air Force officials voiced concern over the anticipated savings being projected by DOD from managing depot level reparable items in the stock fund. Air Force officials contended that the problems which prompted the Navy to adopt the concept did not exist in the Air Force. Air Force units were already repairing all items that could be repaired at the installation level and the Air Force did not have a problem with the timely return of unserviceable items to Air Force depot repair facilities. Notwithstanding the Air Force concerns, DOD directed the Air Force to transfer depot level reparables to the stock fund. DOD projected that such an initiative would result in a ten percent cost reduction and reduced the Air Force's budget accordingly. J-16 p.2

Force organization created a special section to review reparable item processes to determine if items being returned to the depot for repair could be repaired either by Air Force base maintenance personnel or by private contractors. Also, efforts were made to find repair solutions on expendable and consumable items which were never designed to be repaired. J-16 p. 3

Air Force officials indicated initial efforts to repair as many items at the installation level were very successful. However, shortly after the stock funding concept was established, the Air Force initiated a new maintenance concept called two-level maintenance which directly contradicted the intent of stock funding depot level reparable items.

2. Two-Level Maintenance Concept

In July 1991, the Air Force began testing a new concept called two-level maintenance. The primary objective of two-level maintenance was to reduce or eliminate the intermediate maintenance level at Air Force installations and perform the repair work centrally at Air Force repair depots. J-1 p.4 p.5

Air Force officials provided some insight as to how the two-level maintenance concept began. They noted the idea behind two-level maintenance emerged from an early 1980's RAND Corporation study. The study concluded that intermediate-level maintenance could be accomplished centrally at Air Force depots without major repair disruptions. The study also concluded removing the intermediate level repair capability would significantly reduce the need for expensive test equipment and could substantially reduce the deployment footprint for Air Force squadrons without jeopardizing maintenance support. However, Air Force officials stated the RAND study was not taken seriously until 1991 when it became apparent that the Air Force was going to have to downsize significantly. J-1 p.5 J-3 p.8

a. Coronet Deuce

In 1991, the Air Force began its initial test of the two-level maintenance concept under a program called Coronet Deuce. Phase 1 of the program tested F-16 C/D avionics components under the two-level maintenance concept. The components selected for the test were chosen because they were the most reliable avionic systems in the Air Force inventory. Phase I began July 1, 1991, and was completed on March 30, 1992. J-3 p.9 p.10 J-21 p.1

prototype to quickly detect conditions where the Line Replaceable Units (LRU's) were serviceable because test results showed that 28 percent of the items being returned to the depot were operable. The final test period (Phase III) began October 1, 1992, and continued until September 30, 1993, with the objective to sustain and institutionalize process improvements. J-3 p.11

The Coronet Deuce program developed various practices which were adopted for the two-level maintenance program. For example, in October 1992, the Air Force began using Federal Express and commercial carriers to move items within the two-level maintenance program. Also, diagnostic equipment was provided to installations to detect "cannot duplicate" failures thereby eliminating the unnecessary return of items to the repair depot. Air Force personnel at the installation level began performing limited repairs to minimize the number of items being sent to the depot and substantial efforts were made to cross-cannibalize items being returned. J-3 p.12

The test program of two-level maintenance resulted in a number of successes:

-- Base-level repair time (flight-line detection and repair) averaged 10.8 days prior to the test and dropped to 2.3 days after Coronet Deuce (flight line detection and screening). J-3 p.14

-- Depot repair time, (receipt and storage, repair and return to depot stock) was reduced from an average of 43.8 days to 2.4 days. J-3 p.16 p.17

-- Total repair cycle time was reduced from an average of 70.5 days to 10.5 days. J-3 p.18

-- The Air Force concluded two-level maintenance could work with any system and the improvements found during Coronet Deuce could be sustained. J-3 p.19

b. <u>Coral Star</u>

In April 1993, the Air Force began testing two-level maintenance for selected propulsion systems. One of the tests, called Coral Star, included the F-100-220 engine which is used on selected F-15C/D aircraft, selected F-16 aircraft, and all F-15E aircraft. The test period continued through September J-3 p.19

not been able to achieve a noticeable reduction in the repair cycle time for engines. For example, the Air Force set a standard of 25 days for the F-100-220 repair cycle: from failure diagnosis at the base, to shipment to the depot, to repair and return of the engine to the base. The officials noted they have never been able to achieve the standard for the F-100-220 engine. During April and May 1994, the repair cycle time for the F-100-220 engine required 71 and 69 days, respectively. J-3 p.29

Although Air Force officials are reluctant to call two-level maintenance for propulsion systems a failure, they point to a number of situations unique to propulsion systems that may interfere with successful implementation of two-level maintenance on these systems: J.16 p.3

- -- Unlike avionic components, propulsion systems are too large to transport by mail or Federal Express and must be transported by truck to the depot repair facility.

- -- The Air Force is experiencing a parts shortage for propulsion systems throughout the logistics system. A general parts shortage is exacerbated because depot repair facilities are receiving engines with many components requiring replacement. Accordingly, the depot repair facility cannot complete repairs in the scheduled time on many systems. J-16 p.4

- -- Because the depot repair facility cannot return engines in a timely manner, Air Force units are having to cross-cannibalize engine components to the maximum extent possible on engines being returned to the depot repair facility. For example, Nellis Air Force Base has an authorization for nine spare engines to support its flying hour program. Nellis officials noted that seven of its nine spare engines are in the depot repair facility awaiting parts and they have only two spare engines remaining. J-16 p.4

Air Force officials noted that the "jury is still out" on the extent to which two-level maintenance can be effectively implemented Air Force-wide on all weapon systems. They J-3

repair depots. However, testing of the two-level maintenance concept for avionics (Coronet Deuce) and engines (Coral Thrust/ Coral Star) has disclosed that only systems with a high degree of reliability can be transferred to two-level maintenance without jeopardizing support to flying missions. J-1 p.6

Accordingly, the Air Force has since revised its estimate of both the number of aircraft systems and components which will be transferred to two-level maintenance and the number of intermediate maintenance personnel that would be reduced. For example, instead of eliminating 6,500 Air Force intermediate avionics and propulsion maintenance personnel, the current plan calls for a reduction of only 1,741 maintenance positions: 1,058 avionics maintenance personnel and 683 propulsion maintenance personnel. J-1 p.6

c. Two-Level Maintenance Test Incentives

Ogden Air Logistics Center officials noted that when the two-level maintenance program was being formally tested in FY 1993, they provided an incentive for Air Force activities to endorse and participate in the program by artificially reducing the price charged to installations for two-level maintenance items. In FY 1993, customers paid the actual repair cost and a reduced surcharge for two-level maintenance items. J-21 p.6

However, in FY 1994, the Ogden Air Logistics Center discontinued the reduced surcharge practice and concurrently, the Air Force increased the FY 1994 surcharge rate. As a result, these actions inadvertently caused Air Force activities to experience a major price increase on all two-level maintenance avionic items. For example, the exchange price charged to Air Force activities on one item increased from $33,351 in FY 1993 to $79,837 in FY 1994. J-21 p.7 J-23 p.3

Discussions with Air Force installations disclosed they were not aware that FY 1993 prices had been artificially reduced as an incentive for two-level maintenance. Because of the large price increases, installations have had to request additional funds from their major command to continue operating. As of April 1994, one major Air Force command needed $39 million in additional funds to offset the price increases for two-level maintenance avionic items and the Command was not sure where the funds would be obtained. J-2

3. Changes in Deployment Strategies

status. Deployment models indicate that avionic repair requirements can be maintained and supported directly from the depot repair facility without having to deploy maintenance personnel. Instead, an initial aviation package which contains sufficient support for 30 days operation will deploy with the aircraft squadrons. For F-16 and A-10 aircraft, the Mobility Reparable Spares Package (MRSP) contains sufficient avionic LRU's and spare engines to support combat operations during the first 30 days. The F-15C/D/E and the F-111 aircraft only deploy with an Avionics Intermediate Shop (test equipment to detect faulty LRU's) and sufficient LRU spares in the MRSP to sustain operations for 30 days.

J-3 p.35

J-1 p.6

Air Force officials noted that the new deployment strategy significantly reduced the deployment footprint and increased mobility capability for those activities under two-level maintenance. For example, the typical aviation package for a F-15 C/D squadron deployed to Southwest Asia required 17 C-141's for transport. Under two-level maintenance, only 15 C-141's are required.

J-1 p.6 p.7

Air Force officials were not certain how deployment strategies for propulsion systems would change. They believe some of the two-level maintenance personnel located at the depot repair facility may have to deploy with the aircraft to maintain combat operations. However, those decisions are still being discussed.

J-1 p.7 J-3 p.35

Air Force Base officials are concerned that two-level maintenance may not be able to support combat operations if Air Force units have to deploy. Base officials explained when the Air Force used its deployment model to determine if two-level maintenance could support deployed forces, the model contained some assumptions that were optimistic if not outright erroneous. First, the model assumed there would be no constraints on manpower or spare parts; they would have all of the trained personnel necessary to repair items and the spare parts needed would be immediately available for the repair process.

J-21 p.5

The model also assumed there would be no constraints on dedicated transportation to and from the area of conflict. With these assumptions, the mobility model predicted that any contingency could be adequately supported by two-level maintenance without deploying personnel to the theater of conflict (support could be achieved from CONUS two-level maintenance activities located at the depots)

J-21

returned from deployed areas. They pointed out the majority of two-level maintenance items are transported to and from the maintenance sites by Federal Express, United Parcel Service, or similar businesses. They did not believe these companies would be operating in a deployed area and did not know if the Air Force had dedicated transportation to evacuate unserviceable items to repair facilities. They noted without trained personnel, adequate spare parts, and dedicated transportation, the two-level maintenance concept would not be able to support deployed units. J-21 p.5

4. Conflicting Concepts

The Air Force logistics community has been slow to recover from past decisions to implement contradicting concepts of two-level maintenance and stock funding of depot level reparables. Air Force officials stated they were at a loss to explain how they were to implement one concept which requires maximum repair effort at the base level (stock funding depot level reparables) and simultaneously try to implement a concept that eliminates repair capability at the base level (two-level maintenance). Air Force officials explained when depot level reparable items were transferred to the stock fund, substantial emphasis was asserted at the installation level to locally repair as many items as possible. J-16 p.5

To accommodate the need to maximize repair at the installation level, base commanders created special activities under a project called Gold Flag to assess current repair programs and find ways to locally repair items instead of returning unserviceable items to depot facilities. Air Force officials stated the initial efforts under the Gold Flag program were very successful, as they were able to identify items which could be repaired at intermediate maintenance facilities or through contractors at significant savings to the installation. However, shortly after actions were taken to establish Gold Flag, the Air Force began its implementation of two-level maintenance which had the objective of substantially reducing, if not eliminating, all base level repair. J-16 p.5 p.6

Air Force base officials noted two-level maintenance has resulted in situations where many items, which could be easily and economically repaired at the base, are being sent to depot repair facilities. Conversely, Air Force base level officials persist in attempting to find ways to repair items through contracts which are not subject to two-level maintenance. Parts falling into this category include expendable and consumable items which were not designed to be repaired. J-16 p.6

but are not subject to two-level maintenance. One Gold Flag activity determined many expendable and non-reparable items could be repaired and returned to the supply system for which Air Logistic Centers would pay credits equal to the purchase price of the item. Accordingly, the Gold Flag activity awarded a contract to have these items repaired. The Gold Flag activity suffered a major financial set back because the Air Logistics Centers discontinued giving credits for many of the items being repaired. However, when the Air Logistics Centers began to deny credits for the repaired items, the Gold Flag activity had to pay the contractor for the repaired items without receiving a reimbursement. As a result, the Gold Flag activity's savings report for FY 1994 will show a negative figure unless the Air Logistic Centers are directed to reimburse them for the repaired items.

J-16
p.5
p.6

Discussion with Air Logistics Center officials disclosed that the problem experienced at the one Gold Flag activity is common throughout the Air Force. They noted credits are being denied on these items because the Air Force is in a long supply or excess status on the items being repaired. If the Air Force logistics system has a requirement for an item, bases (Gold Flag activities) are given a 100 percent credit for serviceable items returned to supply. Air Logistics Center officials analyzed several items on the one Gold Flag activity's contract list to determine why credits were denied. They found, without exception, credits were denied because the items were in a long supply status. The analysis also disclosed two of the items for which credits were denied were obsolete items no longer used on Air Force weapon systems.

J-21
p.5
p.6

C. Future Maintenance Plans and Concepts

Air Force officials expect further force reductions and restricted budgets will force them to continue maintenance concepts which include both two-level and three-level maintenance. They noted efforts are being made to improve the reliability of additional avionic and propulsion components applicable to current weapon systems so the components can transfer from three level to two-level maintenance. The officials also pointed out efforts are being made to engineer more reliability into new weapon systems such as the C-17 and F-22 aircraft in order to support these new systems with the less expensive two-level maintenance concept.

J-1
p.36

Air Force officials expressed a desire to do whatever is necessary to support all future Air Force missions. These com-

J-1

-- Air Force maintenance personnel are having to resort to cannibalizing spare parts from fully mission capable aircraft to support current flying hour programs. They noted the problem is not isolated to just a few aircraft because cannibalization rates are increasing on most weapons systems. Every squadron in the Air Force has at least one aircraft designated as a "cann bird" where parts are being removed in order to support the squadron's flying program. "Cann birds" are routinely rotated so that an aircraft is not down for more than 30 days. J-16 p.4

-- Air Force maintenance personnel are using other sources such as lateral support (obtaining items from other organizations), "robbing" MRSP's (used to support the squadron in deployment), and cross-cannibalizing components from items being sent to depot repair facilities under two-level maintenance to support their flying hour programs. Even with these sources, shortages are outpacing the ability of Air Force maintenance personnel to obtain sufficient spare parts to support aircraft systems. The 1st Fighter Wing had 18 F-15 aircraft designated in a "not mission capable" status because spare parts were not available (3 of the 18 aircraft were "cann birds"). J-16 p.5 J-1 p.2 p.3

-- Chronic spare part shortages will impede the ability to deploy Air Force Wings. Air Force Fighter Wings consist of three separate fighter squadrons. Those Wings with deployment missions are authorized a MRSP for each squadron. Spare part shortages have resulted in the practice of using the third squadron's assets (aircraft, spare parts, support equipment, and personnel) to fill shortages in the remaining two squadrons before they deploy. The third squadron would be incapable of deployment. This practice was in effect during Operation Desert Storm and continues today. J-1 p.2 J-16 p.5

* * * * *

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REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

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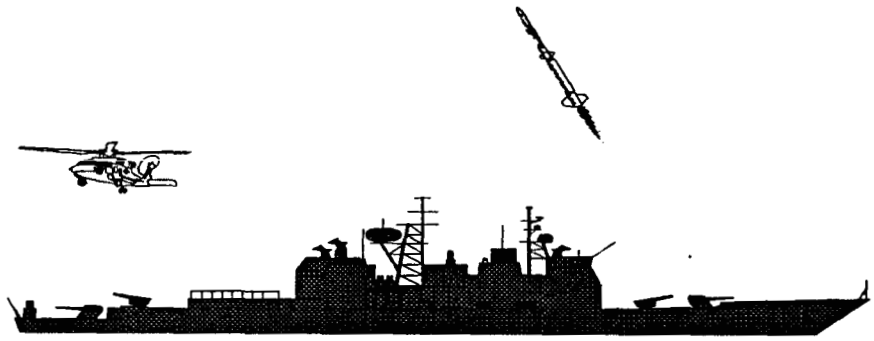
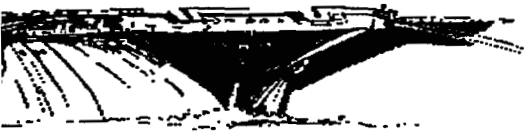


RADM JIM TAYLOR
CHAIRMAN
MAINTENANCE SUPPORT QMB



REGIONAL NAVAL MAINTENANCE

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REQUIREMENT

. RESPONSE

I. PLAN

V. STATUS

. ISSUES / BOUNDARY CONDITIONS

I. BRAC ASPECTS

II. GOALS SUMMARY

59% to commercial - shipyard
35% to commercial - aviation

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

REQUIREMENT

CES SHOULD REDUCE EXCESS MAINTENANCE URCES AND CAPACITY WHILE MAINTAINING IRED READINESS LEVELS. FOCUS SHOULD BE EGIONALIZING AND CONSOLIDATING TENANCE FUNCTIONS, INCLUDING CROSS-ICING SUCH FUNCTIONS WHERE OPRIATE."

Defense Planning Guidance

(DPG PAGE 61)

MLINE LOGISTICS INFRASTRUCTURE."

(DoD STRATEGIC LOGISTIC PLAN GOAL #3)

SER/CONSUMER SEES ONLY A SINGLE, SSIBLE, RESPONSIBLE PROVIDER."

(FLEET SUPPORT QMB KEY ACCOMPLISHMENT #2)

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
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ENANCE STRATEGY REQUIRES:

RESPONSIVE ORGANIC INDUSTRIAL CAPACITY
ARGETTED TO CORE

KEPT LEVEL LOADED

WORK FORCE WHICH CAN FLEX TO MEET WORKLOAD /
OPERATIONAL SCHEDULE

CAPABLE PRIVATE SECTOR

HENCE, REGIONAL MAINTENANCE

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

TOTAL QUALITY LEADERSHIP

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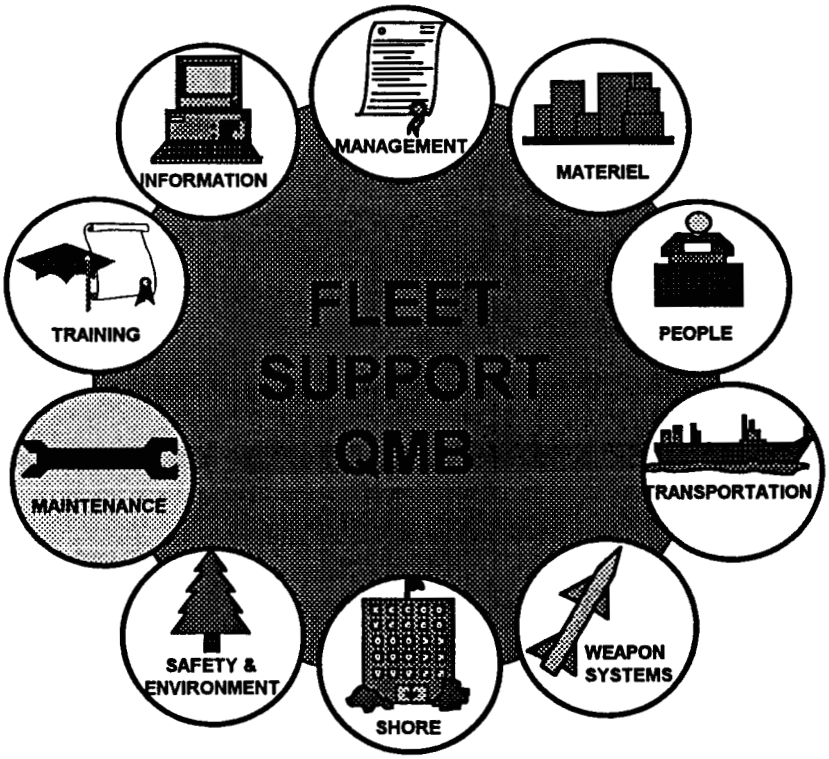
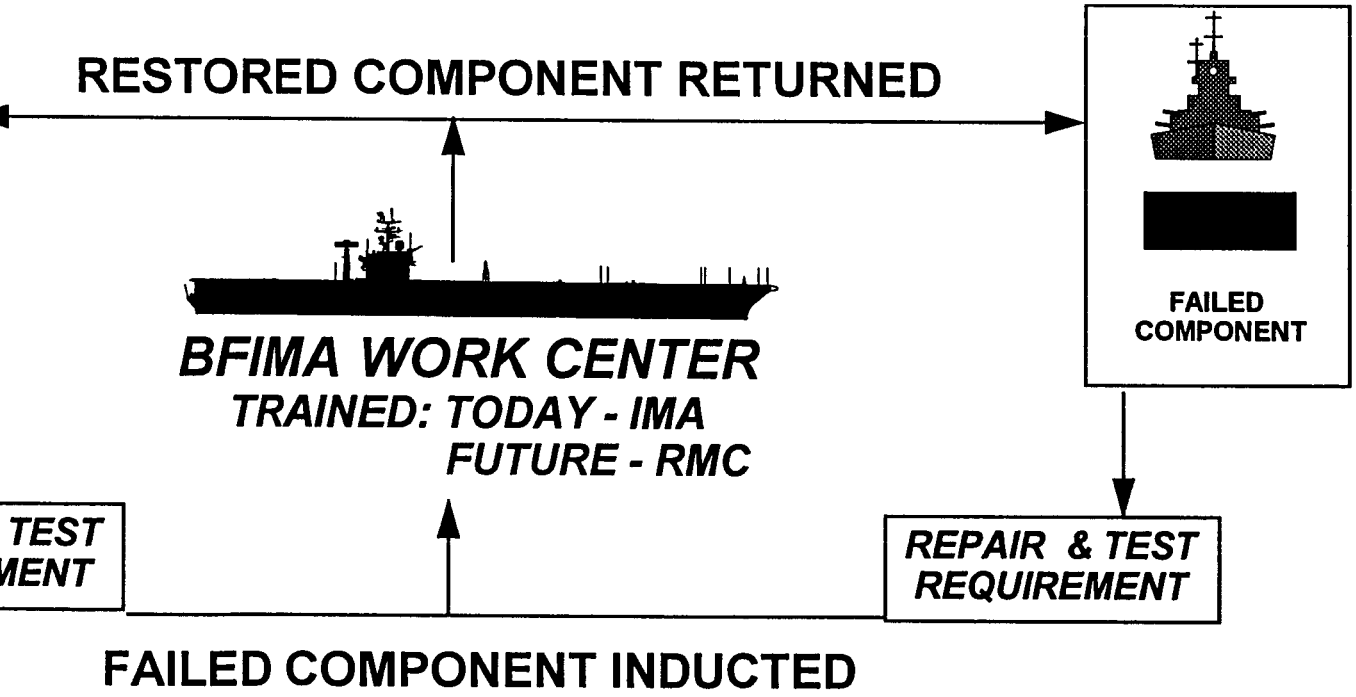


REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

TODAY'S BATTLE FORCE IMA



REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

ASHORE NAVAL MAINTENANCE OBJECTIVES

Include depot and intermediate areas.

- ELIMINATE EXCESS INFRASTRUCTURE
- IMPROVE MAINTENANCE PROCESS
- INTEGRATE SUPPLY AND MAINTENANCE
- COMPATIBLE ADP
- MILPERS TRAINED BY DEPOT ARTISANS
- PRESERVE:
  - SYSCOM TECHNICAL CONTROL
  - LIFE CYCLE SUPPORT
  - RESPONSIVENESS TO FLEET
  - READINESS OF FLEET

FAILED COMPONENT

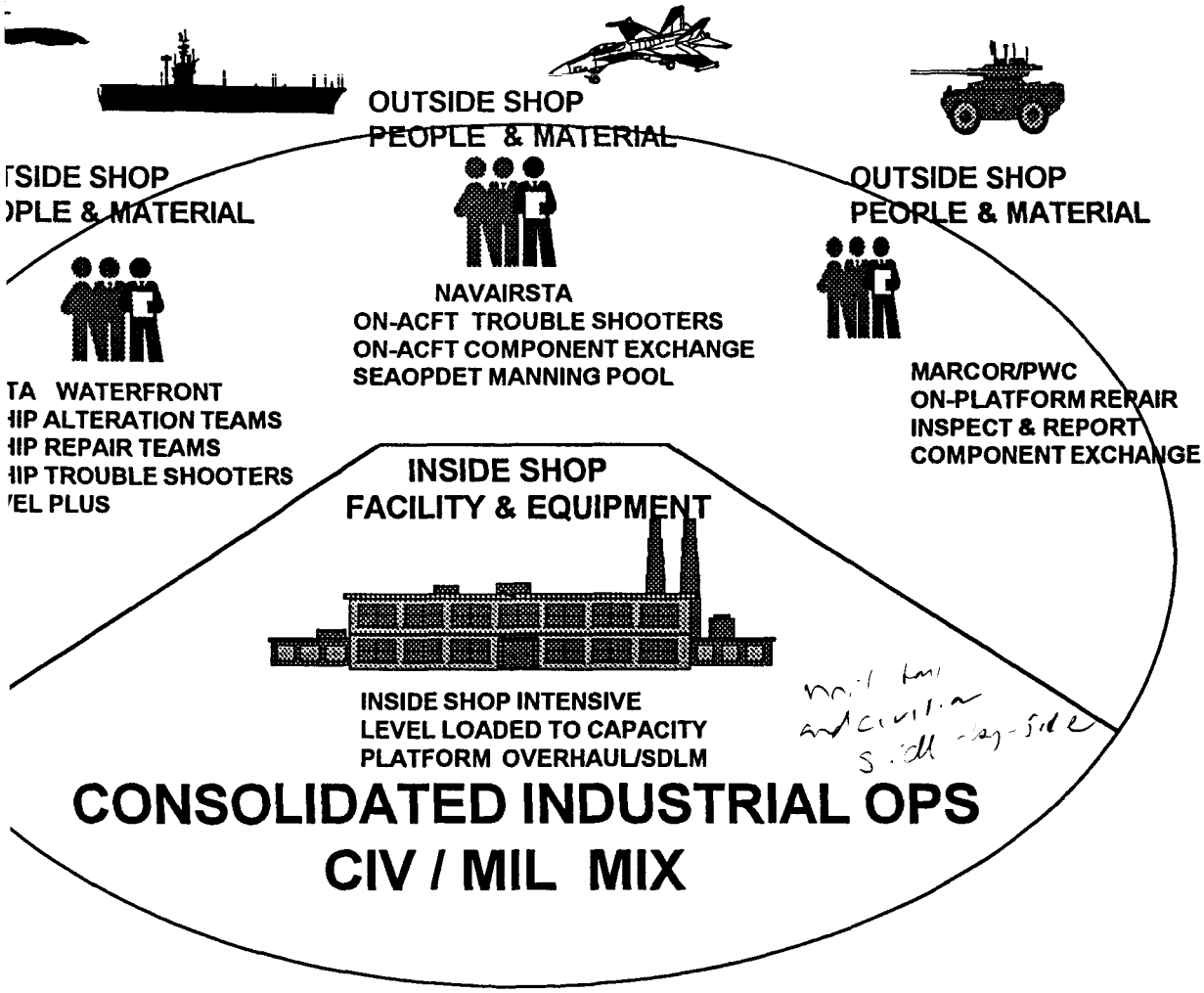
RESTORED COMPONENT

REGIONAL MAINTENANCE CENTER

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

FLEET MAINTENANCE END STATE



REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

PRECEPTS

(APPROVED: 15AUG94 CINC's CONF)

EGIONAL MAINTENANCE POINT OF CONTACT

. INDUSTRIAL CONSOLIDATION

ED CIVILIAN AND MILITARY WORK FORCE

ORTING BY MAINTENANCE COMMANDERS

M

SUPPORT SYSTEM

COMMANDER RETAIN TECHNICAL AUTHORITY

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

PHASED EXECUTION

NAVOP 06/94 CNO 282136ZMAR94

)NE FY95-99

:NANCE CENTERS OF EXCELLENCE PROTOTYPES

_ CONSOLIDATION / INTEGRATION

SIZE ENGINEERING TECH SUPPORT

NALIZE INTEGRATED SUPPLY OPERATIONS-FISC

WO FY96-99

)-LEVEL CONSOLIDATION / INTEGRATION

NAL MAINTENANCE CENTER

HREE FY97-99

: MAINTENANCE PROCESS

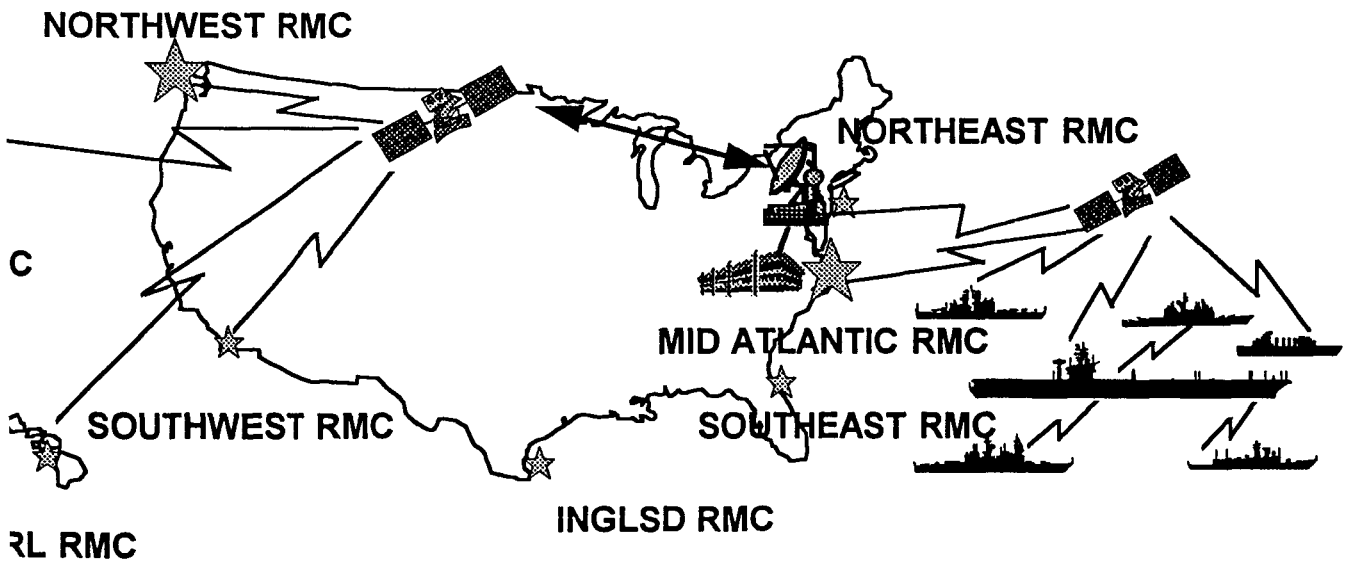
)N BUSINESS PRACTICES

RATED INFORMATION MGMT SYSTEM

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

GIONAL MAINTENANCE CENTERS



IFIC FLEET

RL HARBOR
THWEST
THWEST
TPAC

ATLANTIC FLEET

NORTHEAST
☑ MID ATLANTIC
SOUTHEAST
INGLESIDE

☑ AUTHORIZED FOR FY96 STAND-UP

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

REGIONAL PARTICIPANTS
MIDDLE ATLANTIC

. HUB

- K NAVAL SHIPYARD
- HERRY POINT
- PORTSMOUTH
- NEWPORT NEWS

MA

- RFOLK
- LE CREEK
- RTSMOUTH -Carrier
- PR DEPT)
- PR DEPT)
- FOLK
- NORFOLK

- **AVIATION IMA**
  - NAS OCEANA (AIMD)
  - NAS NORFOLK (AIMD)
- **NAVAL WEAPONS STATION**
  - NAVWEPSTA YORKTOWN
  - NOC EAST
- **PWC**
  - PWC NORFOLK
  - PWC YORKTOWN
- **MSC**
  - MSC MIDLANT

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

REGIONAL PARTICIPANTS MIDDLE ATLANTIC (CONT)

)RFOLK

L

NT

S

JRFACE

ET DAM NECK

ST

NAL

VBASE NORFOLK

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

FLEET HIGHLIGHTS

FORCE IMA
SHIP)/ NALCOMIS(AIR) AIS INTERFACE (CVN 70 & 73)
ECHNICAL SUPPORT CENTER
NT (01 OCT 93) - PAC (01 OCT 94)

/EST REGION
AL MAINTENANCE CENTER (PH I) STOOD UP
EPAIR CONSOLIDATION (I-D) (PAC PROTOTYPE)
OPE REPAIR CONSOLIDATION (I-D)
BREAKER REPAIR CONSOLIDATION (I-D)

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

EGO REGION
SEL ENGINE CONSOLIDATION (I-I)
IBRATION CONSOLIDATION (I-I)(D-I)
LL BOAT REPAIR CONSOLIDATION (I-I)
NDRY STUDY INPROGRESS (NADEP NI OR PSNS)

HARBOR REGION
F/ SUB IMA INTEGRATION/CONSOLIDATION (I-I)
DOCK LEASE FROM PHNSY (D-I)
TROLLED INDUSTRIAL FACILIY (I-D)
ATE MULTI-SERVICE FACILITY (NAVY/ARMY/AIR NAT
RD/COAST GUARD)

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

TIC REGION
EWIND / MACHINE SHOP CONSOLIDATIONS (I-D)
OTOTYPE)
VELEX, GAS TURBINE CONSOLIDATIONS
RF I)
TED MAINTENANCE ASSIST TEAM NNSY
S SUBLANT IMAs (D-I)
LS LAB CONSOLIDATION (I-I)(D-I)
DAT REPAIR CONSOLIDATION (I-I)
ON CONTROL CONSOLIDATION (I-I)

T REGION
CUMULATORS PLATED AT NADEP
CONSOLIDATION AT TRF (SURF I-SUB I)
TION CONSOLIDATION (AIR I-SURF I)
CER REPAIR (TRF SUPPORT SURF)

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

DE REGION
BRATION INTERSERVICE WITH CORPUS CHRISTI
' DEPOT

EAST REGION
BRATION CONSOLIDATION (STUDY)
SCOPE REPAIR CONSOLIDATION (STUDY)
OR REPAIR CONSOLIDATION (STUDY)

TOTALS
98 PILOTS/STUDIES - 37 STARTED

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

ISSUES

NTENANCE METHODOLOGIES

VIATION: REPLACE COMPONENT / REPAIR FOR TOCK

URFACE: REMOVE/REPAIR/REINSTALL COMPONENT

VIATION DOCUMENTS MAINTENANCE COMPLETIONS

URFACE DOCUMENTS MAINTENANCE DEFERRALS

- *INTEGRATED FLEET MAINTENANCE MODEL ADDRESSING*

ANCIAL

EPOTS / TRF / SRF / IMA FUNDED DIFFERENTLY WITH IFFERENT ACCOUNTING REQUIREMENTS

USTOMER DOES NOT SEE FULL COST OF I-LEVEL

- *NAVCOMPT ASSISTING*

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

ALCOMIS/MRMS/LDS/BAIM/.....

O SINGLE POINT OF CONTROL

IFFERENT FUNCTIONS

INFORMATION SUPPORT QMB REGIONAL MAINTENANCE AIS PAT

NTENANCE WEDGE

1.28 BILLION 1995-2000

200 MILLION 1995

CONSOLIDATION + PROCESS IMPROVEMENT

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

BOUNDARY CONDITIONS

CONGRESSIONAL
- BUDGET
- BRAC
- 60 / 40 LEGISLATION
- FULL TIME EQUIVALENT (FTE) CEILING

DEPARTMENT OF DEFENSE
- DoD CORE
- JOINT INITIATIVES
- DBOF IMPROVEMENT PROGRAM

NAVY
- SEA / SHORE ROTATION
- FLEET REORGANIZATION
- TENDER PLAN

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
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QMB

BRAC ASPECTS

AC IS BOUNDARY CONDITION

GIONAL MAINTENANCE INITIATIVE HAS
DE NO IRREVERSIBLE DECISIONS

I (RDA) GUIDANCE ACKNOWLEDGED
GIONAL MAINTENANCE

AC DECISION WILL CLARIFY REGIONAL
NTENANCE CAPABILITIES

REGIONAL NAVAL MAINTENANCE

MAINTENANCE
SUPPORT
QMB

GOALS SUMMARY

T THE WEDGE THROUGH EXCESS
IINATION PLUS PROCESS
ROVEMENT

:GRATED MAINTENANCE TRAINING -
IA / REGIONAL REPAIR CENTERS

LE RESPONSIBLE, ACCOUNTABLE,
ESSIBLE PROVIDER OF MAINTENANCE
ACH REGION

Document Separator

ARMY DEPOT

MAINTENANCE

BRIEFING TO THE DOD

DEPOT MAINTENANCE TASK FORCE

3 FEBRUARY 1994

ARMY DEPOT MAINTENANCE

OVERVIEW

S DEPOT MAINTENANCE?

S OUR DEPOT MAINTENANCE REQUIREMENT?

D WE DETERMINE OUR REQUIREMENT?

D WE SELECT OUR SOURCE OF REPAIR?

ERFORMS DEPOT MAINTENANCE?

ED TOPICS

CADE OF CHANGE

NERSHIP WITH INDUSTRY

ES FACING THE ARMY

MENTS ON THIS STUDY

A DEFINITION

MAIN1

02/02/94 16:29 ☎617 7644 USAMC 022

WHAT IS DEPOT MAINTENANCE?

DEFINITION

'ERHAUL OF END ITEMS & COMPONENTS

RESTORATION TO COMPLETELY SERVICEABLE CONDITION. ITEM IS DISASSEMBLED AND ALL PARTS ARE REPAIRED OR REPLACED TO MEET SPECIFIED STANDARDS

OFFSHOO

IRON - INSPECT & REPAIR ONLY AS NECESSARY. ONLY OUT-OF-SPEC PARTS, NOT ALL, ARE REPLACED.

IPPORT TO LOWER LEVELS OF MAINTENANCE:

- TECHNICAL EXPERTISE - FORWARD, ON-SITE SUPPORT
- MAINTENANCE OVERFLOW
- TRAINING

DDIFICATION/MODERNIZATION/MINOR ALTERATION

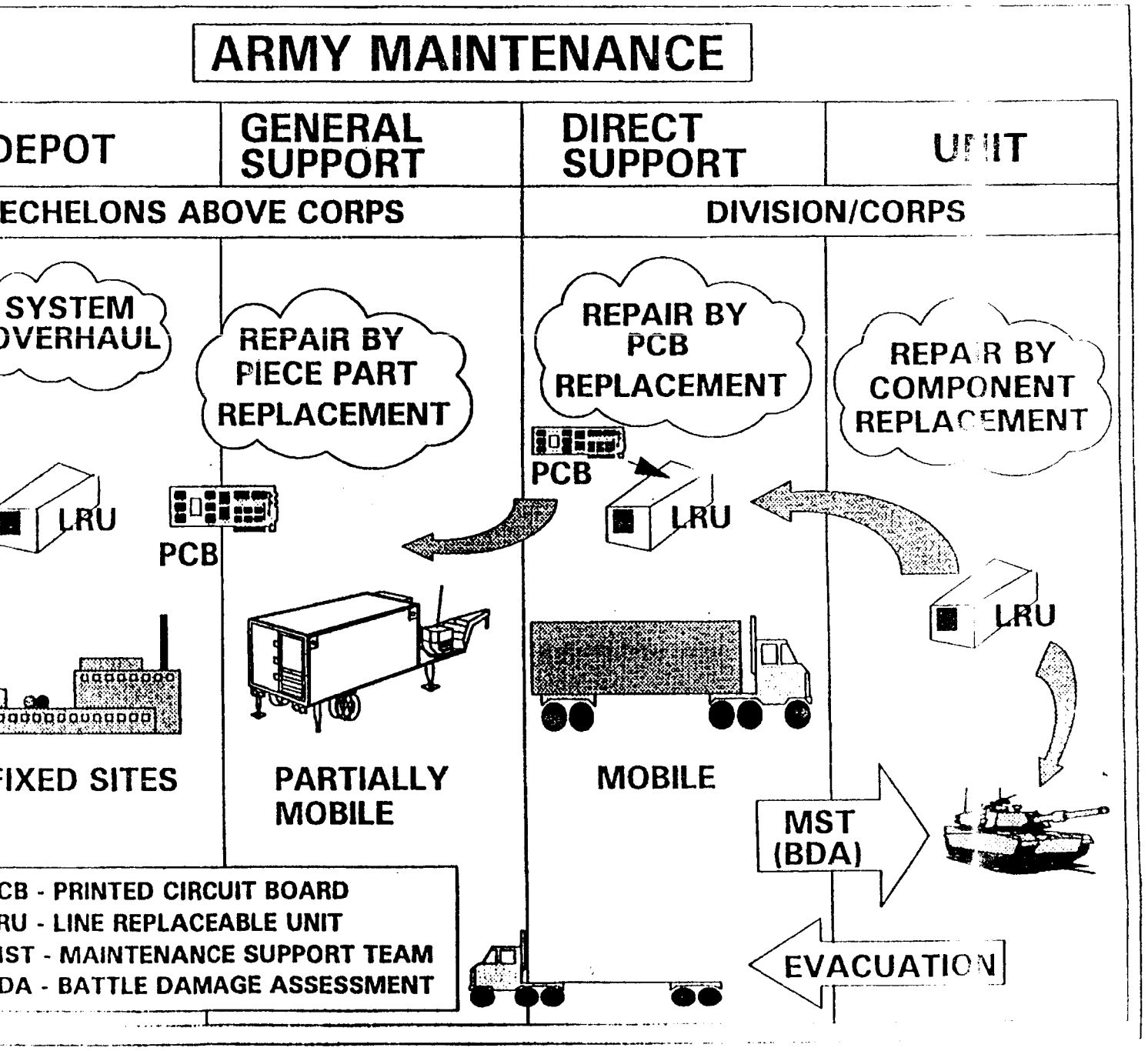
ECIAL INSPECTIONS

NDESTRUCTIVE TESTING OF REMOVED USED PARTS

ANUFACTURE OF PARTS/ITEMS NOT IN THE SUPPLY SYSTEM

RELATIONSHIP TO OTHER LEVELS

MAIN2


ARMY MAINTENANCE
DEPOT
GENERAL SUPPORT
DIRECT SUPPORT
UNIT
ECHELONS ABOVE CORPS
DIVISION/CORPS
SYSTEM OVERHAUL
REPAIR BY PIECE PART REPLACEMENT
REPAIR BY PCB REPLACEMENT
REPAIR BY COMPONENT REPLACEMENT
LRU
PCB
PCB
LRU
LRU
FIXED SITES
PARTIALLY MOBILE
MOBILE
MST (BDA)
EVACUATION
CB - PRINTED CIRCUIT BOARD
RU - LINE REPLACEABLE UNIT
IST - MAINTENANCE SUPPORT TEAM
DA - BATTLE DAMAGE ASSESSMENT

HOW DEPOT MAINTENANCE FITS INTO THE ARMY MAINTENANCE SYSTEM

SUMMARY

UNIT:
- QUICK FIX/RETURN
- REPLACE
- MINOR REPAIR, ADJUST, LUBRICATE

ECT SUPPORT:
EPAIR MINOR COMPONENTS,
REPLACE MAJOR COMPONENTS
EPAIR AND RETURN TO USER
OBILE FORWARD SUPPORT
MAINTENANCE TEAMS

GENERAL SUPPORT:
- COMPONENT REPAIR
- BACKUP DIRECT SUPPOR
- THEATER ORIENTED
- SEMI-MOBILE
- REPAIR FOR THEATER SUPPLY SYSTEM

DEPOT:
- OVERHAUL
- FIXED PLANTS
- REPAIR FOR ARMY SUPPLY SYSTEM

THE FUTURE

MAIN3

INTEGRATED SUSTAINMENT MAINTENANCE

FUTURE

INDIVIDUAL WEAPON SYSTEMS

> 100 INSTALLATIONS ARMYWIDE
(39 PRIMARY DOLs IN CONUS)

(LIKE INDIVIDUAL BUSINESSES)

ABOVE CORPS

ORGANIC VS. CONTRACT

DESCOM MSCs

NATIONAL MAINTENANCE CONTRACTS

DETERMINE SOURCE DEPOT REPAIR

CENTRAL INTEGRATED
WORKLOADING

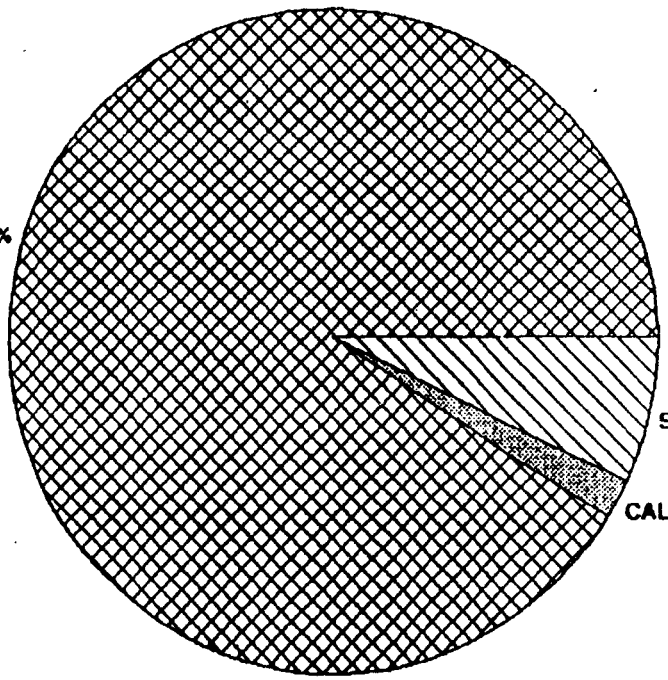
AFFORDABLE/EFFICIENT
SUSTAINING BASE
PEACE & WAR

GOAL: ISM - MAXIMIZE REPAIR CAPABILITY ABOVE DIRECT SUPPORT

DEPOT MAINTENANCE IS HARDWARE, SOFTWARE AND SUPPORT SERVICES

ORIES BY $'s:

FY93 DEPOT
MAINTENANCE PROGRAM
TOTAL $1520M



DEPOT MAINTENANCE IS 91% HARDWARE

MAGNITUDE

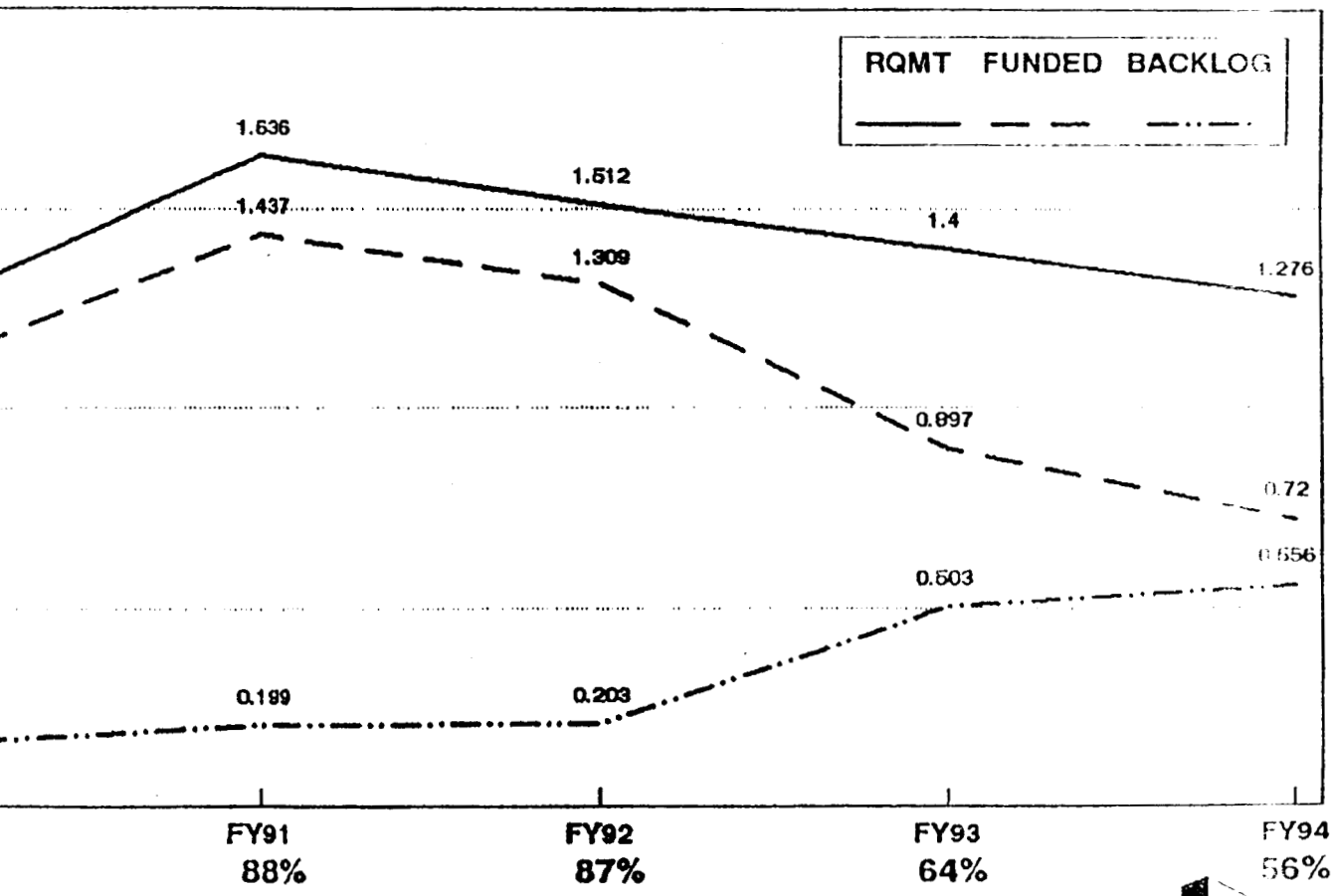
MAIN4

TS
ON
S

WHAT IS OUR REQUIREMENT?
- MAJOR ITEMS -

BACKLOG EXAMPLES
88 BRADLEYS
2150 MLRS PODS
3 M198
34 BLACKHAWKS
22 TANK RECOV

S



ESIDENT'S BUDGET, FY90 - FY94

DETERMINING THE REQUIREMENT

MIKE3

HOW DO WE DETERMINE OUR REQUIREMENT?

- FOR END ITEMS:
  - INSPECTORS IDENTIFY CANDIDATES FOR OVERHAUL (AIRCRAFT, COMBAT VEHICLES).
  - MATERIEL MANAGERS IDENTIFY REQUIRED CONVERSIONS AND MODIFICATIONS BASED UPON FIELDING SCHEDULES
  - MATERIEL MANAGERS FORECAST REQUIREMENTS FOR UPGRADES BASED UPON DIRECTED REDISTRIBUTIONS TO SATISFY FORCE STRUCTURE CHANGES.
- FOR END ITEMS AND COMPONENTS:
  - MATERIEL MANAGERS FORECAST ADDITIONAL REQUIREMENTS (E.G., CRASH DAMAGE) BASED UPON PROJECTED UTILIZATION, FAILURE RATES, PAST DEMANDS.
- FOR SOFTWARE MAINTENANCE:
  - MATERIEL MANAGERS IDENTIFY SOFTWARE DEFICIENCIES. THEY OBTAIN CONFIGURATION CONTROL BOARD APPROVAL FOR CORRECTIVE ACTIONS BEFORE INCLUDING IN DEPOT MAINTENANCE REQUIREMENTS.

MAIN7

HOW DO WE DETERMINE OUR SOURCE OF REPAIR?

PREVIOUS METHODOLOGY:

ARLY SYSTEM DEVELOPMENT, PROGRAM MANAGER SELECTS TYPE
OGISTICS SUPPORT. OPTIONS INCLUDE:

ORGANIC

IFE CYCLE CONTRACTOR

NTERIM CONTRACTOR

ISION IS BASED ON NUMEROUS FACTORS, INCLUDING:

COST OF SETTING UP MAINTENANCE.

SYSTEM DENSITY, LOCATION, AND PLANNED USE.

DESIGN STABILITY

- SUBJECTIVE
- NO DIRECT ANALYTICAL LINK TO WARFIGHTING

RGANIC SUPPORT, SUBSEQUENT INTERSERVICE ANALYSIS
ERMINES SOURCE OF REPAIR.

ARMY DEPOT

OTHER SERVICE DEPOT

- ACQUISITION MANAGERS PLAYED THE KEY ROLE.
- 700 MISSION-ESSENTIAL SYSTEMS REPAIRED IN ORGANIC DEPOTS.

NEW METHODOLOGY

WDEPOT24

CORE - NEW METHODOLOGY

N ANALYTICAL TOOL -- PROVIDES DIRECT LINK TO WARFIGHTING
UIREMENT... MINIMIZES RISK TO COMBAT COMMANDER... DEFINES
PUBLIC-PRIVATE WORKLOAD

FOR 45 CRITICAL ITEMS

1

REGIONAL CONFLICTS → DEPLOYED UNITS → DEPLOYED EQUIPMENT (PORTION OF TOTAL INVENTORY)

2

YED EQUIPMENT X FACTORS
- COMBAT DAMAGE
- USAGE
- ENVIRONMENT

= WARTIME DAMAGE REPAIR

3

IME DAMAGE REPAIR X ACTUAL REPAIR TIMES = WARTIME REQUIREMENT

4

IME EMENT − SURGE CAPABILITY + OR − ECONOMIC ADJUSTMENTS = CORE

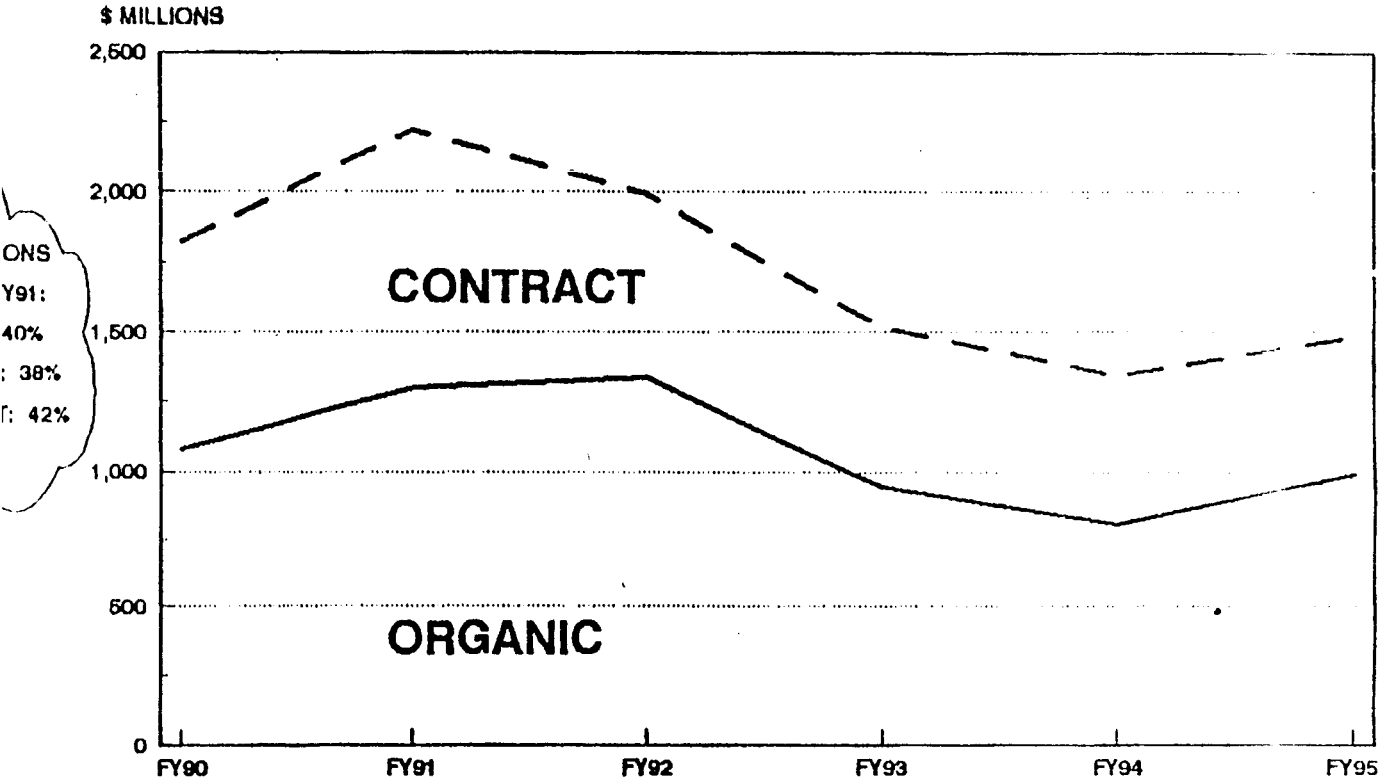
5

AL MENT − CORE = PRIVATE SECTOR WORKLOAD

WHO DOES THE WORK

MAINT

WORKLOAD ALLOCATION
MAJOR ITEMS AND COMPONENTS



ONS
Y91:
40%
: 38%
T: 42%

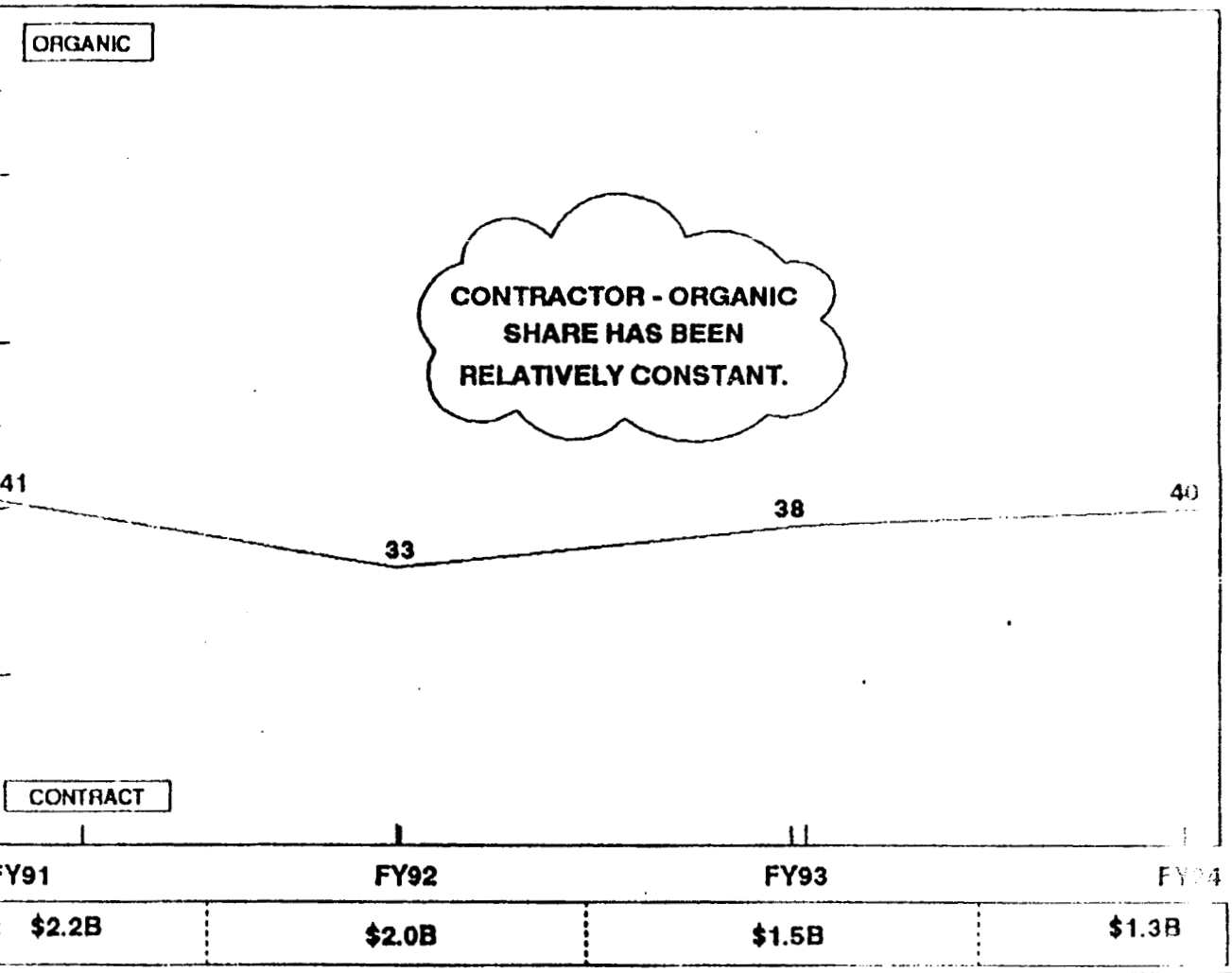
OTAL	1829	2225	1995	1520	1343	1486
CONTR	742	923	657	574	537	495
RG	1087	1302	1338	946	806	991

PERCENT SHARES

MAIN16

CONTRACT - ORGANIC SHARE

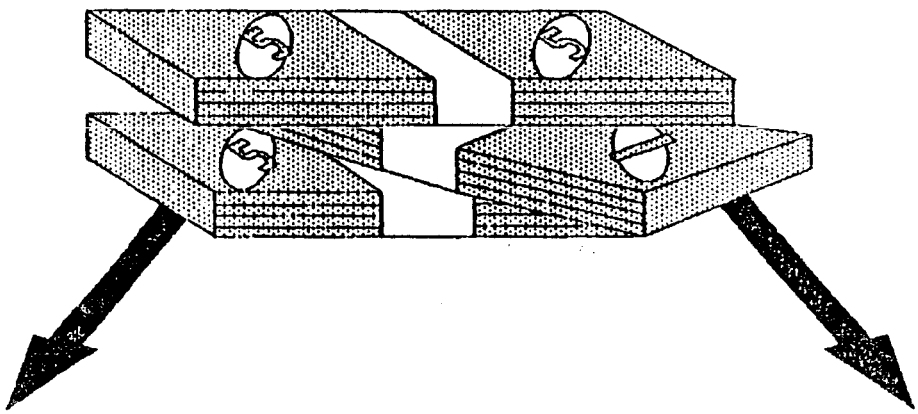
FISCAL YEARS 1991 - 1994



HOW THE $ ARE SPENT

MAIN22

HOW THE DOLLAR IS REALLY SPENT



TO DOD DEPOTS

DEPOT

PARTS
UBCONTRACTING

19 ¢ TO
PRIVATE
INDUSTRY

39 ¢ TO MAINTENANCE
CONTRACTS

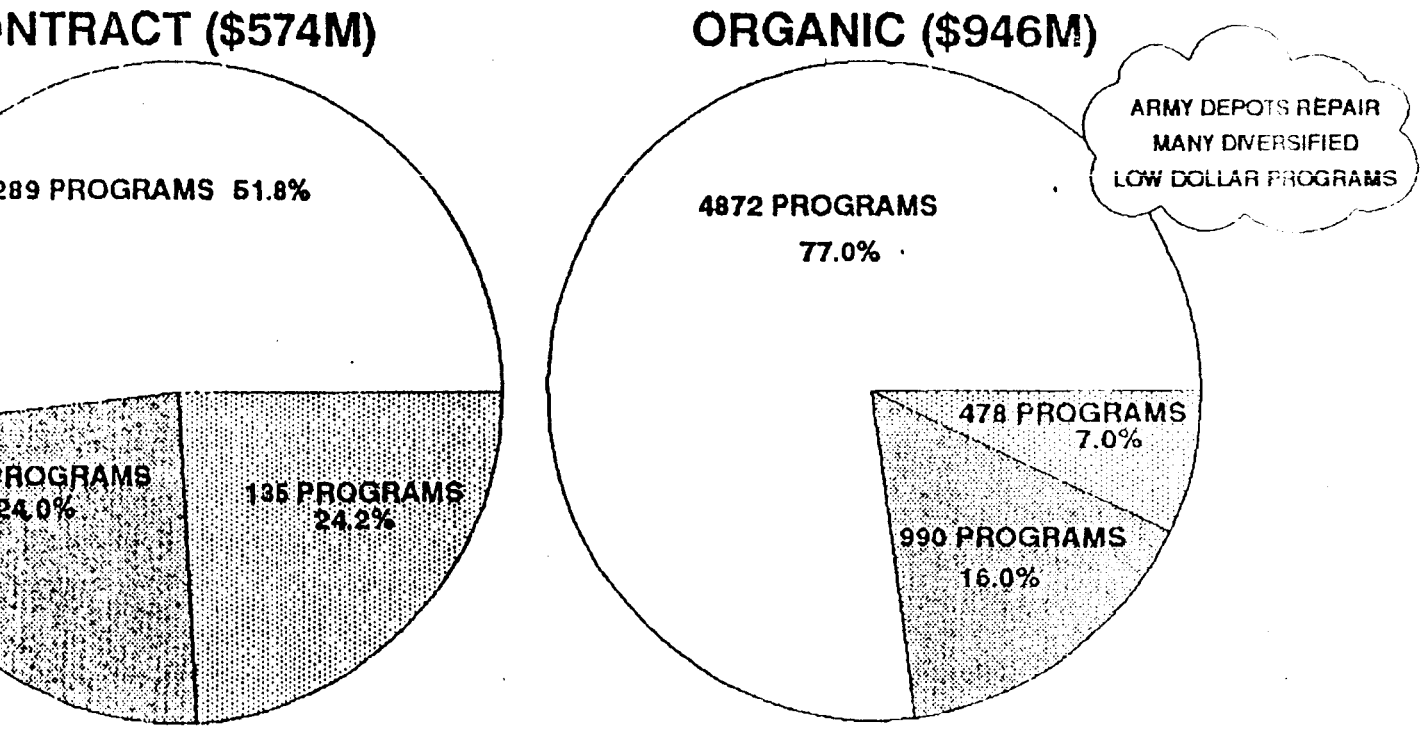
EVERY DOLLAR
BRINGS 58 ¢
TO PRIVATE
INDUSTRY

RCE: AVG OF FY90-93 EXPENDITURES

PROGRAM
PROFILE

MAINTS

MAINTENANCE PROGRAMS BY VALUE
FY93



LESS THAN $100K $100K TO $500K OVER $500K

L CONTRACTS - 558

TOTAL ORGANIC PROGRAMS - 6340

DEPOTS

MAIN20

THE ORGANIC BASE

ARMY MAINTENANCE DEPOTS

Downsizing

From 10 Depots in 1988
to 5 depots post-BRAC 1993

ole AD
l Wheeled
hicles
AC 93

mento AD
ication and
cs Equipment
AC 91

Tobyhanna AD
- Communication and Electronics Equipment
- AVIONICS

Letterkenny AD
Artillery
DOD Tactical Missiles
Fire Control Systems

Red River AD
- LT Combat Vehicles
- Automotive Components

Corpus Christi AD
Helicopters

Anniston AD
Combat Vehicles
Small Arms

ANIZED AS COMMODITY REPAIR
TERS - CENTERS OF TECHNICAL
EXCELLENCE

DEPOT SYSTEM PROFILE

MAIN11

DEPOT PROFILE

INTENANCE
YSTEM - ALL
SSIONS

S
NGS
SQUARE FEET
D FLOOR SPACE
LE (WITH TENANTS)

DEPOTS ARE LARGE, MULTIFUNCTIONAL COMPLEXES

MISSIONS

MAINTENANCE
AMMUNITION STORAGE & RENOVATION
CHEMICAL DEMILITARIZATION
FIRING/TEST RANGE OPERATION
HOST TO:
- SUPPLY STORAGE & DISTRIBUTION
- MILITARY & CIVILIAN TRAINING/ SCHOOLS
- HEADQUARTERS ACTIVITIES

PLE: ANNISTON

	MAINT ONLY
S	96 BUILDINGS
	0.5 SQUARE MILES
	2586 PEOPLE

MAINTENANCE ONLY

281 BUILDINGS	5%
5.7 MILLION SQUARE FEET COVERED FLOOR SPACE	18%
11,139 PEOPLE	59%

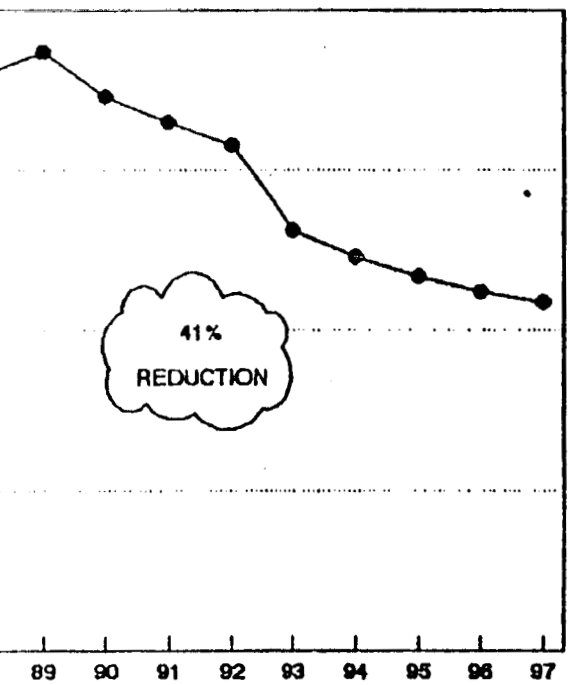
HOW WE'VE CHANGED

MAIN25

DECADE OF CHANGE
ARMY MAINTENANCE DEPOTS 1987 - 1997

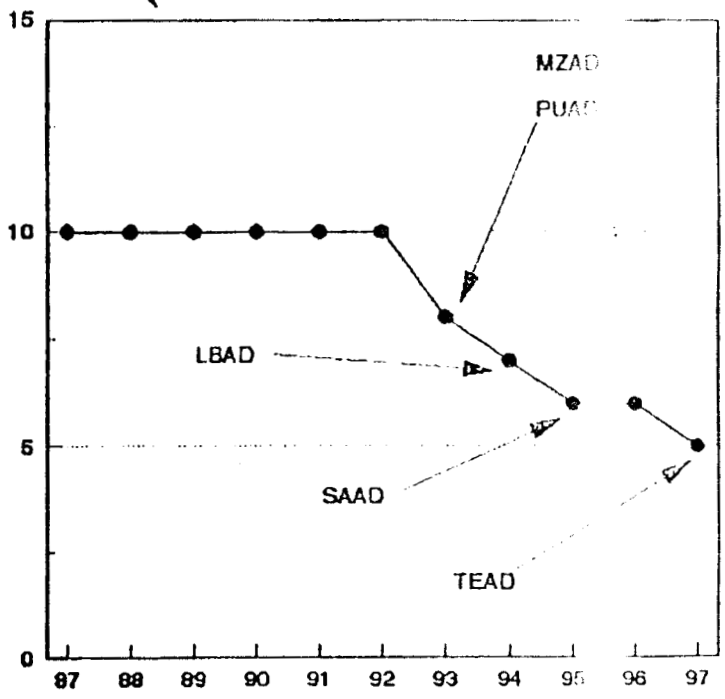
SIGNIFICANT DOWNSIZING

- NUMBER OF EMPLOYEES -



89	90	91	92	93	94	95	96	97
18.7	17.3	16.5	15.8	13.1	12.3	11.7	11.2	10.9

EACH - MAINTENANCE DEPOTS -



87	88	89	90	91	92	93	94	95	96	97
10	10	10	10	10	10	8	7	6	6	5

WHERE WE SHOULD GO

MAIN21

PARTNERSHIP WITH INDUSTRY...
WORKING AS A TEAM MAXIMIZES BENEFITS

TED DEFENSE - LETTERKENNY PARTNERSHIP

CONVERT M109A2/A3 TO M109A6 PALADIN.
LETTERKENNY DISASSEMBLES, OVERHAULS.
FMC BUILDS NEW CAB, ASSEMBLES AT THE GOVERNMENT DEPOT.
824 CONVERSIONS 1992 - 1999. $334M TO FMC, $227M TO LEAD.

NERAL DYNAMICS LAND SYSTEMS - ANNISTON PARTNERSHIP

UPGRADE M1 ABRAMS TANK TO M1A2.
ANNISTON DISASSEMBLES, OVERHAULS.
GENERAL DYNAMICS AND SUBCONTRACTORS BUILD NEW TURRET, ASSEMBLE.
1079 CONVERSIONS 1992 - 2003. $5.8B VALUE-- $5B TO GENERAL DYNAMICS AND SUBCONTRACTORS

TURE CONTRACTOR - ANNISTON PARTNERSHIP

- HEAVY ASSAULT BRIDGE AND BREACHER.
- 115,000 DLH PER YEAR, 1997 - 2000

- MAJOR BENEFITS FOR BOTH SECTORS.
- MORE TO COME:

NEFITS OF PARTNERSHIP

- REDUCES OVERHEAD FOR GOVERNMENT AND INDUSTRY
- KEEPS JOBS IN THE COMMUNITIES
- MAXIMUM USE OF GOVERNMENT AND INDUSTRY TALENTS

CHALLENGES

V DEPOT31

ISSUES FACING THE SERVICES... OUR CHALLENGES

MUST BE MOBILE

R PROJECTION REQUIREMENT.

OF ARMY TO BE IN CONUS. MOST SINCE PRE WWII. LESS
: TO SUPPORT FROM FORWARD LOCATIONS.

CAREFULLY HUSBAND, PRIORITIZE RESOURCES

ING BACKLOG.

M IN FY94. 80% OF THE FUNDED LEVEL.
ERVES SHORT OF NEWEST EQUIPMENT.

) BEST IDENTIFY AND SUPPORT CRITICAL PRIVATE SECTORS.

INTEGRATE INTO A UNIFIED INDUSTRIAL BASE.
DO WE PRESERVE CRITICAL R&D, PRODUCTION CAPABILITY?
MUCH SUPPORT IS NEEDED?

LOOK AT THE TOTAL INDUSTRIAL BASE: R&D, ACQUISITION MAINTENANCE

: COSTS.

SS CAPACITY.
DARD BUSINESS PRACTICES IN A NONSTANDARD ENVIRONMENT.
OVERNMENT PERSONNEL INFLEXIBILITY.
EPRECIATION OF FACILITIES.
IXED PRICES

CONGRESSIONAL TASKS

WDEPO! :S

COMMENTS ON CONGRESSIONAL TASKS

RELATED TO #5
"WHAT IS CORE?

IE KEY TASKS ARE:

7 BALANCE BETWEEN PUBLIC-PRIVATE SECTORS.

8 IDENTIFICATION OF PUBLIC-PRIVATE FUNCTIONS AND ACTIVITIES.

ECAUSE:

OTH PUBLIC AND PRIVATE SECTORS ARE NECESSARY FOR NATIONAL SECURITY.

OTH OFFER UNIQUE TALENTS.

EPOT MAINTENANCE IS ONLY ONE COMPONENT OF THE INDUSTRIAL BASE.

* READINESS -- IT'S THE BOTTOM LINE

- THE ABILITY TO DEPLOY, FIGHT, WIN AND BE PREPARED FOR FOLLOW-ON CONFLICTS MUST BE THE PARAMOUNT CONSIDERATION.

Document Separator

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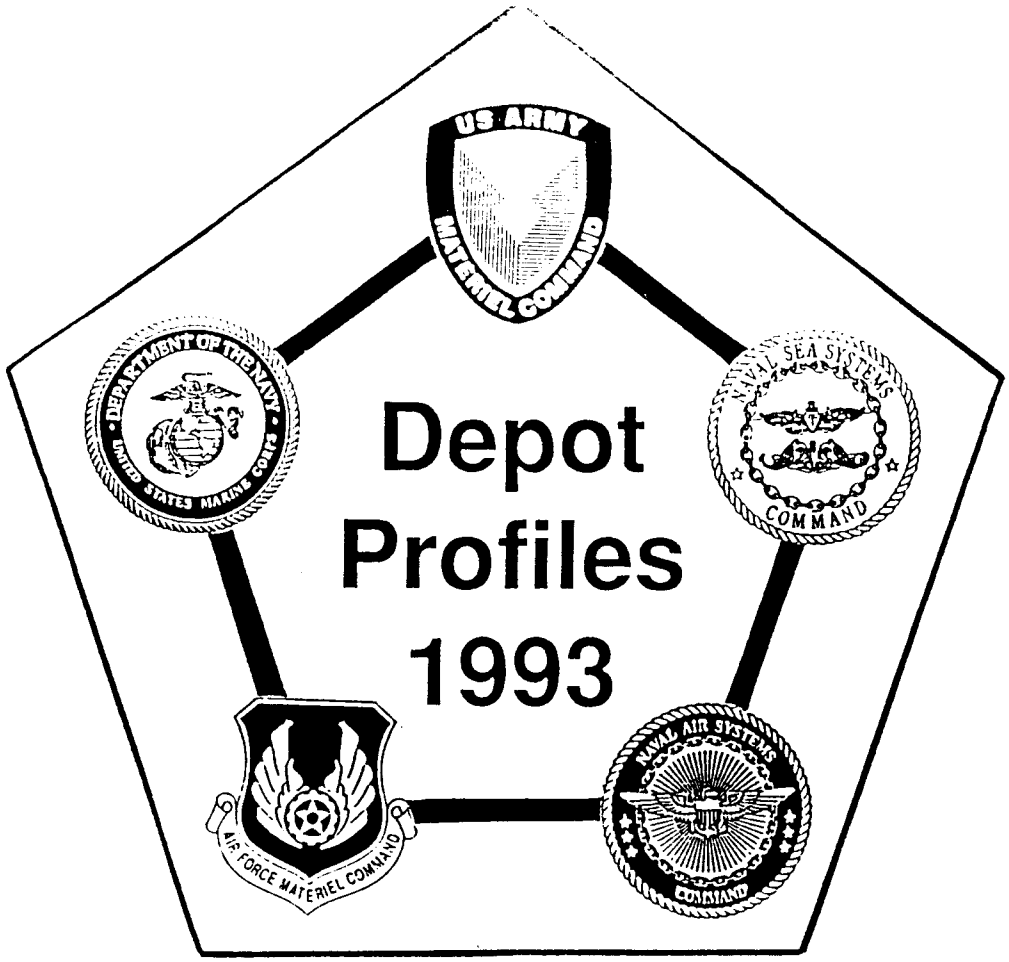

Depot Profiles 1993

Prepared by: Joint Depot Maintenance Analysis Group
Technology Assessment Division

1.1 Anniston Army Depot (ANAD), Anniston, Alabama

1.1.1 OVERVIEW

[illegible] when it opened in 1942 under the [illegible] of the Army, the depot was known as Anniston Ordnance Depot. From 1943 to 1945 the depot, managed by Chrysler Corporation, stored and shipped ammunition on an around-the-clock basis. During this time, depot employees handled more than 1.25 million (M) tons of material. In September 1945, the Army resumed direct management of the depot. In the early 1950s the depot assumed additional missions, the main tank overhaul facility was completed, and supply facilities were increased.

Anniston Ordnance Depot became Anniston Army Depot (ANAD) in 1962, when it was placed under AMC. Supporting various missile systems stimulated continued growth during the 1960s. In September 1976, ANAD was placed under the direction of DESCOM, a major subordinate command of AMC. ANAD is unique today in that it is the Army's sole CONUS combat vehicle rebuild depot, dedicated to producing the highest quality reworked items in a "like-new" condition at a fraction of the cost of the new item.

The three major missions at ANAD are maintenance, supply, and ammunition. The maintenance mission includes the overhaul and depot rebuild of combat vehicles, missiles, small arms, munitions and other commodities, related spare parts, and sub-assemblies. Current responsibilities include the M1 Abrams tank, the M48 and M60 series medium battle tanks, M551 vehicles, M88A1, AVLB, TOW, DRAGON, HELLFIRE, TOW 2, AIRBORNE TOW, SHILLELAGH, LANCE Missiles and associated launchers, and a large variety of small arms and light artillery weapons.

The supply mission consists of the storage and worldwide distribution of combat vehicles, small arms, and associated spare parts and sub-assemblies; the receipt, storage, and shipment of General Services Administration (GSA) and Defense Logistics Agency (DLA) commodities and both serviceable and non-serviceable commodities within the Army, for the AMCCOM, MICOM, TACOM, and ATCOM. Anniston's annual supply outloading capacity (based on 250 working days) is 1,000 rail carloads, 3,750 truckloads, and 2,000 filled containers. Supply storage capacity is 3.02 M gross square feet (GSF) covered space and 1.8 M square feet (SF) open storage.

The ammunition mission consists of the storage and maintenance of conventional and chemical munitions and missiles. The ammunition mission supports AMCCOM and

and toxic munitions maintenance.

LOCATION: ANAD [illegible] the city of Anniston and Fort McClellan, another active US Army installation. The small community of Bynum lies on the depot's southern boundary. The north boundary is Pelham Range, a wooded operational training area owned by Fort McClellan. The east and west boundaries are bordered by lightly populated rural lands. A short distance to the south is Interstate 20, a major east-west artery that provides easy access to two of the south's largest cities, Birmingham, Alabama (50 miles west) and Atlanta, Georgia (110 miles east).

SIZE: ANAD occupies 18,113 acres, with 96 maintenance buildings, 82 shops, and 1,558,724 SF of shop space. The total facility value is $176M, with the maintenance facility valued at $38M and plant equipment value at $138M. The main depot covers 15,279 acres and contains the major functions of ammunition, base operations, maintenance, and supply. In addition to the main depot, there is a separate inactive ammunition storage area known as the Coosa River Storage Annex. This 2,834 acres is located approximately 12 miles southwest of the main reservation on Talladega County Highway 93.

WORK FORCE/PAYROLL: Work force end strength at the end of fiscal year 1992 was 3,599. The average number of military personnel assigned to ANAD is nine. Having an annual operating budget of $334M, ANAD impacts the local economy with an approximate $152M payroll; $5M for utilities, and $9M in local procurement.

1.1.2 DEMOGRAPHIC DATA

POPULATION: The work force 1s drawn primarily from six surrounding counties: 70.8 percent Calhoun County, 11.7 percent Talladega County, 6.9 percent Etowah County, 3.5 percent St. Clair County, 2.4 percent Cleburne County, 1.5 percent Clay County, and 3.2 percent from 27 other counties in two states.

SKILL BASE: The population base is well educated and the source of skilled and semi-skilled labor is expanding as more and more industries relocate to the Anniston area. Educational institutions in the area include Jacksonville State University, Talladega College, Ayers State Technical College, and Gadsden State College, all within 30 miles; and the University of Alabama at Birmingham, 50 miles away. It is estimated that 17

proximity to major rail switching yards at Birmingham and Atlanta.

ENVIRONMENTAL PROGRAMS: The environmental program at ANAD is divided into the following major categories: air, wastewater, groundwater, and solid/hazardous waste. [illegible] consists of bulk hydrocarbon dispensing and storage tanks, five [illegible] fired boilers at the main boiler plant, and thermal destruction of ammunition. There are two wastewater treatment plants with a total capacity of 520,000 gallons per day (gpd). There is a remedial groundwater program with plans to treat up to 700,000 gpd of contaminated groundwater from four areas. The installation has a permitted sanitary landfill for disposal of solid waste, and the hazardous waste program consists of storage areas for hazardous wastes and thermal destruction of ammunition under the auspices of Resource Conservation and Recovery Act (RCRA) regulations. Future plans include a project for destruction of chemical munitions stored here.

LOCAL INDUSTRIES:

COMPETITIVE -

Chalkline Fabrication Co	**Union Yarn Co**
Monsanto Chemical	**FMC Corp**
Goodyear Tire and Rubber Co	**Republic Steel Co**
Federal Mogul Electrical Co	**Phelps-Dodge**
Garret Industries	

COMPLEMENTARY -

Willings-Detroit Diesel	**Dixie Bearing Co**
Birmingham Rubber & Gasket Co	**Parts & Equipment Co**
Post Welding Supply Co	**Hall Building Co**
Industrial Steel & Processing Co	**Sterling Lumber Co**
Porter-Warner Co (abrasives)	**Jeffery Steel Co**

1.1.3 TECHNOLOGICAL ENHANCEMENTS

STATE-OF-THE-ART TECHNOLOGY: Many high tech equipment projects have been installed or are approved for funding. They include:

Automated-infrared Printed Circuit Board (PCB) Tester

Electrical Discharge Machines, Wire and Ram Type
Electron Beam Welder
Gantry Mounted Machining Center
Inhibited RF Nitric Acid Rehabilitation Facility
Laser Tracking System
Maintenance Shop Floor System
Robotic Camouflage Painting of Vehicles
Robotic Metalizing
Robotic Painting of Containers
Robotic Welding
Ultrasonic Flaw Detection System
Various CNC Machine Tools and Fabricators
Water Jet Brakeband Denuder

SPECIAL SKILLS: Repair and manufacturing skills available at ANAD include.

Electroplating
Small Arms Repair
Optical Instrument Repair
Machine Tooling
Artillery and Heavy Mobile Equipment Repair
Automotive Repair
Sheet Metal Working, Handling and Repair
Certified Ballistic Welding
Metal Surface Treating and Plating
Electromechanical and Electronic Repair and Manufacturing

MANUFACTURING TECHNIQUES/PROCESSES: Anniston is modernizing and replacing facilities and equipment with state-of-the-art technology to include new machine shop, bearing rebuild, engine rebuild, and small arms rebuild facilities. This effort will improve work flow, increase productivity, and decrease repair cycle time and unit cost. ANAD will be integrating high technology equipment at an increasing rate. The capital investments in manufacturing technology will be oriented toward increasing productivity, assuring quality, enhancing responsive capability, and reducing personnel hazards. Technologies under consideration are:

Ammunition Handling/Assembly Robotics
Ceramics/Composites Manufacturing

REPAIR TECHNIQUES/PROCESSES: Areas currently being studied include:

Acoustical Small Arms Targeting and Accuracy Equipment.
Automated Machine Vision Inspection and Reverse Engineering System
Artificial Intelligence Engine Diagnostic System
[illegible] for Combat Vehicles
Auto Infrared Printed Circuit Board Tester
Ultra-sonic Flaw Detection System
Vehicle X-Ray Facility and Equipment

Capital Investment Strategy and Modernization Program

1. Anniston Army Depot (ANAD) has planned capital equipment purchases of $3.4M for FY93 and of $4M for FY94. ANAD has infrastructure improvements and modernization planned totaling $4M a year for FY93 and FY94.

2. The environmental program at ANAD is concentrating on three regulations and the operations that are impacted immediately.

   a. Montreal Protocol on substances that deplete the ozone layer - chloroflurocarbons (Freon, Halon, chlorinated solvents).

   b. Clean Air Act amendments of 1990 - Volatile organic compounds (VOC) from such operations as painting, degreasing, and paint removal from solvent based paint strippers).

   c. Resource Conservation and Recovery Act (RCRA) - Disposal of hazardous waste from metal finishing operations such as: painting, degreasing, chemical cleaning, electroplating, chemical conversion coating, and paint removal (both chemical and abrasive based systems).

3. Funding for projects will be from the Defense Environmental Restoration Account (DERA) for FY92 and the Waste Minimization Capital Account (WMCA) for FY92, FY93, and FY94. The ANAD target for WMCA funds is $1M per year.

4. The Anniston Flexible Computer Integrated Manufacturing (FCIM) project is part of the AMC FCIM initiative and is currently listed in the AMC FCIM Business Plan as a candidate site for the manufacture of mechanical components. Anniston is the lead effort for FCIM in the area of mechanical components for DESCOM. The computer integrated manufacturing technology and architecture developed by

5. As a result of the Defense Depot Maintenance Council (DDMC) studies, a charter was established for the Joint Technical Coordinating Group - Flexible Computer Integrated Manufacuturing (JTCG-FCIM). The charter provides for the formation of a JTCG-FCIM management group to satisfy the needs of the JTCG-FCIM in [illegible] member of a working group supporting the management group. Anniston teamed with Rock Island Arsenal, Illinois and responded to a request for submission of estimates from the JTCG-FCIM. The Anniston/Rock Island Arsenal team was selected as the Army representative in the area of small mechanical parts.

6. Anniston is participating in other efforts relating to FCIM. Anniston is working with the program manager of Digital Storage and Retrieval of Engineering Data Systems (DSREDS) at (MICOM) to establish a remote site at Anniston.

1.2 Corpus Christi Army Depot (CCAD), Corpus Christi, Texas

1.2.1 OVERVIEW

HISTORY/MISSION: This installation was opened in 1961 as an aircraft overhaul and repair facility with a work force of 1,000 military and civilian employees. The installation was formally commissioned as the US Army Aeronautical Depot Maintenance Center (ARADMAC). In 1967, changing needs and increased demand for helicopter repair resulted in a mission change, requiring the phasing out of fixed wing aircraft repair and the starting up of a complete rotary wing program. This sparked a great deal of new construction on the depot. In 1974, it was renamed Corpus Christi Army Depot (CCAD) with a work force of approximately 4,000 employees. Today the depot is the only aeronautical overhaul and repair facility for the Army. CCAD performs overhaul, repair, modifications, retrofit, and modernization on rotary wing aircraft, engines and components for all Services and the foreign military sales program. CCAD provides worldwide on-site maintenance services, aircraft crash analysis, lubricating oil analysis, and chemical and metallurgical support. CCAD also serves as the depot training base for 2,000 active duty, reserve, National Guard, and foreign military personnel annually. A prior mission of performing worldwide maintenance programs was eliminated in 1992 by the transfer of this mission to the DLA.

LOCATION: The depot is a tenant on the Corpus Christi Naval Air Station, located on Flour Bluff Point, about thirteen miles southeast of downtown Corpus Christi. Flour Bluff Point is a promontory bordered on three sides with lagoons and bays situated on the Gulf of Mexico. The city is about 225 miles southwest of the major industrial center and seaport of Houston and the seaport and resort area of Galveston. The city of San Antonio, famous for the Alamo, Spanish missions, and the Institute of Texas Cultures, as well as a large military presence, is situated about 150 miles northwest of the depot on I-37. About 160 miles south of the depot on Highway 77 are the Republic of Mexico and the Texas Rio Grande Valley, a major national supplier of citrus fruits and vegetables.

The climate is semi-tropical with mild winters and warm, humid summers, and an average temperature of 71.8 degrees Fahrenheit. Normal rainfall is 28.5 inches a year. The Texas coast is affected by hurricanes on the average of once each 2.5 years. A specific area is subject to a severe tropical storm on the average of once every 10 years.

SIZE: CCAD consists of 140 acres, with 126 acres dedicated to maintenance. Total number of buildings is 47, with 24 buildings for maintenance operations. Total available

with an annual payroll of approximately $155.M.

1.2.2 DEMOGRAPHIC DATA

POPULATION: The total work force at the depot is 3,600, with approximately 3,200 residing in the city of Corpus Christi itself and the remainder in nearby communities.

SKILL BASE: Recent Department of Defense (DOD) downsizing efforts have restricted external hires, and have resulted in a gradual decrease in strength. When in a hiring posture, most external recruitment is for entry level clerical or mechanical helper positions. On a smaller scale, there is usually some external hiring for specialized, highly skilled positions, i.e., engineers, chemists, etc. Primary wage grade skills include aircraft mechanic, transmission mechanic, jet engine mechanic, machinist, electronics mechanic, and aircraft electrician. Total work force percentage assigned in the highly skilled category is approximately 59 percent; moderately skilled, 26 percent; and entry level, 15 percent.

TRANSPORTATION ACCESS: The city of Corpus Christi is situated at the junctions of Interstate Highway 37 and US Highways 77 and 181, which, with several excellent state highways, provide ideal access for land transportation. The city is serviced by 20 motor freight lines and three railroads. The Port of Corpus Christi, the deepest port on the Gulf Coast, provides the capability for maritime shipping as needed. The Corpus Christi International Airport, located 15 miles north of CCAD, is served by four major airlines. The Naval Air Station is capable of handling the largest military aircraft.

ENVIRONMENTAL CONSTRAINTS:

The following are all local, state and federal legislation that are in effect at CCAD.

- Clean Air Act
- Clean Water Act
- Spill Prevention and Cleanup
- Resource Conservation and Recovery Act - Hazardous Waste
- Solid Waste Landfill Disposal
- Toxic Substance Control Act
- Safe Drinking Water Act
- Noise Pollution Control

Disposing of hazardous materials, installing pollution prevention devices and training personnel in procedures for preventing pollution have added significantly to the cost of doing business and have created the need for continuing research into improved materials,

LOCAL INDUSTRIES: CCAD is the largest industrial employer in south Texas. Industries in the area include agriculture, fishing, shrimping, petroleum, petrochemical, maquiladora, industrial construction, deep water port, and tourism. The principal products produced are petroleum refining products, petrochemical, chemical and allied products. Also the Port of Corpus Christi handles a variety of commerce products, including petroleum products, chemicals and grain.

COMPETITIVE - There are no major local industries or organizations that compete for skills or resources with CCAD.

COMPLEMENTARY - There are no local industries that compliment CCAD to a significant extent.

1.2.3 TECHNOLOGICAL ENHANCEMENTS

Laser Vane Removal Process. Damaged gas turbine engine vanes will be removed by a 1,000 watt Industrial CO_2 laser system. This process will perform the operation in approximately 10 minutes per vane compared to the present electric discharge machining process, which requires about one hour per vane for removal.

Advanced Composite Repair. The repair and rework of bonded composite honeycomb assemblies have been identified as high cost areas to the Army. It is CCAD's objective to establish the manufacturing methods required to integrate all the key repair/rework elements needed for reliable and low cost maintenance of adhesive-bonded structures. This approach will provide the Army with a modern, efficient honeycomb repair center that integrates the available new technologies with the necessary equipment and facilities to meet increased production requirements.

Computer Simulation. The depot uses Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) system to simulate robotic movements to determine feasibility of applications. Other computer simulation packages will be used for automatic storage/retrieval system, wire guided vehicles, work flow with shop, work flow through complete depot overhaul, and machine tool cutting.

determined with an accuracy of +0.5 degrees centigrade. Applications for this system include identification of faulty integrated chips, steam traps, and uninsulated steam lines. Significant reductions in energy utilization are projected through utilization of the thermo imaging system.

Artificial Intelligence. Expert systems using artificial intelligence will assist in troubleshooting complex systems for the UH-60 Black Hawk and AH-64 Apache helicopters and in the inspection, testing, and evaluation of repairable helicopter components for all aircraft types during the depot maintenance repair cycle. The expert system will be configured to support both depot and field maintenance operations and will consist of appropriate computer equipment and software to simulate a standardized, efficient evaluation procedure. These artificial intelligence based systems will improve the effectiveness of preliminary aircraft inspections by standardizing and expediting analysis required to identify the source and cause of malfunctions and to determine corrective action to be applied.

Laser Paint Stripping. To reduce the high cost of stripping paint from aircraft, CCAD is investigating the low cost, reduced toxicity, and increased stripping speed possible using lasers. The laser paint stripping investigation is being directed toward CO_2 pulsed lasers. This type of laser appears to be the most efficient type of laser and has the proper operating parameters for paint removal. This is because the high power exists only during the pulse. The pulse allows for easy control during high power, which vaporizes paint. The laser penetrates the paint and forms a gaseous layer. This gaseous layer blisters (forms paint bubbles) and pops, thus facilitating removal.

1.3 Letterkenny Army Depot (LEAD), Chambersburg, Pennsylvania

1.3.1 OVERVIEW

[illegible] LEAD was conceived in the [illegible] pre-war atmosphere of [illegible], when America began gearing up for war. Realizing the forthcoming deluge of war material would swamp existing storage facilities, the War Department laid plans for 12 large, new ordnance depots. Letterkenny township, Pennsylvania, was chosen as one site because of its location, close to the major ports of the eastern seaboard, yet far enough inland to make enemy attack unlikely. In addition, the site offered good rail connections and an adequate water supply.

Letterkenny received its first shipment of ammunition on 23 September 1942, less than nine months after construction began. By 1943 the installation had hit full stride. When the war ended in August 1945, Letterkenny had shipped more than 3M tons of ammunition and supplies, and had made maintenance modifications on more than 1,300 tanks.

In 1948 the depot began reworking guns and fire control equipment as well as combat and general purpose vehicles. The installation experienced another surge of activity during the Korean War years, when the work force swelled to 6,500 persons. These years also saw a construction boom at the depot that included a large, new maintenance building. The introduction of missile system repair in the late 1950s continues to provide the depot with growth into the 1990s.

The major missions that have evolved at Letterkenny are maintenance, supply, and ammunition. The maintenance mission provides repair, overhaul, and modification of missile systems, trucks, combat vehicles, detection systems, muzzle velocity radar, and associated sub-assemblies and support equipment. Specific responsibilities include HAWK and PATRIOT missile systems, 2 1/2- and 5-ton trucks, self-propelled and towed howitzers, forward area alert radar (FAAR) detection system, and M90 chronograph muzzle velocity radar. The depot serves as the Center for Technical Excellence (CTX) for artillery and the HAWK and PATRIOT missile systems.

The ammunition mission includes receiving, storing, maintaining, and issuing general supplies and ammunition. Depot ammunition operations include all types of class V items from small arms ammunition to large bombs and missiles. Through a Depot Maintenance Interservice Support Agreement, Letterkenny up-rounds SPARROW and SIDEWINDER

Service Business Plan, February 1991, and the DDMC Corporate Business Plan, May 1991. The directed consolidation was also included in the Army's Base Realignment and Closure 1991 (BRAC91) submitt '.

The action, which is being implemented under Public Law 101-510, consolidates the tactical missile workload to include guidance and control section repair for all current and future air and ground launched missiles and the ground support equipment to include launchers and radars at LEAD. The current estimate of total direct labor workload transitioning to LEAD is 1,326,400 direct labor hours between 1993 and 1996.

The Directorate of Product Assurance utilizes a radiographic (x-ray) inspection facility that houses a 25 megavolt Betatron x-ray machine. The Betatron unit can x-ray through 20 inches of steel and is used for inspection of large items (i.e., the interior of large rocket motors).

LOCATION: Letterkenny is located in south central Pennsylvania in the Cumberland Valley, approximately 25 miles west of Gettysburg, near Chambersburg, Pennsylvania.

SIZE: Total installation size at LEAD is 19,243 acres of Army owned-in-fee land; 270 acres of which is dedicated to industrial operations. There is a total of 1,866 buildings on the installation of which 64 are dedicated to maintenance. Total maintenance space is 879,288 SF. The maintenance facility value is $26,090,600 and total installation facility is valued at $123,929,500.

WORK FORCE/PAYROLL: Work force and strength at the end of fiscal year 1992 was 2,622. The average number of military personnel assigned to LEAD is 21. LEAD impacts the local economy with an approximate $78.0M payroll.

1.3.2 DEMOGRAPHIC DATA

POPULATION: Of the 3,300 employees (including tenant activities), most live in Franklin County (2,200); 86 are military.

SKILL BASE: The skill level required to perform LEAD's various missions are:

General Schedule Employees:

Administrative	31%
Clerical	35%

TRANSPORTATION ACCESS: Interstate Route 81 and US Routes 11 and 30 serve the general area and are within five miles of the main entrance to the depot. Letterkenny's location provides highway access to convenient seaports of embarkation at Dundalk Marine Terminal, Baltimore, Maryland (80 miles); Military Ocean Terminal, Bayonne, New Jersey (275 miles); and Naval Weapons Station, Earle, New Jersey [illegible]

LEAD is served by the Baltimore and Ohio Railway, which is part of the Chessie System. Government track connects with the Chessie System track at the extreme southeast section of the depot. The government performs all internal switching. The Chessie System has a freight station at Culbertson, Pennsylvania, east of the depot along State Route 433. The Railway Express Office for Class A or B ammunition is Harrisburg. Interchange service is provided with ConRail and the Norfolk and Western Railway.

There are more than 50 major truck lines serving the depot. Additionally, the depot has a 100' X 100' helicopter landing pad located north of Coffey Avenue, along Cargo Road. Military fixed wing aircraft and helicopters utilize the Chambersburg Municipal Airport located one mile south of the depot. Letterkenny is close to the Harrisburg (55 miles) and Baltimore (70 miles), and Washington County Regional (25 miles) airports.

ENVIRONMENTAL CONSTRAINTS:

a. Air Pollution Control Act. The Volatile Organic Compound (VOC) Compliance Plan affects LEAD's painting operations by regulating the emission of VOCs from spray painting to 50 tons/year or 500 pound/day maximum, or the depot must use all compliant coatings and/or emission control equipment.

b. Air Pollution Control Act. Permit system requires permits, and in some cases, controls to operate air pollutant sources.

c. Clean Streams Law. National Pollutant Discharge Elimination System (NPDES) permits require a permit to operate the industrial wastewater treatment plant, which limits the amount of certain water pollutants that can be discharged.

d. Solid Waste Management Act/RCRA Part B Permit. Requires a permit for treatment, storage, and disposal of solid and hazardous wastes.

The emissions of VOCs cited above will lessen due to increased use of compliant coatings and installations of ultraviolet light-activated oxygen emission control system. Other [illegible] will [illegible] The [illegible] of the environment at Letterkenny is

LOCAL INDUSTRIES:

COMPETITIVE - Normally, LEAD's current employees leave only for better [illegible] employees [illegible] business for themselves. As such, LEAD does not have anyone in the local area competing against it.

COMPLEMENTARY - The depot hires individuals from surrounding industries such as Grove Manufacturing, JLG Industries, T.B. Woods, Ingersoll-Rand, Chambersburg Engineering, SKF Industries, Landis Tool Co., Mack Truck and Arnold Industries. No significant hiring has been done within the last five years, and none is anticipated in the near future. Additional complementary industries are outside a 30-mile radius from the depot.

1.3.3 TECHNOLOGICAL ENHANCEMENTS

MANUFACTURING TECHNIQUES/PROCESSES:

Transmission Test Stand

The Hicklin Power Company has installed a transmission test stand at LEAD to meet the test requirements of the M109-HIPXTG-411 crossdrive transmission. The stand is powered by a remotely located diesel engine and generator drive power and dynamic loading of each output by hydrostatic pressure. The control console features a computer for date acquisition and storage. The test stand will provide increased capability, accuracy, and reliability compared to the previous test stand.

Computer Numerical Control (CNC) Computer Aided Design Workstations

Three CNC CAD workstations are scheduled for installation at LEAD. The workstation's major attributes include a 380 megabyte disk subsystem, a 380 megabyte main memory expansion, a paper type disk puncher and reader, an asynchronous multiplexer, and 18 new software packages. These new workstations will increase the industrial capability and efficiency of Letterkenny Army Depot.

CNC/Manual Punch Press With CAD/CAM Interactive Graphics

CNC Lathe With Power Rotary Tools

The CNC lathe provides the capability of turning, milling, and drilling in one set with the revolving tool turret and a rotating spindle. The turret has 12 tool stations, 6 each powered and 6 each stationary. The lathe is equipped with a CNC control unit with Cathode Ray Tube (CRT) defined menu legends that take you step by step through programming and operation functions, along with shop floor program capability.

Electric Discharge Machine (Wire)

The electric discharge machine (EDM) provides the capability to manufacture repair parts of complex shapes and special materials. The EDM performs machining functions that provides for intricate cuts, tight corners, extreme tapers, and simultaneous cutting of work pieces with different geometrical shapes. It interfaces with the depot's CAD/CAM system, which will ultimately reduce direct labor hours, increase productivity, and enhance the quality of depot manufactured parts.

Heat Treating

a. Atmosphere controlled integral quench furnace with endothermic generator provides a wide spectrum of metallurgical processes, i.e., hardening of carbon and tool steel, annealing and normalizing of carbon steel, carburizing, sintering, brazing, and carbon restoration of any manufactured part, 18" X 24" X 36".

The ability to process a load of parts while loading the heat treating system with the next load makes a production line type operation possible.

b. Atmosphere controlled furnace with internal dimensions of 5' X 6' X 6' with a maximum operating temperature of 1800 degrees Fahrenheit. The furnace provides heat treating and stress relieving capabilities for large components during manufacture, repair, and rebuild procedures.

Matsuura CNC Vertical Machining Center

The CNC vertical machining center is capable of performing complicated full four-axis contouring work along with straight-forward drilling, milling, tapping,

three-axis contouring work along with straight-forward drilling, milling, tapping, reaming, and boring. The automatic tool changing system, using a 24-tool magazine, automatically changes the tools preselected by the NC program.

Jones and Lamson CNC Turning Center

The CNC universal 2-axis lathe, is designed to perform bar feed, chucking, and shaft type work. This turning center is equipped with an 8-station side turret and a 6-station end turret.

Hardinge CNC Superslant 3-Axis Lathe, Bar, and Chucking Machine

The CNC superslant 3-axis lathe, bar, and chucking machine, equipped with a 60 degree slant bed, improves the operator's access and visual control. A rigid 8-station vertical turret simplifies jobs such as turning, facing, boring, threading, and chamfering.

Unique to the 3-axis model is a programmable precision 8-station end working turret with a 72-tooth coupling for 20-millionth-of-an-inch indexing repeatability utilized in center drilling, drilling, reaming, end milling, and tapping.

Warner and Swasey CNC Grinding Machine

The CNC, 2-axis cylindrical step grinder is used for grinding multiple diameters on the same part. The grinder can store up to 10 different grinds in an automatic program. The system can be run in automatic cycle, single cycle, or manual modes.

Jones and Lamson Optical Comparator

This precision measuring instrument makes possible absolute measurement of fabricated parts and tooling vital to NC equipment. It magnifies the object to be measured and projects it onto a 30-inch screen for finite measurement. Using a powerful tungsten halogen light source, measurements down to 50 millionths of an inch can be made. A six-position electrically operated lens selector allows magnification from 10X to 200X.

strokes of the same depth may be repeated as many times as required and with a high degree of accuracy, which prevents overbending.

Pacific CNC 200 Ton Hydraulic Press Brake

The press brake is equipped with a Hurco autobend power press brake gauging system control with digital readout. This control uses a microprocessor, which reduces setup time, improves forming accuracy, reduces material handling, and reduces scrap.

Okamoto Precision CNC Surface Grinding Machine

This is a column type surface grinding machine with a 20" X 120" reciprocating table. The table bed and horizontal spindle are constructed to afford maximum rigidity and constant accuracy down to 80 millionths of an inch. A control unit, Heidenhain Corporation's POS-E-TOUCH II, permits automatic grinding cycles controlling the entire grinding operation such as roughing, finishing, and sizing.

Hardinge CNC Superslant 2-Axis Lathe Bar, and Chucking Machine

The CNC hardinge CNC superslant 2-axis lathe, bar, and chucking machine equipped with a 60-degree slant bed, improves the operator's access and visual control.

Programmable resolution and programmable tool offset capabilities are 10 millionths of an inch (1/4 micron). These extremely close tolerances allow micro-inch finishing without grinding.

A rigid 8-station vertical turret simplifies jobs such as turning, facing, boring, threading, and chamfering.

Installed with an optional programmable tailstock, which includes a live spindle with a number 2 Morse taper center, the tailstock can be programmed to advance or retract during a machining cycle. This eliminates manual movement and saves cycle time in facing, turning, boring, and other machining operations.

Pressure Blast Wet Blasting System

is always conducted in an enclosed cabinet, which permits the abrasive slurry to be continually reclaimed and reused.

Gymnasticator

The mechanical gymnasticator is designed to "break-in" and test various applications of recoil mechanisms associated with field artillery weapons. It has dual function capabilities of either exercising (break-in) or gymnasticating (test of recoil buffer action) and can be operated in both manual or fully automatic modes. The operator selects various programs through the control terminal and the controller program automatically sequences the gymnastication test and prints countercoil data as required.

Engine Test Cell Control

The dynamometer controller is manufactured by Digilog Corporation and features digital readout of speed and load with faster response and increased accuracy. The Digilog controller will be mated to a microprocessor to provide automatic, semi-automatic, or manual control of engine test procedures and data accumulation. This will reduce manhours expended during testing and increase the reliability, accuracy, and repeatability of engine testing operations.

Trumpf CNC Plasma Arc Punch Press

The plasma arc punch press is a 2-Axis NC punching and contouring machine with fully automatic tool change. Punch, stripper, and die are changed within 8 seconds using random select universal 20-stations tool changer. High speed punching and nibbling can be accomplished at speeds of 265 and 400 continuous strokes per minute. A punching capacity of 33 tons provides full punching capacity in material up to 1/2 inch thick and continuous stroke contour nibbling capacity in material up to 3/8 inch thick. The machine is also equipped with hypertherm water injection plasma arc cutting system with automatic torch height control.

Kearny and Trecker CNC Horizontal Machining Center

This CNC machining center is capable of performing complicated full 4-axis

MDI/CNC Universal Milling Machine

The milling machine with the ULTIMATE 2 controller will provide various milling, drilling, and tapping requirements. The controller provides manual [illegible] input minimum data into the controller from a shop drawing. The ULTIMATE 2 automatically calculates all additional information needed to program the part. When the program is complete, the controller stores the program on cassette for future use.

CNC Robotic Waterjet System

CNC robotic 5-axis waterjet system will be capable of cutting metallic and non-metallic materials up to 250 inches per minute with a 4' X 8' working envelope. The cutting head will be mounted on a CNC robotic system. The system will be capable of cutting 6-inch-thick mild steel. A sample of materials that could be cut with this system are: nickel and cobalt based alloys, titanium, glass, plastics, marble, granite, kevlar, and every aerospace composite.

Desktop Publishing

The Personal Computer (PC) based desktop publishing (DTP) system runs WordPerfect and Xerox Ventura Publisher software. It interfaces with the CAD system to import illustrations directly into documents. The DTP system imports text and graphic files previously created with all common word processing and drafting software. Hewlett Packard LaserJet printers produce high resolution camera ready output. The DTP system generates a variety of publications in accordance with military standards, customized formats, and computger aided logistic support (CALS) compatible output. Entire publications are provided in hard copy camera ready originals or magnetic media.

Flexible Computer Integrated Manufacturing (FCIM)

The FCIM architecture integrates advanced manufacturing technologies with current systems and provides for compatibility with existing and emerging technologies and standards. FCIM currently consists of CAD/CAM workstations, a drawing scanning system, plotters, and a DNC system (shop floor workstation control). This equipment integration interconnects the planning, engineering, [illegible] FCIM provides the capability of using part

1.4 Red River Army Depot (RRAD), Texarkana, Texas

1.4.1 OVERVIEW

HISTORY/MISSION: Activated on 9 August 1941 as an ordnance depot, RRAD was carved from 116 East Texas farms and ranches in 1941-42. Although originally intended to serve only as an ammunition storage depot, Red River's responsibilities soon expanded to include the maintenance, repair, and overhaul of tanks, artillery pieces, and other heavy weapons. The depot also was assigned a general supply mission in 1943 and it shipped thousands of tons of ordnance materiel during World War II. RRAD was later assigned the general supply distribution mission in 1949 and maintained that roll until the arrival of the Defense Logistics Agency in 1991. RRAD also geared up to support US troops in the Korean War, and in 1951 the depot's employment level increased to an all-time high of 11,500.

The depot retained its prominence in the depot system in the 1950s by pioneering work in logistics. During the Vietnam conflict, the depot responded to increased requirements for maintenance and supply support. Due to its reputation for quality overhaul of combat vehicles, the depot was designated as the rebuild point for the M113 Armored Personnel Carrier family of vehicles in 1977. The mission for repair and overhaul of the Bradley Fighting Vehicle and the Multiple Launch Rocket System was assigned to the depot in 1980.

Red River continues to have major maintenance and ammunition missions focusing attention on repair and overhaul of light and medium tracked vehicles.

LOCATION: RRAD stands at the hub of an area surrounded by the corners of four southwestern states - Arkansas, Oklahoma, Louisiana, and Texas. The depot is located 18 miles west of Texarkana, Texas. (Population 55,000)

SIZE: RRAD occupies 19,081 acres of which 208 acres are devoted to the maintenance mission. Total buildings on the facility are 1,400 with 86 devoted to maintenance operations. Maintenance facilities consist of 825,094 SF out of the facility's total of 7,796078 SF. Total facility value is $159.86M and plant equipment value is $140.8M.

WORK FORCE/PAYROLL: Military personnel, 11; civilian personnel, 3,294. Annual payroll, $123M.

skilled resources, to include heavy industry, business and management, all engineering specialties, machine tooling, welding skills, and electronic and optic repair skills.

[illegible] RRAD is supp[illegible] by one airport, multiple rail and motor freight carriers to include 23 regular route common carriers and 34 specialized commodity carriers, and one east-west interstate highway (I-30).

ENVIRONMENTAL CONDITIONS/CONSTRAINTS:

Environmental Conditions.

The Environmental Management Division is now a part of the Directorate of Industrial Risk Management, which was created effective 1 January 1991. Based on the size and diversity of missions assigned to this installation, the environmental activity has multifaceted environmental challenges to effectively deal with including air, water, wastewater, hazardous waste, and solid waste management. Red River has its own water plant, steam generation plant, sewage and industrial waste treatment facilities, and sanitary landfill.

Water/Wastewater Management.

The existing sewer treatment plant is capable of properly treating the sanitary sewage generated by the depot and Lone Star Ammunition Plant. NDPES permit limitations are easily met. The plant has design capability that allows twice the amount of flow presently being treated.

The Industrial Waste Treatment Plant treats phosphate and heavy metal rinse water from various operations on depot. This is an NPDES permitted facility and also generates RCRA regulated wastewater sludge, which is disposed of as an Environmenal Protection Agency (EPA) F006 waste. Treated rinse waters are released three to four times a week after in-house analytical testing verifies the rinsewaters are below NPDES permit effluent limitations.

RRAD has submitted to the EPA a notice of intent (NOI) to comply with the requirements of the general permit for storm water management. Storm water sampling requirements have been completed. A storm water pollution prevention plan for RRAD is being prepared by Army Environmental Hygiene Agency (AEHA), but implementation, compliance, and maintenance [illegible]

hazardous waste from "cradle-to-grave" and regulatory inspectors are very impressed with the system. Red River's tracking system is the cornerstone for an Army-wide standardized system Department of the Army (DA) is developing for implementation in

The depot was issued a ten year RCRA Hazardous Waste Permit by both the Texas Water Commission and EPA in August 1988. A Part B permit application for open burning/open detonation of waste explosives was submitted to both the Texas Water Commission and EPA in November 1988. The regulatory agencies have yet to issue a permit pursuant to this application and RRAD continues operation of this site under interim status.

Red River is actively engaged in hazardous waste minimization (HAZMIN) actions to reduce the volume and toxicity of hazardous waste generation. RRAD is designated as a Center of Technical Excellence (CTX) for the reduction of chlorinated solvents. Water blast equipment that uses non-toxic detergents and hot water under pressure of 150-400 pounds are being used to separate oil and grease from parts being cleaned. A 1,1,1, trichloroethane distillation system was installed in 1991 to remove contaminates and recover 1,1,1, trichloroethane for reuse until water blast equipment could be procured to replace degreaser vats.

Solid Waste Management.

RRAD has two permitted Type I sanitary landfills. One is currently in use and will be closed in late fiscal year 93 the new landfill, permitted 16 November 1989, will begin operation. This landfill will meet the newly promulgated Subtitle D regulations prior to operation and has a life expectancy of 20 - 25 years. The landfill serves RRAD and the Lone Star Ammunition Plant.

Air Quality Management.

RRAD has several air permits from the Texas Air Control Board covering a gamut of air emission sources such as: degreasing, plating, painting, abrasive cleaning, coal/wood natural gas fired boilers, open burning/open detonation of explosives, and propellants. We are currently in the process of completing a comprehensive air emission inventory in order to meet the permitting requirements of the Clean Air Act Amendments of 1990. We successfully negotiated an air permit for the fluidized bed rubber denuding system which removes rubber from track and road wheels. This process greatly reduced

environmental staff at RRAD. Regulatory inspectors from these agencies conduct multi-media inspections at the depot at least annually. These inspections have become more in-depth in recent years, and despite the fact RRAD has one of the smallest environmental management organizations within Depot System Command, very few major notices of violations are issued.

LOCAL INDUSTRIES

COMPETITIVE - The following local industries compete for the same skills, resources and transportation as RRAD.

Georgia Pacific Paper Company	3 Large Medical Centers
International Paper Company	Weyerhauser Paper Co
Cooper Tire & Rubber Company	Hotel/Motel/Restaurants
Defense Depot Red Rive (DLA)	Lone Star Ammunition Plant
Federal Correctional Institute	Alumax
Texana Tank Car	Smith Blair
Johnson Controls	

1.4.3 TECHNOLOGICAL ENHANCEMENTS

SIGNIFICANT EXISTING/CURRENT CAPABILITIES -

EQUIPMENT: RRAD uses a large scale mainframe computer (IBM 4381-P13) interconnected to a Local Area Network with over 180 terminal devices in its maintenance shop floor system (MSFS).

SOFTWARE: The MSFS application provides total asset visibility from acquisition of an item to end item completion. This MSFS application modules in support of product production at RRAD include:

Requisition	Inventory
Requisition Suspense	End Item Tracking
Component Tracking	Bench Stock
Test Equipment	Kitting
Work Station Requirement	Administration
Hazardous Waste Tracking	

construction of an outdoor laser safe range with required features and equipment for test firing of laser range finders; construction of a centralized modern facility to primarily house machining, forming, cutting, grinding, plating, punching, and metallurgical treating of metals, including [illegible]

Some new items and processes have been planned as a result of new products introduced or to meet Occupational Safety and Health Act (OSHA) and EPA requirements. The Are:

> Intermediate Forward Test Equipment to support Multiple Launch Rocket System (MLRS), Bradley Fighting Vehicle System (BFVS), possibly Paladin and future weapon systems and support equipment.
>
> The use of computer aided coordinate measuring systems to determine critical hull measurements to be used during conversion programs on light track vehicles. These systems will also support prototype development and other program developments under way and planned by RRAD.
>
> Use of ASCII 5 x 7 dot matrix stamps to identify ordnance material to aid in planning and scheduling of production.
>
> Use of electroless nickel in lieu of chrome plating on selected items.
>
> Use of zinc plating in lieu of cadmium plating on selected items.
>
> Process logic controller to automate track and road wheel rebuild operations.

Fluidized Bed Denuding System

RRAD has the only CONUS road wheel and track rebuild facility operated by DOD. RRAD supports the road wheel and track block requirements for all of DOD, not just the Army. RRAD Production Engineering Division and Rubber Products Division personnel have developed and initiated a production improvement and modernization program. This five year modernization program addresses work place safety, environmental improvements, quality improvements, increased productivity, and cost reductions. The modernization program includes the installation of a fluidized bed rubber denuding system to strip rubber from metal parts.

The fluidized bed system (FBS) represents an investment of over $3M. AMC and

organic components or the rubber are converted to gases, which are then removed and burned in a secondary combustion chamber. The air steam is cleaned before being exhausted to the atmosphere. After rubber removal is complete, the road wheels [illegible] quench [illegible] or co[illegible] and then to an unloading station. The hot FBS tanks are totally enclosed with the operators remotely located in a control room. The heating, cooling, ventilation/pollution control, and material handling systems are all automated and computer controlled.

Implementation of the FBS system of denuding is a major factor in achieving the Rubber Products Modernization program objectives that include a 50 percent reduction in hazardous waste, a 29 percent reduction of volatile organic compounds emitted to the atmosphere, and a 38 percent reduction in utility costs. This system will enable RRAD to reach the highest competitive level in road wheel and track remanufacturing with the capability to rebuild all configurations of road wheels and track in quantities required to support all DOD activities.

Red River Army Depot Investment Strategy/Modernization Program.

The DDMC, Corporate Business Plan - Army, outlines the future strategies that each depot shall pursue in attaining the target savings while maintaining a responsive depot maintenance capability in support of mission requirements.

Under this plan, RRAD will be postured as the light combat vehicle CTX and depot maintenance facility for the Army. Included are armored personnel carriers, assault vehicles, air defense weapon systems carriers, land combat missile system platforms, (where system integration requirements demand repair/overhaul of the platforms at RRAD), light tracked anti-tank and communications station carriers, and towed and self-propelled artillery. Inherent in the repair/modification for assigned systems is the associated repair of engines and other secondary items. The theater readiness monitoring facility for the HAWK and PATRIOT missile systems will be retained at RRAD.

Capability in the light track area has been established for many years and RRAD has constantly been in pursuit of the latest technological advancements to upgrade and maintain the current level of support. With the decision to send artillery to RRAD, some new priorities were established. The final planning documents have not been laid in place but preparations to acquire full support have already begun.

RRAD has [illegible]

many logistics problems associated with acquiring this depot maintenance plant equipment (DMPE). The funding will be identified and split between Defense Business Operations Fund (DBOF) and BRAC 91 funds (exactly how has not been determined). Some DPME

Included in future investment programs is the FCIM PProgram. This program is now beginning to gain influence at RRAD. The total parameters of the program have not been determined at this time; however, investigation into its feasibility at RRAD has begun. RRAD has, for planning purposes, defined a requirement for $1M of funding to do the design phase prior to implementation. In the implementation phase it is envisioned there will be a requirement for an additional $9.9M. This will allow for the implementation and compliance with the following initiatives; (1) Computer Aided Acquisition, Logistics and Support (CALS), (2) Equipment Data Management and Information Control System (EDMICS), and (3) RAMP.

Individuals visiting RRAD, that have been here in the past, will surely recognize a major effort to give the depot a facelift. Those that have never been at RRAD will see a depot dedicated to beauty and professionally kept.

All of the structures on RRAD have been or are in the process of being painted. The front gate area has undergone a beautification project which has greatly enhanced the depot image. Streets and sidewalks, that have long ago needed repairs, have been repaired. The old World War II wooden barrack type structures have been demolished which has greatly enhanced the beauty and professional image of the depot. This is but another phase of RRAD's investment strategy. With competition a by-word in the Army community RRAD has committed to increase the moral of the work force by instilling pride in the depot and to gain a long range savings, by spending dollars that will stop unnecessary repairs down the road. As a result of this initiative, RRAD is fast becoming a show place within the DESCOM community.

Red River Army Depot has won the DESCOM Communities of Excellence award for the past two years. Currently, RRAD is one of two finalist in the Army Communities of Excellence competition.

1.5 Tobyhanna Army Depot (TOAD), Tobyhanna, Pennsylvania

1.5.1 OVERVIEW

HISTORY/MISSION: The history of Tobyhanna began in 1913, when it was activated as the Tobyhanna Military Reservation and used as an Army and National Guard field artillery training site. During World War I, it became an ambulance and tank training center. Tobyhanna was deactivated after the war. In 1938, West Point cadets began using it for field artillery training. After the outbreak of World War II, Tobyhanna became an Army Air Corps training center and was also used as a prisoner of war camp. After World War II, it became idle and remained so until April 1953, when it reopened as the Tobyhanna Signal Depot. It became Tobyhanna Army Depot when it joined the Army Materiel Command and was given expanded responsibilities. Tobyhanna became part of DESCOM when that command was organized in 1976. Tobyhanna Army Depot currently is scheduled to acquire from Lexington-Blue Grass Army Depot its Communications-Electronics and Communications-Security (COMSEC) workload. As a result of announced base closures, Sacramento Army Depot's mission may also be transferred to Tobyhanna Army Depot.

GENERAL MISSION RESPONSIBILITIES: Tobyhanna Army Depot provides for the receipt, storage, maintenance, issue, and disposal of assigned commodities. All of the organizations are integral members of a highly motivated team that meets the challenges of changing technology, force modernization, and special mission requirements. Mission functions are in support of the Army, other military services, government agencies and allies.

TOAD is a Communications-Electronics Maintenance and Supply Depot. Its mission includes: the receipt, storage, assembly, disassembly, care and preservation, and shipment of materiel as directed by commodity managers; overhaul, rebuild modification, conversion, repair, manufacturing and fabrication of assigned commodities; "quick reaction" fabrication support for the US Armed Forces and other government agencies; operation of an automatic test and diagnostic equipment programming facility; and mobile maintenance support for the automatic digital network (AUTODIN) facilities in CONUS and overseas. The depot possesses a antenna pattern range, which supports the Army, Navy, Air Force, and Marine Corps radar requirements. As part of its mission the depot also procures transportation and provides storage and related services for movement of DOD household goods of military and civilian personnel in designated areas of Pennsylvania and New Jersey, conducts training for military personnel, and provides

LOCATION: The depot is situated in the northeast region of Pennsylvania in the Pocono Mountains. It is approximately 90 miles east of New York City, 100 miles north of Philadelphia, 22 miles south of the city of Scranton, 15 miles northwest of Stroudsburg.

SIZE: TOAD's total installation occupies a total of 1,293 acres, of which 398 acres are in the industrial area. There are 141 buildings (11 maintenance) with an estimated replacement value of $655.5M The maintenance facility value is $14.1M. These buildings house $132.5M of industrial machinery and equipment.

WORK FORCE/PAYROLL: Overall employment at the close of FY91 included 3,510 depot civilian employees, 387 civilians employed by the tenant activities, 78 non-appropriated fund (NAF) workers, 2 Army interns, and 30 military personnel for a total of 3,977. Payroll for FY91 was $107.3M.

1.5.2 DEMOGRAPHIC DATA

POPULATION: The work force population at the depot comes from nine surrounding counties: 42 percent from Lackawanna County, 31 percent from Luzerne County, 14 percent from Monroe County, 6 percent from Wayne County, and a combined 7 percent from Carbon, Wyoming, Susquehanna, Schuylkill, Pike, and Northampton counties.

SKILL BASE: This depot is located in a predominately resort area. Approximately 65 percent of initially hired personnel are semi-skilled, and most have military or technical school training. A permanent classroom training program provides state-of-the-art electronics training to maintain a viable, qualified work force. At any given time, TOAD has approximately 25 percent semi-skilled, 40 percent skilled, 10 percent highly skilled, 20 percent professional, and the remaining 5 percent are unskilled laborers.

TRANSPORTATION ACCESS: An intercontinental trucking activity, Consolidated Freightways, has a major terminal 5 miles south of the depot with immediate access to Interstates 80, 81, and 380. Also, there are additional trucking companies within a 20-mile radius that provide long haul services.

Military airlift facilities are available at McGuire AFB, New Jersey, and Dover AFB, Delaware, which are within 200 miles of the depot. Two major airports, Wilkes-Barre/Scranton and Allentown-Bethlehem-Easton, can accommodate jet aircraft and are located 22 and 50 miles respectively from the depot. In addition, Mount Pocono Airport

ENVIRONMENTAL CONSTRAINTS: Change in operations due to environmental regulations are numerous. Hazardous Wastes (HW) are strictly regulated in accordance with RCRA and Superfund Reauthorization Act (SARA). This has created over 100 jobs in HW handling and mandatory annual training requirements plus associated record-keeping requirements to satisfy state [illegible] federal environmental [illegible] has been a complex on-going training program in respect to environmental and hazardous waste handling. The Depot Environmental Office and Directorate of Information Management (DOIM) have developed a data base to determine who is required to be trained and who has received training.

Located in the Pocono mountains, the depot is in a natural environment setting surrounded by a state park and a wildlife refuge. In the past decade the surrounding area has experienced a population growth, with new homes and small businesses as people move in from metropolitan areas. Resorts and tourist attractions are within a 30-mile radius and offer all year-round activities. At 2,000 feet elevation, the seasonal mean temperatures are 40 degrees Fahrenheit during spring, and 71 degrees Fahrenheit during summer.

LOCAL INDUSTRIES:

COMPETITIVE -

Allied Bendix Corporation
Loral Inc
Grumman Aerospace Corp., Electronics Division

COMPLEMENTARY -

Nivert Metal
Allentown Valve & Fitting
The Bittenbender Company
Pennsylvania State University
Scranton University

1.5.3 TECHNOLOGICAL ENHANCEMENTS

MANUFACTURING TECHNIQUES/ PROCESSES: The latest state-of-the-art computer aided engineering (CAE) system is being upgraded and integrated into our design/manufacturing environment. It is used for mechanical, electronic and printed

The depot is affiliated with the Commonwealth of Pennsylvania Department of Commerce Program designated the Ben Franklin Partnership. This entity fosters cooperative projects between industry and universities to improve productivity through application of modern technology. [illegible] Partnership include Surface Mount Testing and Repair, Applications for Composite Materials, Artificial Intelligence, and Reverse Engineering to Avoid Sole Source Contracting. The application of any of these proposed projects using the latest state-of-the-art equipment, materials, and procedures will increase the efficiency and effectiveness of the depot.

REPAIR TECHNIQUES/PROCESSES/FACILITIES:

In cooperation with the Navy, a project for the laser robotic welding of equipment racks is nearing completion. Design of the system has been completed and the prototype developed. Pennsylvania State University is the prime contractor. Another joint project just starting is with the Air Force for the solder/desolder of electronic components. This project will be to develop a system to semi-automatically repair printed wiring board assemblies with surface mount devices. It will be modular with stations to identify the type of conformal coating, remove the conformal coating, desolder the surface mounted device, re-insert a new component, solder the component to the board and re-apply the conformal coating.

Depot Modernization Plan. Some of the additions and modifications to depot facilities planned to enable simultaneous improvement in all phases of operation and to update the depot's image are listed below:

Satellite Communications (SATCOM) Mission Facility - a permanent secure building of 52,500 SF at a cost of approximately $6.2M in FY92, to provide a consolidated, self-contained, secure facility for prototype fabrication, staging, repair, and overhaul of satellite communications systems and equipment.

Shelter/Van Repair Facility - a permanent enclosure of 91,200 SF at a cost of approximately $8M in FY94, to provide a centralized area for the disassembly and assembly of large communications-electronics shelters and vans.

Industrial Operations Facility - a permanent enclosure scheduled for FY96 to provide a centralized area for the cleaning, preparation, and painting of large communication-electronics shelters and vans before movement into electronic