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Report to the Chairman, Committee on Armed Services, House of Representatives

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STRATEGIC BOMBERS

Logistics Decisions Impede B-1B Readiness and Supportability

GAO/NSIAD-89-129

GAO
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National Security and
International Affairs Division

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The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

This report, which was prepared at your request, addresses B-1B logistics management and the need to ensure adequate attention to readiness, supportability, and maintainability of weapon systems throughout the acquisition and development cycle.

As arranged with your Office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after its issue date. At that time we will send copies to appropriate congressional committees; the Secretaries of Defense and the Air Force; the Director, Office of Management and Budget; and other interested parties upon request. This report was prepared under the direction of Harry R. Finley, Director, Air Force Issues. Other major contributors are listed in appendix II.

Sincerely yours,

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

In April 1988 the Air Force accepted the 100th and final B-1B strategic bomber 2 months ahead of schedule. These aircraft were needed to fulfill the Air Force's operational requirement for a bomber able to penetrate Soviet defenses until the 1990s. However, when the final B-1B was accepted, less than one-half of the aircraft were mission capable, and fewer than planned had been placed on alert. B-1B supply and maintenance problems were major contributors to this outcome.

GAO has reviewed the B-1B program since the early 1980s. In 1987 the Chairman, House Committee on Armed Services, requested that GAO report on logistical support, maintenance, and readiness of the B-1B. This report addresses the achievement of readiness objectives, updates the status of previously reported parts shortages and maintenance problems, identifies impending logistical challenges, and discusses opportunities to enhance logistics management.

Background

Department of Defense (DOD) acquisition guidelines provide for phased development, testing, production, and deployment of a major weapon system such as the B-1B. The guidelines also require that logistics support (i.e., reliability, maintainability, and supportability requirements) receives the same emphasis as cost and schedule while a system progresses through these acquisition phases.

To provide the capability to penetrate Soviet defenses until the mid-1990s, the Air Force accelerated the B-1B acquisition with concurrent development, testing, production, and deployment. Plans and provisions for the logistics support needed to carry out daily operations were also required during the same period. The Air Force believed its approach was feasible based on its experience with the B-1A bomber, the B-1B's predecessor.

Results in Brief

DOD and the Air Force emphasized production schedules and program cost during B-1B development. Tradeoffs were made that affected logistics support. Lack of adequate logistics support has contributed to significant numbers of grounded aircraft and has reduced mission capable time. This, in turn, has delayed crew training and plans for increasing the number of alert aircraft.

The Air Force continues to face difficult challenges that could require billions of dollars to support full B-1B operations. A comprehensive assessment of B-1B logistics support status could help identify B-1B

readiness and supportability issues and needed follow-up actions. In addition, visible and measurable readiness and supportability goals for early operations could assist in achieving DOD's policy of sufficient attention to logistics issues throughout the development and acquisition process.

GAO's Analysis

Delivery Schedule Met, but Operational Targets Not Met

While the Air Force's commitment to achieving the production and delivery schedule provided 100 aircraft ahead of schedule, the B-1B did not meet initial operating goals and has not achieved current expected operational readiness capabilities. In addition, it will be delayed several years in achieving mature operational readiness. For example, the Air Force has not been able to put B-1Bs on alert at the rate established in its Program Management Directive. As a result, the number of B-1Bs on alert is behind early expectations for the program. In the event of a surprise nuclear attack, aircraft not on alert are likely to be destroyed.

Logistical Problems Impede Readiness and Supportability

Logistical support problems and development deficiencies have contributed to the Air Force's inability to meet B-1B operational readiness targets. The Air Force has been faced with significant B-1B parts and maintenance problems that have required extraordinary effort to support operations. These problems have seriously limited aircraft availability, forced the Air Force to rely on extensive use of parts from grounded aircraft to continue operations, and reduced its ability to carry out training. Even though some measures used by the Air Force to assess B-1B parts supply and maintenance operations show improvement, the not mission capable rates indicate these problems continue. For example, the total not mission capable maintenance rate increased from 30 percent in October 1987 to 48 percent in September 1988. According to DOD, the January 1989 rate was 36.4 percent.

Major Logistical Support Challenges Remain

The Air Force has made progress in supporting B-1B operations, but achieving mature operations will take years and require billions of dollars. B-1B system maturity is planned for 1994 after flying 200,000 cumulative hours. The Air Force Cost Center estimates that operation and support costs for the B-1B will total $2.6 billion for fiscal years 1988 through 1994. When the B-1B program management responsibility

transfers, the Air Force Logistics Command will be faced with achieving system maturity, providing organic maintenance, and addressing logistical support requirements, reliability and maintainability improvements, and the need for increasing contractor engineering support.

Management Emphasis on Readiness and Supportability Needed

DOD and Air Force guidance provides that emphasizing the logistic support elements, as well as cost, schedule, and performance, during acquisition is an essential task in ensuring the readiness and supportability of major weapon systems. During B-1B development and acquisition the Air Force (1) deferred integrating logistics into the B-1B program during early acquisition planning and (2) made program decisions that impeded or complicated supply and maintenance operations needed to ensure the readiness and supportability of the B-1B.

DOD recently established a new acquisition review, called Milestone IV, Logistics Readiness and Support Review, that could provide decisionmakers with a comprehensive assessment of what is needed to ensure readiness and supportability. As of December 1988, DOD had not conducted a Milestone IV review on any of its systems and had not scheduled the B-1B for such a review.

The DOD review could prove useful in focusing early attention on readiness and supportability of weapon systems. In addition, GAO believes visible goals and better information on the status of readiness and supportability would be useful to increase management emphasis on logistics throughout system development and acquisition and should help achieve DOD's policy of giving equal emphasis to logistics.

Recommendations

GAO recommends that the Secretary of Defense conduct the Milestone IV, Logistics Readiness and Support Review for the B-1B. GAO also recommends that the Secretary of Defense ensure that decisionmakers establish and use visible and measurable interim operational readiness goals that can be applied to early operations of systems, especially for systems in which cost and schedule are imperatives.

Agency Comments

DOD generally agreed with GAO's findings and provided additional information and more current data. GAO has revised its report and included DOD's comments where appropriate.

DOD said a Milestone IV, Logistics Readiness and Support Review of the B-1B is planned for mid-1989. DOD also agreed that the Secretary of Defense should ensure that decisionmakers establish and use visible and measurable operational readiness goals for early operations of new systems. However, DOD commented that current guidelines provide a framework to establish and monitor the achievement of readiness and support goals and establish a logistics support program for new weapon systems. DOD officials have previously recognized that direct measurement of such goals established in current regulations cannot be made during early operations because the goals are for mature systems. GAO agrees that the goals are for mature systems. Accordingly, GAO modified its recommendation to emphasize the need for interim goals to measure the Air Force's progress in obtaining improved logistics performance following initial operational deployment.

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Abbreviations

AFB	Air Force Base
AFLC	Air Force Logistics Command
AFSC	Air Force Systems Command
ALC	Air Logistics Center
CITS	central integrated test system
DOD	Department of Defense
GAO	General Accounting Office
IOC	initial operational capability
SAC	Strategic Air Command

Introduction

The Air Force declared the B-1B operational in September 1986 and accepted delivery of the 100th and final B-1B in April 1988. As of December 1988, 73 primary assigned B-1Bs were deployed to bombardment squadrons at four main operating bases: 11 at Dyess Air Force Base (AFB), 30 at Ellsworth AFB, 16 at Grand Forks AFB, and 16 at McConnell AFB. Of the remaining 27 aircraft, the Air Force assigned 17 to the training squadron at Dyess, 4 to backup inventory, 3 to testing, and 3 were destroyed in crashes (one in September 1987 and two in November 1988). The Air Force expects the B-1B to reach system maturity in 1994 after completing 200,000 cumulative flying hours.

B-1B Development and Acquisition

The Air Force undertook the B-1B bomber program to modernize the aircraft portion of the Strategic Triad.[1] From several candidates, including the advanced technology aircraft and derivatives of the B-1A and FB-111, the Air Force selected the B-1B, a variation of the B-1A, to replace the B-52 as a penetrating bomber. The B-1B's planned penetrating role was to be relatively short. It was expected to be able to penetrate Soviet defenses until the mid-1990s. At that time a more advanced bomber—the B-2—was expected to be needed for the penetrating role. After the B-2 becomes available, the B-1B is expected to be used as a cruise missile carrier or as a conventional bomber.

In selecting the B-1B, the Air Force stated that the technology, cost, and schedule risks would be low because of the experience gained from the B-1A program, which was canceled in 1977. On January 18, 1982, the President certified to the Congress that the B-1B would have an initial operating capability during 1986 and that the development and acquisition cost of the B-1B fleet would not exceed $20.5 billion (in 1981 dollars). This amount equals $27.8 billion in then-year dollars.

To meet operation schedules, the B-1B acquisition program featured highly concurrent full-scale development, production, testing, and operations. With this approach, the production decision was made prior to completing full-scale development and testing. This eliminated several checks and balances normally found in the acquisition cycle of major weapon system development and production, most significantly, the milestone reviews. This approach also increased developmental and production risks.

[1]The Strategic Triad is composed of the strategic bomber force, the land-based intercontinental ballistic missile force, and the sea-based submarine ballistic missile fleet.

The acquisition of a major weapon is generally divided into phases. Before completing a phase, a milestone review is conducted, and a decision is made by the Secretary of Defense or his designated representative as to whether to proceed to the next acquisition phase. Milestone reviews for the B-1B program were not conducted because the program was simultaneously engaged in full-scale development and production. Instead, a system of secretarial program reviews was used. According to congressional testimony, these reviews involved the Air Force briefing the Secretary of Defense on the program status, focusing primarily on cost and schedule.

Program Management

Air Force management responsibilities for the B-1B are divided among three major Air Force commands: the Air Force Systems Command (AFSC), the Air Force Logistics Command (AFLC), and the Strategic Air Command (SAC). Within the Systems Program Office of AFSC, the B-1B Program Manager has overall responsibility for development and production, and the Deputy Program Manager, Logistics, is responsible for the logistical aspects. In fulfilling its responsibilities, the program office acted to make sure all the aircraft systems worked together—a role that is usually performed by contractors under the direction of the Air Force. Within the AFLC, the Oklahoma City Air Logistics Center (ALC) is responsible for managing the maintenance and logistical support of the B-1B. B-1B program management responsibility was planned to transfer from the AFSC to the AFLC in January 1989. As of April 1, 1989, the transfer had not been approved, according to Air Force officials. SAC is responsible for B-1B operations.

Significance of Logistics

Providing effective, efficient, and economical logistical support to a weapon system is of major concern to the Congress, the Department of Defense (DOD), and the military services because logistics determines whether a weapon system will be ready to perform its mission and is a major component of life-cycle costs. For every $1 billion spent on acquiring a major weapon system, $1 billion to $4 billion is typically spent on logistical support during its life time, according to Defense Systems Management College course materials.

DOD has recognized the importance of logistics by establishing policies and procedures to improve readiness and support. DOD policy states that a primary objective of the acquisition process is improved readiness and that resources needed to achieve readiness will receive the same emphasis as those required to achieve schedule and performance objectives. In

September 1987 DOD added a logistics readiness and support milestone review to its weapon system acquisition process to enhance the focus on logistics.

Prior B-1B Reports

Since the B-1B program started in 1981, we have issued several reports discussing the program's progress as it moved through the acquisition process. A list of these reports is provided at the end of this report.

Objectives, Scope, and Methodology

In 1987 the Chairman, House Committee on Armed Services, requested that we report on the support, maintenance, and readiness of the B-1B. This is the last of our planned reports on these issues. The objectives of this review were to (1) assess the B-1B's achievement of its production schedule and readiness objectives, (2) update the status of parts shortages and maintenance problems identified in our previous reports, (3) identify the logistics challenges the B-1B program faces as the Air Force transfers program management responsibility from the Systems Program Office to the AFLC, and (4) identify opportunities, based on the B-1B experience, to improve logistics support of future aircraft.

To assess the achievement of B-1B production schedules and readiness objectives, we reviewed the B-1B 1988 Program Management Directive, SAC's 1984 Statement of Operational Capability, and the May 1987 B-1B Full Operational Capability Plan. The objectives identified in these documents included the percent of time an aircraft is to be mission capable, the planned number of qualified aircrews, and the number of aircraft planned to be on alert status. We did not assess the Air Force's capability to put aircraft on alert in the event of a national emergency.

To update the status of parts shortages and maintenance problems, we monitored the indicators in the B-1B operating bases' monthly maintenance reports, which show the impact of these problems. The indicators we reviewed included the percent of time aircraft were not mission capable because of parts shortages, the percent of time aircraft were not mission capable because of maintenance actions, the number of aircraft temporarily grounded on a daily basis because of parts shortages, and the extent the Air Force was relying on using parts from grounded aircraft to continue operations.

To identify B-1B logistic challenges, we reviewed Air Force logistics management decisions and plans to transfer management responsibility

from the AFSC to AFLC. We gathered data on plans and associated costs to resolve logistics support problems and enhance reliability and maintainability. Also, we gathered cost information on operation and support, contractor engineering support, and contractor repair. In addition, we reviewed the Air Force schedule to perform repairs in-house.

We performed our work at Headquarters, U.S. Air Force, Washington, D.C.; B-1B System Program Office and AFLC, Wright-Patterson AFB, Ohio; Oklahoma City ALC, Oklahoma; Headquarters, SAC, Offutt AFB, Nebraska; Dyess AFB, Texas; Grand Forks AFB, North Dakota; and McConnell AFB, Kansas. At each of these locations, we interviewed responsible agency personnel and reviewed applicable policies, procedures, and pertinent documents. We conducted our review between October 1987 and November 1988 in accordance with generally accepted government audit standards.

B-1B Met Delivery Schedule but Not Operational Readiness Targets

The Air Force based its 1981 decision to expedite the development, production, and delivery of the B-1B on the need to have the B-1B ready in 5 years to perform its mission as a penetrating bomber. The initial operational capability (IOC), which the Congress required the President to certify as achievable, required the delivery of the 15th B-1B by October 1986. The Air Force was also to have sufficient support resources to accommodate Single Integrated Operational Plan alert and SAC day-to-day operational flying requirements by the IOC date. Even though the Air Force achieved the delivery schedule, the B-1B has had a number of operation and support shortcomings, and the Air Force has not achieved its desired operational capability such as numbers of alert aircraft, aircraft availability rates, and numbers of trained crews.

Delivery Schedule Met

The Air Force's commitment to achieving the production and delivery schedule provided aircraft ahead of schedule as shown in table 2.1.

Table 2.1: B-1B Delivery Schedule

	Planned	Actual
First B-1B delivery	July 1985	April 1985
Delivery of 15th B-1B (IOC)	October 1986	September 1986
Last B-1B delivery	June 1988	April 1988

To achieve this schedule, the Air Force accepted B-1Bs with deficiencies, and B-1B initial performance has been less than originally intended. In February 1987 we testified[2] on B-1B development deficiencies that affected mission effectiveness such as problems with flight controls, terrain-following radar, defensive avionics systems, and fuel leaks. These deficiencies are being corrected through maintenance actions or modifications. In July 1988 we reported[3] that the Air Force had also granted its contractors waivers to prevent production delays and keep production costs down. In doing this the Air Force accepted B-1B aircraft with parts missing, parts that did not meet configuration or test specifications, and parts that did not fully meet performance requirements.

In its comments on a draft of this report DOD said that accepting equipment with a waiver or deviation is a normal practice and does not necessarily mean the system is deficient or cannot perform its mission. We

[2]The B-1B Aircraft Program (GAO/T-NSIAD-87-4A, February 25, 1987).

[3]Strategic Bombers: B-1B Parts Problems Continue to Impede Operations (GAO/NSIAD-88-190, July 26, 1988).

agree that not all deviations and waivers are serious problems that preclude mission performance, but some can complicate logistics support. For example, some B-1B parts accepted under deviations and waivers, such as delaminating windshields, grounded aircraft and degraded the B-1B's mission capability.

Operational Readiness Targets Not Fully Met

The Air Force has not fully met its established operational readiness targets for the B-1B. As the Air Force strived to meet its production and delivery goals, it expected to achieve certain operational readiness targets. These targets included the number of aircraft to be placed on alert, the mission capable rate (the portion of total aircraft time that the aircraft is available to perform its mission), and the number of aircrews to be trained mission ready.

Alert Aircraft

One critical Air Force objective is to have B-1Bs on alert. SAC's historical criterion for an alert force is 30 percent of the bombers assigned to the strategic bombardment wings. For example, to meet this criteria, SAC would need to place on alert 24 of the 80 B-1Bs it planned to assign to bombardment wings. Nevertheless, SAC has placed fewer aircraft on alert than are needed to keep pace with the alert objectives identified in the Program Management Directive dated January 4, 1988. These alert objectives and the number of alert B-1B aircraft are discussed in the classified supplement to this report. SAC officials said that, in the event of a surprise nuclear attack, aircraft not on alert will likely be destroyed before they can be loaded with munitions and fuel and launched.

DOD commented that the B-1B met its operational alert target when it went on operational alert in September 1986. It said that our use of 24 alert aircraft based on SAC's historical rate of 30 percent was in error because only 73 B-1Bs are assigned to bombardment squadrons. DOD also said that SAC's historical rate is applicable to mature systems and inappropriate to apply at initial deployment. DOD noted that the Commander-in-Chief of SAC determines the number and types of bombers required on alert to meet the Single Integrated Operation Plan and the decision is based upon the current situation and priorities.

We included the historical rate as a basis for understanding the operational alert concept, not for identifying how many alert aircraft the Air Force should have now. We used 80 aircraft as the basis for our example

because it was the number of aircraft that the Air Force planned to distribute to bombardment squadrons. However, the Air Force subsequently assigned 7 of the 80 aircraft planned for the bombardment squadrons to the training squadron. We have changed the report to clarify that 24 alert aircraft is an example and not a measure of how many alert aircraft the Air Force should have now.

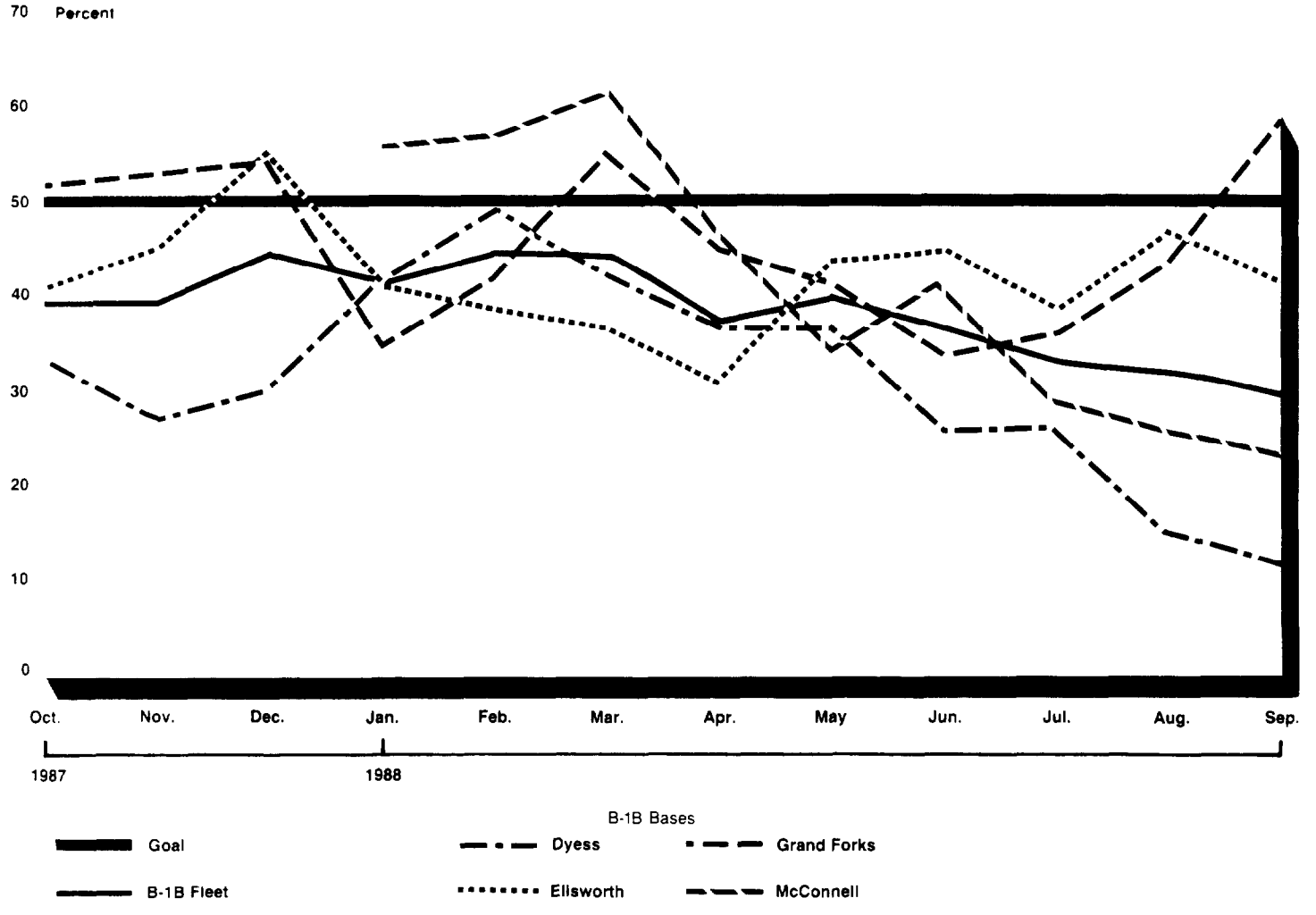
Mission Capable Aircraft

The Air Force uses availability and mission capability rates in assessing logistical support. The availability rate is the more rigorous standard. It is the percent of time the aircraft is available to perform all its missions, also called the fully mission capable rate. The mission capability rate is the percent of time the aircraft is available for some mission. The Air Force established availability goals for (1) IOC in September 1986 and (2) maturity after 200,000 flying hours, estimated to occur in 1994. These goals are presented in the classified supplement to this report.

The Air Force did not have a mission capable goal for the B-1B for IOC, which occurred on September 30, 1986. The Air Force's goal for the period covering fiscal year 1988 was 50 percent, and, according to DOD, the mission capable goal of maturity reported in the B-1B Weapon System Master Plan as of August 4, 1988, was 80 percent. The B-1B's mission capable rate at IOC was 2 percent. The rate has improved but is still below the interim goal of 50 percent. The Air Force's goal for B-52s, which is generally achieved, is that the aircraft should be mission capable 75 percent or more of the time. The B-52 goal is provided to help assess the status of the B-1B and is not intended to infer that the B-1B should have the same mission capable rate as the more mature B-52.

Figure 2.1 shows the percent of time B-1Bs were reported as mission capable from October 1987 through September 1988 and the goal for that period.

Figure 2.1: B-1B Monthly Mission Capable Rates – October 1987 Through September 1988



Number of Trained Mission Ready Crews

SAC does not expect to achieve its desired number of mission ready crews (those crews that have completed all the training required to be assigned to alert) until October 1993. SAC determined in 1984 that 1.31 mission ready crews per primary assigned aircraft were needed to carry out its alert force plans, and it planned to achieve this goal by December 1988. In October 1987, when it temporarily reduced the number of mission ready crews it planned to train by December 1988 from 1.31 per aircraft to 1.1 per aircraft, SAC cited a heavy modification schedule. The SAC

Commander said the reduced ratio would continue until logistical support was capable of meeting the continuation training and alert commitments of a mature system. Table 2.2 shows that as of November 30, 1988, SAC had formed 82 crews, of which 69, or 84 percent, were mission capable.

Table 2.2: Number of Aircrews Formed and Mission Capable as of November 30, 1988, at the Bombardment Wings

Air Force Base	Primary assigned aircraft	Aircrews	
		Formed	Mission capable
Dyess	18[a]	13	7
Ellsworth	30	33	32
Grand Forks	16	18	15
McConnell	16	18	15
Total	**80**	**82**	**69**

[a]Seven of these aircraft were assigned to the Dyess training squadron, leaving a total of 73 primary assigned aircraft at bombardment squadrons.

Logistical Problems Impede B-1B Readiness and Supportability

B-1B parts supply and maintenance problems have impeded the aircraft's readiness and supportability. In July and October 1988[4] we reported that parts shortages and maintenance problems, respectively, have reduced the time B-1Bs were available to meet required training and alert commitments. Some aspects of parts supply and maintenance operations show improvement, such as a reduced number of false indications of failures from the on-board test system. However, the measures used to assess parts and maintenance problems show that readiness and supportability problems are continuing.

On-Board Test System Is Improving

Even though the desired operational goal of not more than two false failures per flight has not been achieved, the B-1B test system, called the central integrated test system (CITS), is improving. The B-1B maintenance concept depends on a properly working CITS because it measures the performance of the parts and equipment to determine failures while the aircraft is operating. A false failure occurs when the system indicates that a part has failed when it has not. The Air Force's goal was two false failures per flight at both IOC and system maturity.

During initial B-1B operations in 1985, CITS was producing as many as 200 false indications of failures per flight. SAC concluded that CITS was operationally unacceptable in both the time and cost needed to respond to false failures. SAC wanted to limit false indications to no more than five per flight. The B-1B Program Office initiated incentive contract modifications to resolve the problems. In April 1988 the number of CITS false indications was down to about 16 per flight, and by October 1988 CITS was experiencing a false failure rate of 12 per flight, according to Air Force officials. Although CITS is working better, development of the software program to monitor parts in the troubled defensive avionics subsystem, the ALQ-161, was not complete as of December 1988. DOD commented that CITS software for the ALQ-161 was delivered in December 1988 and testing is underway.

[4]Strategic Bombers: B-1B Maintenance Problems Impede Its Operations (GAO/NSIAD-89-15, October 24, 1988).

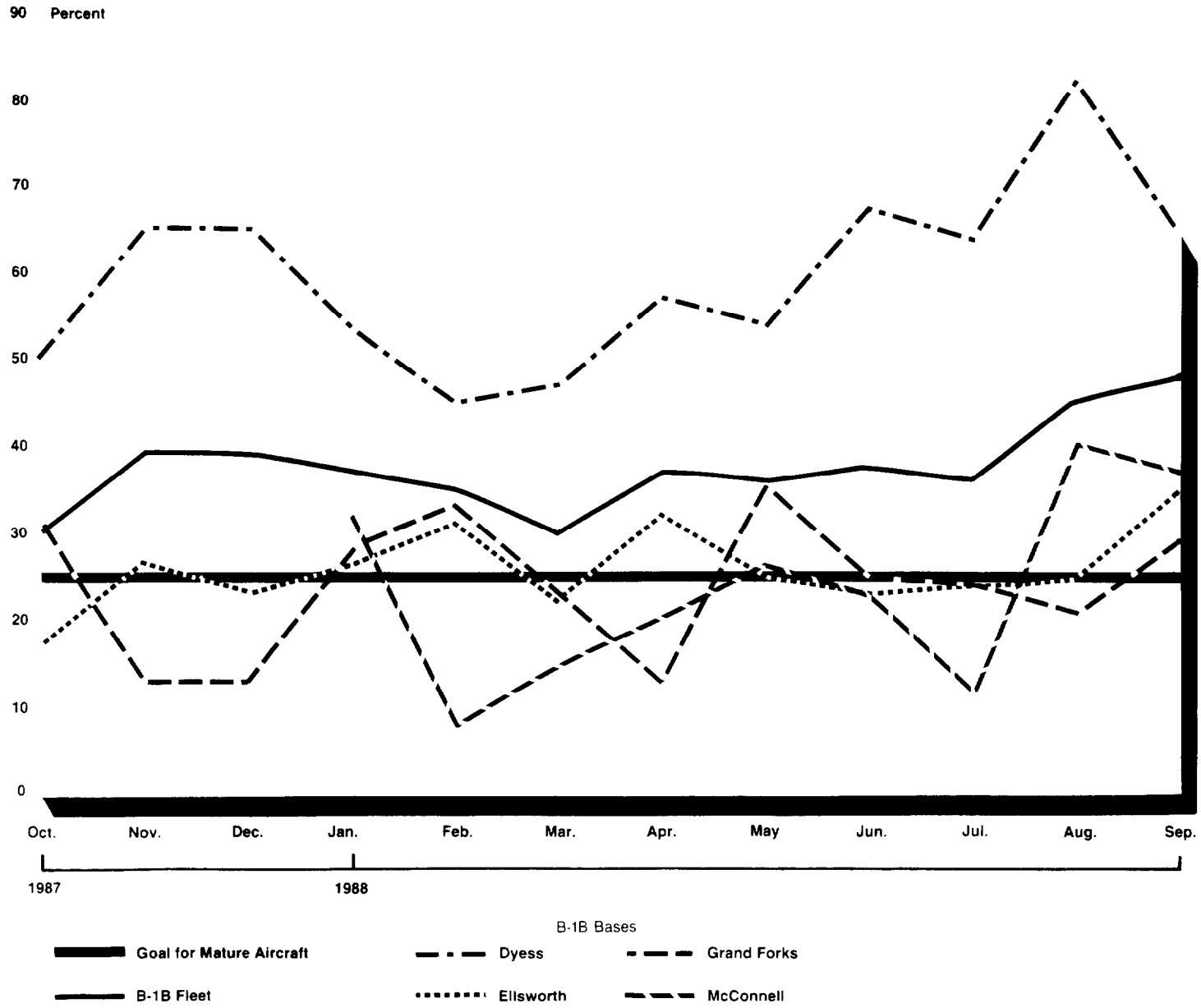
Not Mission Capable Maintenance Rates Indicate Maintenance Problems Continue

The portion of time B-1B aircraft could not perform their mission because of maintenance, as measured by the total not mission capable maintenance rate,[5] indicates that maintenance problems continue. In October 1988 we reported that problems such as frequently failing tires, generators, and windshields were causing a heavy maintenance workload and contributing to the amount of time aircraft were not available because of maintenance. The total not mission capable maintenance rate is the sum of the percent of time the aircraft is not available to perform its mission because of maintenance alone and the percent of time it is not available to perform its mission because of both supply and maintenance.

The Air Force has not established B-1B goals for not mission capable maintenance because it considers the aircraft too immature. The Air Force's goal for mature aircraft, such as the B-52 and the FB-111, is for the total not mission capable maintenance rates to be below 25 percent. Figure 3.1 shows some fluctuations, but no significant improvement, in total not mission capable maintenance rates for the B-1B since October 1987.

[5]Not mission capable rates are calculated on the basis of three categories: maintenance only, supply only, and both maintenance and supply. The third category is used in combination with the first and second for determining total not mission capable maintenance rates and total not mission capable supply rates, respectively.

Figure 3.1: B-1B Monthly Total Not Mission Capable Maintenance Rates – October 1987 Through September 1988



The percent of time the B-1B fleet was not mission capable because of maintenance increased from 30 percent in October 1987 to 48 percent in September 1988. Air Force officials said they were investigating a significant increase in not mission capable maintenance rates at Dyess. DOD

commented that significant challenges in maintaining the B-1B still exist but that recent data reflect improvement. It cited rates for December 1988 and January 1989 of 40.0 and 36.4 percent, respectively.

Not Mission Capable Supply Rates Indicate Parts Shortages Continue

We reported in July 1988 that parts failing faster than expected and not having negotiated delivery dates for ordered parts were major factors contributing to parts shortages. At the end of 1987 about 75 percent of the purchased parts had not been delivered. Air Force officials reported in November 1988 that about 57 percent of the parts had not been delivered.

The portion of time B-1B aircraft could not perform their missions because spare parts were not available, as measured by the not mission capable supply rate, indicates continuing parts problems. Aircraft are temporarily grounded or otherwise prevented from performing a mission when critical parts such as generators, windshields, and batteries fail and are not available from base supply. To obtain the parts needed for the aircraft to perform their missions the Air Force (1) issues high-priority requisitions to locate the part and expedite its delivery from a prime contractor, manufacturer, repair source, or another Air Force base and/or (2) cannibalizes parts from other B-1B aircraft. The number of these high-priority requisitions and cannibalizations are also indicators of the extent of the spare parts problem.

The total not mission capable supply rate is the total time aircraft were not available while waiting for parts only plus the time they were not available waiting for both parts and maintenance. According to Air Force officials, a goal for total not mission capable because of supply rate for the B-1B has not been set because the Air Force does not consider the B-1B a mature aircraft. The Air Force goal for mature aircraft, such as the B-52 and the FB-111, is for the total not mission capable because of supply rate to be below 20 percent. We provide the goal for mature aircraft as a benchmark to indicate the status of logistical support for the B-1B, not as a basis to determine what the current B-1B rate should be.

Figure 3.2 indicates that significant parts problems remain to be resolved before the B-1B can achieve a rate comparable to mature aircraft. DOD commented that improved rates are expected due to increased procurements and the delivery of parts on order.

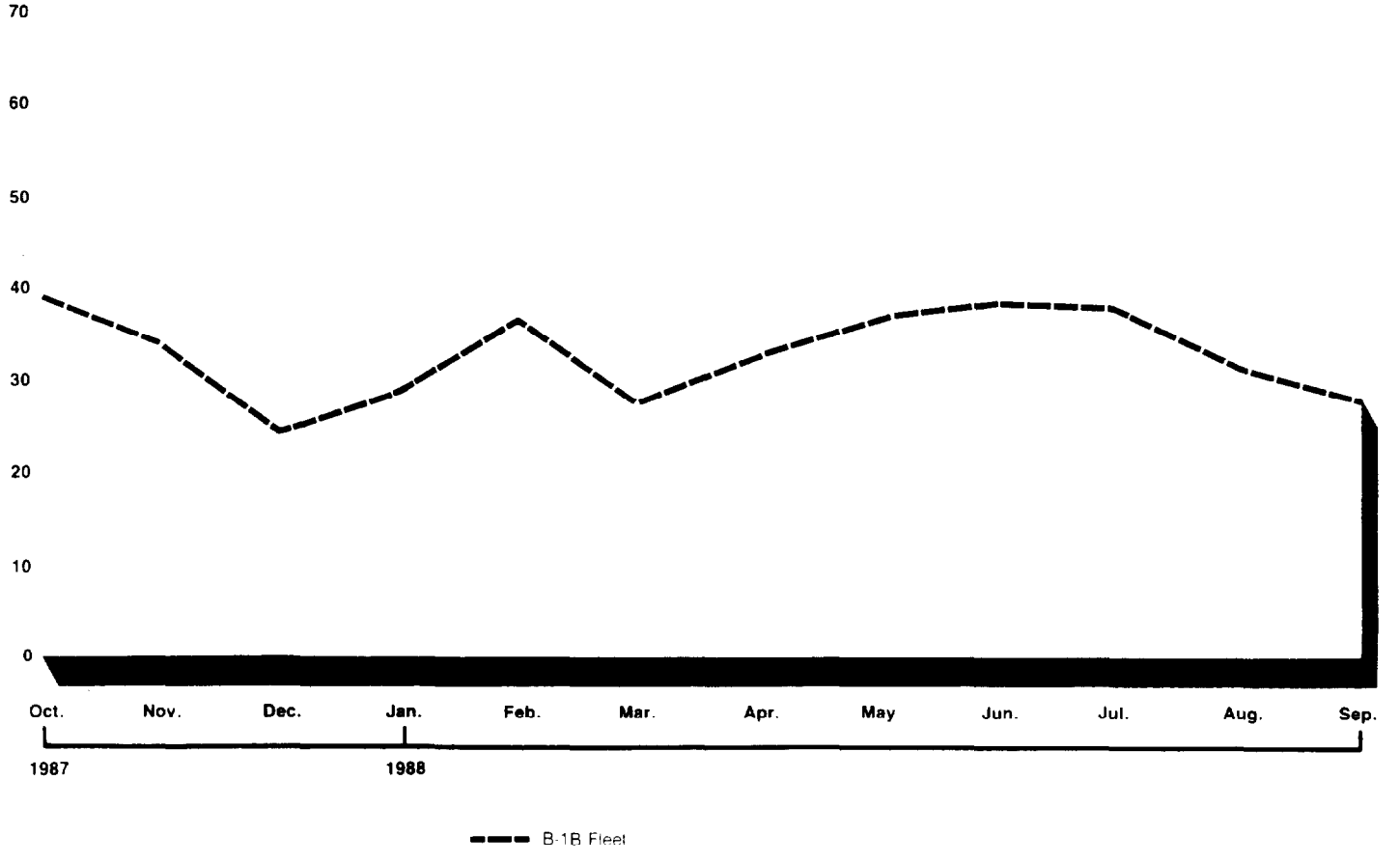
Figure 3.2: B-1B Monthly Total Not Mission Capable Supply Rates – October 1987 Through September 1988

Air Force data show a daily average of about 700 high-priority requisitions for spare parts during fiscal year 1988. About 73 percent of these requisitions were for missing parts that would ground the aircraft. Aircraft missing grounding parts are normally not ready for flight for at least some portion of the day. According to Air Force officials, some aircraft without selected grounding parts can be flown to carry out some missions. This is particularly true for aircraft without defensive avionics parts. Also, to minimize the number of grounded aircraft, the Air Force cannibalizes parts from other aircraft. DOD commented that the daily average of high-priority requisitions for October 1988 through

January 1989 was 357. We did not attempt to substantiate this number but agree that the average number has declined since September 1988.

Cannibalization of parts from other grounded aircraft is used to reduce the total number of aircraft grounded because of parts shortages. For all Air Force aircraft, cannibalizations average about 3 to 4 per 100 flying hours. The Air Force, which states it expects high cannibalization rates for new aircraft, has not established goals for B-1B cannibalizations per 100 flying hours. As shown in figure 3.3, the number of cannibalizations per 100 flying hours from October 1987 through September 1988 has fluctuated monthly but has not significantly improved.

Figure 3.3: B-1B Monthly Cannibalizations per 100 Flying Hours - October 1987 Through September 1988



SAC officials said that an interim goal has been set for the number of cannibalizations per sortie. As of October 1988 this goal was 1 per sortie, which equates to about 30 cannibalizations per 100 flying hours. The Air Force is close to achieving this goal.

Major Logistical Support Challenges Remain

As the Air Force prepares to transfer B-1B program management responsibility from the AFSC to the AFLC, attention is focused on improving the readiness and supportability of the B-1B. The Air Force's preliminary assessments of efforts and activities needed to support and maintain the B-1B efficiently and effectively indicate that these efforts and activities will be costly and take years to complete. Specifically, the Air Force faces the following logistics challenges:

- increasing the flying hour program to mature the aircraft and add alert aircraft,
- transferring essentially all maintenance operations from the contractors,
- identifying, prioritizing, and funding logistics support requirements, and
- establishing priorities and funding for contractor engineering support and for reliability and maintainability enhancements.

Achieving System Maturity

Air Force efforts to obtain sufficient B-1B flying hours to mature the B-1B and add alert aircraft will be challenged by aircraft availability and cost. The Air Force expects that the B-1B will achieve maturity after completing 200,000 cumulative flying hours, originally expected to occur in 1992. According to DOD officials, logistics support—reliable parts, support equipment, and repair instructions—will need to be in place by maturity so that the Air Force can support operational levels comparable to those of mature systems such as the B-52 and FB-111. Thus far, logistical and operational problems plus a heavy aircraft modification schedule have reduced the flying hours needed to mature the aircraft, train crews, and increase alert aircraft. In September 1988 DOD stated that full system maturity had been delayed until 1994. The Air Force said that the fiscal constraints imposed by DOD and the Congress had also contributed to this delay.

To achieve its revised goal of full system maturity by 1994, the Air Force will need to increase significantly B-1B flying hours. In fiscal year 1989 the Air Force plans to increase the flying hours by 8,285 hours, or about 43 percent more than the planned 1988 level. Applying the Air Force's planning factor of 6.1 hours per sortie to the additional flying hours indicates about 1,360 additional sorties will be needed to meet the 1989 schedule. However, the Air Force has made limited progress in resolving parts problems. As of September 30, 1988, the total not mission capable supply rate indicated that parts shortages have not yet shown significant improvements (see fig. 3.2). SAC estimates that cannibalizations, which are used to minimize the effect of parts shortages, will ground 12 aircraft per month during fiscal year 1989 and that the

modification and inspection schedule is expected to remove from service as many as 20 aircraft per month during the same period. Accordingly, an increased flying hour schedule will be a challenge and could continue to require a tradeoff with the number of B-1Bs on alert.

Based on Air Force Cost Center estimates, operation and support costs for the B-1B will total about $2.6 billion for fiscal years 1988 through 1994, as shown in table 4.1. Variable costs per flying hour are estimated at about $8,800 at maturity, which is about $1,200 more than the per flying hour cost of the B-52H. Part of the higher estimated cost is due to the higher complexity of the new system.

Table 4.1: B-1B Estimated Operation and Support Costs for Fiscal Years 1988 Through 1994 as of August 1988

Dollars in millions

Fiscal year	B-1B flying hours[a]	Variable costs per flying hour[b]	Variable costs	Fixed costs	Total costs
1988	19,176	$21,413	$410.6	$58.3	**$468.9**
1989	27,461	14,143	388.4	61.6	**450.0**
1990	26,875	15,660	420.9	52.6	**473.5**
1991	27,549	8,384	231.0	52.0	**283.0**
1992	30,289	8,532	258.4	52.0	**310.4**
1993	31,882	8,622	274.9	52.0	**326.9**
1994	32,161	8,799	283.0	52.0	**335.0**
Total	**195,393**		**$2,267.2**	**$380.5**	**$2,647.7**

[a]B-1B flying hours before fiscal year 1988 totaled 11,584 hours.

[b]According to Air Force officials, the higher variable costs through 1990 are due to including the early investment in spare parts and the interim contractor support in operation and support costs.

The variable costs include the costs for fuel and lubricants, reparable parts, and expendable parts such as tires and batteries. Fixed costs include the costs of facilities and equipment needed to overhaul and maintain the fleet. These estimates do not include Air Force planned improvements to the defensive avionics, flight controls, and other modifications or the cost of military personnel. DOD commented that the $2.6 billion is normal aircraft operating and support costs for the period and is not intended to solely support the achievement of maturation.

Transferring Maintenance Operations From the Contractors

The Air Force plans for essentially all B-1B maintenance to be organic, which means maintenance will be performed within the Air Force by Air Force personnel. Air Force forecasts for continued interim contractor support indicate that achieving organic maintenance remains a challenge.

For the most part, contractors continue to provide most base- and depot-level repairs for B-1B parts, and the Air Force provides organic maintenance on the flight line and for B-1B engines. Under interim contractor support, contractors provide logistic support while requirements are being refined, technical problems are being resolved, design stability is being achieved, or lead time is provided for complex support resources.

We reported in October 1988 that delays in obtaining support equipment and repair instructions have extended the Air Force's reliance on contractor maintenance support, resulting in increased estimates of interim contractor support costs. Support equipment required to maintain and support the B-1B ranges from sophisticated test equipment to common hand tools. Air Force maintenance personnel use support equipment (1) on the flight line to repair aircraft systems and prepare these systems for their mission and (2) in base maintenance shops and depots to make repairs to and install modifications on aircraft. Repair instructions are needed so personnel will know how to use the equipment and make required repairs.

In 1981 the Air Force estimated interim contractor support would be needed through fiscal year 1989 and would cost $250 million in fiscal year 1987 dollars. As of September 1988, the Air Force expected that interim contractor support costs would be needed through 1995 at a total estimated cost of $736 million.

Identifying Logistics Support Requirements

As part of the program management responsibility transfer process, the Air Force has identified tasks, called residual tasks, that are necessary to complete the planned development program. Additional tasks that are needed to improve the aircraft's logistical support have been identified. The Air Force has budgeted $294 million of program funds to complete 39 residual tasks. The supportability of the B-1B will be affected until these tasks are complete. As of November 28, 1988, over 1,800 of the 2,471 repair instructions on contract remained to be delivered and/or verified, over 600 waivers and deviations for parts and components remained unresolved, and over 500 engineering changes had not been accomplished. DOD commented that it is not unusual for a major weapon

system to have residual tasks before program management responsibility transfer, and, in this regard, the B-1B is similar to the F-16. It also noted that repair instruction delivery and verification efforts are improving with 1,173 remaining in development as of January 31, 1989.

In addition to residual tasks needed to complete the development program, requirements are needed to improve system supportability. In March 1988 the Oklahoma City ALC identified seven unprogrammed requirements estimated to cost more than $1 billion, as shown in table 4.2.

Table 4.2: Preliminary Estimate of B-1B Supportability Requirements

Dollars in millions

Supportability requirements	Estimated cost
Computer memory must be expanded	$414.0
Fleet configuration needs to be standardized	387.0
Computer software needs comprehensive correction and update	100.0
Structural vibration study is needed	83.0
Engineering drawings must be corrected	38.2
Avionic cooling is inadequate	16.3
Aircraft stress data recorder needs improvement	8.3
Total	**$1,046.8**

Following the ALC's preliminary assessment, a Post Production Team was established by the AFLC to more thoroughly identify support requirements, determine the funds needed to satisfy the requirements, and identify when the requirements are needed. Table 4.3 summarizes the requirements identified by the Post Production Team for fiscal years 1989 through 1996. The funds identified are those estimated to be required beyond currently programmed funds.

Table 4.3: Post Production Team's Support Requirements for Fiscal Years 1989 Through 1996

Dollars in millions

Requirements	Estimated costs
Interim contractor support	$227.8
Sustaining engineering	226.2
AN/ALQ-161 spares	259.5
Depot government furnished equipment	21.3
Hardness maintenance	34.2
Service reports	30.9
Configuration standardization	387.0
Reliability and maintainability	43.0
Anechoic test	90.0
Remainder	407.2
Total	**$1,727.1**

According to Air Force briefing documents, these requirements were derived from over 600 items identified as needed to support the B-1B. DOD commented that even though residual tasks remain to be accomplished, the cost estimates cited may overstate the magnitude and cost of these tasks because they have not been subject to the formal requirements and funding process. It noted that these estimates do not reflect an official Air Force requirement and that an updated B-1B Weapon System Master Plan in mid-1989 will reflect approved aircraft modifications.

In some cases, the areas identified by the Post Production Team as requiring additional funding have concerned the Air Force for some time. For example, we reported in October 1988 that B-1B problems created by overlapping development and production required (1) extensive contractor engineering support, called sustaining engineering, and (2) many reliability and maintainability enhancements. Cost estimates for sustaining engineering and reliability and maintainability enhancements discussed below are for total program requirements and should not be added to the Post Production Team's estimates for these items, which are for the unfunded portion of the fiscal year 1989 through 1996 requirements.

The AFLC uses contractor engineering support to ensure that needed engineering expertise is available so that design and performance improvements can be made on systems and subsystems. AFLC officials expect that several years of contractor engineering support will be needed to resolve the B-1B technical problems and develop and test

modifications. As of October 1988, estimated contractor engineering support costs totaled $806 million, $195 million more than a January 1988 estimate. According to an AFLC official, the reason for the increased estimate is that requirements are becoming better defined.

The B-1B Program Office has proposed over 50 improvements to the B-1B's reliability and maintainability. In early 1988 the estimated cost of these improvements was $586.3 million. Some of these improvements involve problem parts that the Air Force and contractors have been working on since production. For example, one improvement, estimated at $15.2 million, would provide for developing and testing new technology windshields to replace the current B-1B windshields, which have distortion and delamination problems. DOD commented that these estimates need to be evaluated in terms of requirements and cost effectiveness. It said the updated master plan will reflect anticipated reliability and maintainability enhancements.

Management Emphasis on Readiness and Supportability Needed

DOD and the Air Force recognize that pressures to achieve relatively short-term goals for acquisition cost and schedule affect the emphasis they give to longer-term logistics issues and thereby impede readiness and supportability. Since about 1980 DOD has increased emphasis on logistics during the development and acquisition of major weapons. The B-1B acquisition program indicates a continuing need for additional emphasis on logistics throughout development and production.

A 1987 DOD decision to add a Milestone IV, Logistics Readiness and Support Review to the DOD milestone review process could help ensure the future support of the B-1B and further emphasize logistics for other weapon systems. The purpose of review, which is to take place after a weapon system is fielded, is to ensure that operational readiness and support objectives are achieved. Such a review for the B-1B, which has been planned for mid-1989, could highlight readiness issues for decisionmakers.

For other weapon systems, further actions to elevate the visibility of logistics issues throughout the development and acquisition process might ensure added emphasis on logistics. Such actions could be directed at establishing visible readiness and supportability goals and emphasizing the program manager's accountability for these goals.

Early Logistics Planning Deferred

In 1983 we reported[6] that B-1B logistics planning had been adversely influenced by an Air Force decision in the earlier B-1A program to defer the development of logistics support. DOD directives specify that (1) integrated logistics support planning should begin during the initial phases of the acquisition process and continue into system operations and (2) the delivery of a supportable weapon system requires integrated logistics support tasks to be accomplished as the weapon system moves through the acquisition phases. For the B-1A, which was oriented toward aircraft research and development efforts, logistics support planning and development was deferred until a production commitment was established. Although a production commitment was made in December 1976, the program was terminated in 1977. Research and development and flight testing continued on the B-1A aircraft after the acquisition program was terminated, but logistics support activities were minimal.

[6]The B-1B Bomber Program – A New Start (GAO/MASAD-83-21, April 13, 1983).

Our September 1984 report[7] stated that the decision to develop and produce the B-1B concurrently in conjunction with the lack of B-1A logistics support data forced Air Force planners to make logistics support decisions with insufficient data. For example, logistics support analysis, an analytical approach to define operating and support requirements, normally details logistics requirements before production begins. However, the compressed schedule prevented this analysis from being completed in time to influence initial B-1B support decisions. In response to our 1984 report, DOD said that conscious up-front decisions, such as maximizing the use of support equipment common to existing weapon systems and using preplanned interim contractor support, would ensure that the B-1B would be supported when fielded.

Two other early decisions indicate the potential for adverse impact on B-1B logistics support. First, the Air Force said that about $400 million needed to develop organic depot support had not been included in the $20.5 billion B-1B estimate. To stay under the cost ceiling, which was critical in justifying the program, the Deputy Secretary of Defense determined that the support equipment would have to be purchased without additional program funds. Second, the Deputy Secretary directed that a programmed 6-percent engineering change order budget not be exceeded. B-1B logistics officials said this constraint precluded logistics enhancements unless they resulted in significant acquisition cost savings.

Program Decisions and Approach Impeded Logistics

Although DOD guidelines recognize that accelerated programs such as the B-1B require increased logistics emphasis, the following examples indicate that Air Force program decisions and its concurrent approach deferred or impeded supply and maintenance activities needed to help ensure the readiness and supportability of the aircraft. Deferring logistics support is probably not unique to the B-1B. For example, an Air Force lessons learned report points out that program managers typically defer program support requirements when faced with unexpected development problems. Also, a Cost Analysis Improvement Group official noted that program managers often move funds out of the logistics budget to fund other activities. Although deferring logistics tasks might reduce cost early in a program, the cost of addressing logistics issues often increases as the program matures.

[7] Logistics Support Costs For the B-1B Aircraft Can Be Reduced (GAO/NSIAD-84-36, September 20, 1984).

Examples of Supply Management Problems

- The Air Force contracted for a 4-year supply of parts for the B-1B. This was planned to save an estimated $159 million in program funds by combining production requirements with an expanded advance purchase of spare parts. The provisioning contract included the expanded requirement; however, over one-half of the needed funds were released too late for the associate contractor to integrate spares with production. Therefore, the Air Force committed to expanded buys but did not achieve expected savings. The Air Force also purchased expanded advance quantities of defensive avionics parts, even though regulations caution that expanded advance buys should not be made for parts that are not design stable because of increased risks that parts will become unusable. As a result of the quantity buy and the unstable system, some parts have become unusable, and many will require modification.
- When parts began to fail faster than anticipated, the Air Force identified those problem parts that were major causes of grounded aircraft for executive-level attention. Our July 1988 report suggested a more structured approach to quickly identify those parts that were grounding aircraft so that executive-level attention could help ensure a timely correction of the problems. The Air Force established a process by which problem parts could be added to and deleted from its top priority list.
- The Air Force had planned to process less than one-fourth the number of design change notices experienced on the B-1B. Our July 1988 report discussed the backlog of change notices, which slowed the issuance of parts to the field. The Air Force has reduced this backlog.
- The Air Force has been delayed in obtaining competition for additional parts because a large volume of reprocurement data—engineering drawings and specifications—has not been received and evaluated. The Air Force buys reprocurement data so that competitors may bid on producing the parts. The B-1B contracts called for delivery of all reprocurement data to the Air Force before December 1986, but, as of August 1988, the Air Force had received about 4 percent of the reprocurement data. A primary cause of the delay was that the Air Force was not prepared to accept and evaluate the engineering data. Delivery of all data is scheduled to be completed by March 1990.
- As stated in our November 1987 report,[8] the Air Force did not take full advantage of buying B-1B parts directly from the manufacturers, which can avoid overhead costs and profit added by the prime contractors. In response to our report, the Air Force stated that buying directly from

[8]Air Force Procurement: More B-1B Spares Should Have Been Bought Directly From Manufacturers (GAO/NSIAD-88-13, November 18, 1987).

manufacturers takes longer and that they wanted to have parts available to meet the B-1B IOC date.

Examples of Maintenance Management Problems

- The Air Force did not have detailed plans for the transfer of maintenance responsibility from contractors. Our October 1988 report stated that the Air Force had not used such factors as repair rates or repair costs in setting priorities for the transfer. ALC officials said that in January 1988 they began placing the highest priority on transferring frequently repaired parts and problem parts, such as those in short supply and causing aircraft groundings, to organic maintenance to speed up the repair cycle and reduce interim contractor support costs. In November 1988 the Air Force Audit Agency reported that Air Force management over B-1B maintenance support elements required to establish organic maintenance was not adequate.
- Our 1983 report noted that the B-1A on-board test system was unsuccessful and did not adequately perform to specifications. We noted that the system was not performing as desired on the B-1B and could result in increased costs for spares, additional test equipment, and a need for additional, more highly trained maintenance personnel, or it could result in reduced aircraft readiness. In October 1988 we reported that the B-1B on-board test system was not ready to support the aircraft at IOC, September 30, 1986. As discussed previously, the Air Force has made significant progress on CITS.
- The AFSC reduced the original engineering change proposal funding from $799 million to about $88 million in 1987. It shifted $711 million to pay for other requirements such as defensive avionics. As of September 30, 1988, the B-1B Program Office had a priority listing of engineering change proposals whose estimated cost exceeded funds currently available. Lower priority proposals, especially those improving reliability and maintainability, could not be funded with available budget authority.
- According to Air Force guidance, the transfer of management responsibility from the AFSC to the AFLC is to occur as early as possible in the production phase so contractor engineering resources for the production and logistical operations would be used most efficiently. The Air Force said the short B-1B production run did not allow for management transfer during production. As of April 1, 1989, about 12 months after the delivery of the last B-1B, management responsibility had not transferred to the AFLC. As a result, the AFLC supported the B-1B from early deployment through production with limited contractor engineering resources needed for support planning and reliability and maintainability improvements.

Other Decisions That Complicated Support

To achieve its delivery schedule, the Air Force made a number of decisions that complicated the supportability and readiness of the B-1B. For example, contractors were permitted to use various parts in meeting delivery schedules. As a result, the Air Force estimates that $387 million will be needed for configuration changes to make the aircraft uniform and more easily supportable. Another example of a decision that complicated logistics support was that the Air Force granted waivers to contractors to meet the delivery schedule and, in doing so, accepted aircraft with parts missing and other parts problems. As of December 1988, about 600 waivers and deficiencies remained to be resolved by the program office.

DOD commented that the concurrent nature of the development and production of the B-1B necessitated difficult tradeoffs between fielding the aircraft on schedule and providing full logistics support and that the design immaturity and instability of some components warranted delaying logistics support. Also, DOD noted that (1) the originally budgeted funds were spent for logistics and (2) development, production, and logistics requirements and activities were optimized within the congressional cost cap and the compressed acquisition schedule to provide a supportable B-1B aircraft.

We agree that the Air Force, operating under a compressed schedule, made, in its judgment, necessary tradeoffs between logistics support and fielding aircraft on schedule. However, this report provides examples showing that throughout the development and acquisition of the B-1B,. including the B-1A, logistics tradeoffs impeded readiness and supportability.

Ensuring B-1B Readiness and Supportability

The Air Force has faced numerous challenges and taken significant actions to ensure the readiness and supportability of the B-1B. It is continuing to define the requirements and the funding necessary to achieve these objectives. Preliminary estimates indicate these efforts will be costly and take years to complete. However, a comprehensive review that would ensure complete evaluation of B-1B support objectives and their achievability has not occurred.

DOD has recently established a milestone review—Milestone IV, Logistics Readiness and Support Review—to help ensure adequate logistical support. This review, which was added to DOD's acquisition process in September 1987, is to occur 1 to 2 years after initial deployment and is to

identify actions and resources needed to ensure that operational readiness and support objectives are achieved and maintained for the first several years of the operational support phase. Primary considerations are

- logistics readiness and sustainability (peacetime and wartime);
- weapon support objectives;
- the implementation of integrated logistics support plans as defined in DOD Directive 5000.39, "Acquisition and Management of Integrated Logistic Support for Systems and Equipment;"
- the capability of logistic activities, facilities, and training and personnel to provide support efficiently and cost effectively;
- disposition of displaced equipment; and
- the affordability of life-cycle costs.

According to a DOD analyst, the purpose of the Milestone IV review is to review logistics efforts and identify lessons learned from the acquisition of a specific weapon system. As of December 1988, a Milestone IV review had not been conducted for any DOD weapon system.

Recommendation

We believe that a Milestone IV, Logistics Readiness and Support Review for the B-1B would be an appropriate means to ensure that B-1B support objectives and their achievability have been fully evaluated. Accordingly, we recommend that the Secretary of Defense conduct a Logistics Readiness and Support Review of the B-1B.

Agency Comments

DOD agreed with our recommendation and stated it has scheduled a B-1B Milestone IV, Logistics Readiness and Support Review for mid-1989.

Other Opportunities to Emphasize Readiness, Maintainability, and Supportability

DOD's new Milestone IV, Logistics Readiness and Support Review could be useful in improving attention to readiness, maintainability, and supportability during the development and production of weapon systems. However, because such reviews are not scheduled until 1 to 2 years after deployment of a weapon system, other actions might help to ensure that logistics receives adequate attention throughout development and production. This could be especially important in acquisition environments in which cost and delivery schedules become imperative. Such actions could be directed at establishing visible readiness and supportability goals and emphasizing accountability for these goals.

One approach to add emphasis to logistics is to define clear measurable goals for readiness and supportability and use them as measures of program success. The B-1B's delivery schedule was specific, measurable, and very visible. On the other hand, the B-1B's readiness objectives were not specific or visible. For example, at IOC the Air Force was to have fielded 15 B-1Bs with sufficient resources to support the Single Integrated Operational Plan and day-to-day B-1B operations. The Air Force fielded 15 aircraft on schedule; however, it did not establish visible and measurable objectives for assessing the sufficiency of support.

Officials with decision-making and oversight responsibilities have had limited information on the adequacy and status of logistics planning and support early in the program. In this regard, the Secretary of Defense was required to report to the House and Senate Committees on Armed Services on the maintenance and logistics standards and expected levels of crew training when IOC is achieved for the Advanced Technology Bomber. Logistics measures that could have been useful in determining whether the Air Force met IOC readiness and supportability goals for the B-1B include high-priority requisitions, not mission capable supply rates, and not mission capable maintenance rates.

The B-1B experience suggests that defined and visible goals for logistics support during development and production could help those with managerial and oversight responsibility identify and resolve support problems early and should help achieve DOD's policy of giving equal emphasis to logistics. This, in turn, should help ensure that more weapon systems can be operated and supported in a cost-effective manner. DOD commented that well-defined and visible goals for all areas of logistics support are essential and that the B-1B Milestone IV review will address the progress that has been made toward meeting these goals.

Recommendation

We recommend that the Secretary of Defense ensure that decisionmakers establish and use visible and measurable interim operational readiness goals that can be applied to early operations of new systems, especially for systems in which cost and schedule are imperatives.

Agency Comments

DOD commented that current guidelines provide a framework to establish and monitor the achievement of readiness and support goals and to establish a logistic support program for new weapon systems. However, DOD officials have previously recognized that direct measurement of such goals established in current regulations cannot be made during

early operations because the goals are for mature systems. We agree that the goals are for mature systems. Accordingly, we modified our recommendation to emphasize the need for interim goals to measure the Air Force's progress in obtaining improved logistics performance following initial operational deployment.

Comments From the Assistant Secretary of Defense for Production and Logistics

Note: GAO comment supplementing those in the report text appears at the end of this appendix.

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

PRODUCTION AND LOGISTICS

April 14, 1989

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and
International Affairs Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "STRATEGIC BOMBERS: Logistics Decisions Impede B-1B Readiness and Supportability" dated January 24, 1989 (GAO Code 392367), OSD Case 7888 and the Classified Supplement, OSD Case 7888-X. The DoD generally concurs with the GAO findings and recommendations.

The GAO draft report provides an accurate portrayal of the unusual B-1B acquisition process that was directed by the President and that required periodic Secretarial Program Reviews vice the traditional milestone reviews. The concurrent development, testing, and production required to achieve the October 1986 Initial Operating Capability (IOC) (within five years after program initiation) precluded traditional acquisition processes and timeframes to both develop and field the B-1B aircraft. Design immaturity required that the logistics support planning and specific support elements undergo frequent changes as the design evolved. This design immaturity and delayed logistics support were among the risks accepted when the aggressive B-1B development and production was undertaken. Further, it was deemed prudent to delay the acquisition of full logistics support and extend interim contractor support (ICS) on some components. As noted in the GAO report, the establishment of full organic repair capability is progressing but remains a challenge.

The B-1B is now being brought under the traditional DoD acquisition framework. The Under Secretary of Defense (Acquisition) directed that B-1B Milestone IV Logistics Readiness and Support Review be scheduled. The review is being planned for about mid-1989 to assess the adequacy of maturation, funding and modification plans to meet operational readiness and support goals.

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Detailed DoD comments on the report findings and recommendations are provided in the enclosures. The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Jack Katzen
Assistant Secretary of Defense
(Production and Logistics)

Enclosures

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GAO DRAFT REPORT - DATED JANUARY 24, 1989
(GAO CODE 392367) OSD CASE 7888

"STRATEGIC BOMBERS: LOGISTICS DECISIONS IMPEDE B-1B READINESS AND SUPPORTABILITY"

DEPARTMENT OF DEFENSE COMMENTS

* * * *

FINDINGS

o **FINDING A: B-1B Development And Acquisition.** The GAO reported that, in April 1988, the Air Force accepted the final B-1B aircraft, two months ahead of schedule. The GAO observed that the Air Force needed these aircraft by the April date to meet its operational requirement for a penetrating bomber through the mid-1980s and early 1990s. The GAO further observed that, in attempting to meet operational schedules, the B-1B acquisition program featured highly concurrent full-scale development, production, testing, and operations. The GAO explained that with this approach, the production decision was made prior to completing full-scale development and testing. This eliminated several checks and balances normally found in the acquisition cycle of major weapon system development and production, most significantly the milestone reviews and increased developmental and production risks. The GAO explained that, instead of the usual milestone reviews, a system of Secretarial Program Reviews was used, which focused on program status (primarily cost and schedule). The GAO noted that, in selecting the B-1B, the Air Force maintained that the technology, cost and schedule risks would be low because of the experience gained from the B-1A program. According to the GAO, logistics issues had difficulty competing for attention and dollars in the B-1B development program (pp. 2-3, pp. 8-10, p. 13/GAO Draft Report)

Now on pp. 2, 8-9.

DOD RESPONSE: Concur. The DoD concurs with the description of the development and acquisition of the B-1B as reported by the GAO. It should be recognized, however, that while logistics support had to compete with other areas for funding, $1.8 billion (in FY 1981 dollars) originally budgeted for logistics was spent. The concurrent development, testing and production required to achieve the 1986 Initial Operating Capability (IOC) necessitated that tough trade-offs be made during the early stages of the program in order to field the aircraft and provide optimal support.

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Enclosure 1

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The design immaturity of certain B-1B components during the concurrent full scale development, testing, and production required that the logistics support undergo frequent changes as the design evolved. Consequently, it was deemed prudent to delay the establishment of intermediate and depot organic maintenance capability for selected items. This approach resulted in both the early acquisition of logistics support for some elements of the weapon system (e.g. the engines) and the deferral of full support for other components such as the defensive avionics. Design immaturity and delayed logistics support were among the risks which were accepted when the aggressive B-1B development and production was undertaken.

- **FINDING B: B-1B Met Delivery Schedule But Not Operational Targets.** The GAO reported that, to achieve delivery of the aircraft ahead of schedule, the Air Force accepted B-1Bs with deficiencies. The GAO found that, in addition to meeting the Initial Operating Capability (IOC), the B-1B was also to have sufficient support resources to accommodate Single Integrated Operation Plan (SIOP) alert requirements and Strategic Air Command (SAC) day-to-day operational flying requirements by the IOC date. The GAO found, however, that the Air Force has not met fully its established operational readiness targets for the B-1B, including (1) the number of aircraft to be placed on alert, (2) the mission capable rate, and (3) the number of crews to be trained and mission ready.

  - **Alert Aircraft.** The GAO observed that, to meet its historical criterion of 30 percent aircraft on alert, the Strategic Air Command (SAC) would need 24 of the 80 B-1Bs planned for bombardment wings on alert at any given time. The GAO found that, when the final B-1B was accepted, fewer than planned were placed on alert. The GAO observed that, according to SAC officials, in the event of a surprise attack, aircraft not on alert will likely be destroyed.

  - **Mission Capable Aircraft.** The GAO found that the Air Force established mission capable rates for the B-1B at IOC and at maturity after 200,000 flying hours (estimated to occur in 1994). The GAO found that, in September 1986, the mission capable rate was 2 percent and, when the bomber was accepted, less than half the aircraft were mission capable. The GAO charted the monthly mission capable rates for October 1987 through September 1988, in comparison to the interim goal for that period. (The GAO pointed out that the Air Force goal for the mature B-52 system, which is generally achieved, is 75 percent. The GAO also noted, however, that it presented the goal for a mature system only as a focus to assess the

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status of the B-1B--not as basis for determining where it should be.)

- **Number of Trained Mission Ready Crews**. The GAO found that the SAC does not expect to reach the goal of 1.31 mission ready crews until October 1993--i.e., the goal (set in 1984) was planned to be reached by December 1988. The GAO reported that the SAC temporarily reduced the ratio to 1.1, which ratio is to continue until logistical support can meet training and alert requirements for mature system.

The GAO concluded that lack of adequate logistics support has contributed to significant numbers of grounded aircraft and has reduced mission capable time. The GAO further concluded that this situation has, in turn, delayed crew training and the plans for increasing the number of alert aircraft. Finally, the GAO concluded that supply and maintenance problems are major contributors to the inability of the B-1B to meet operational readiness targets. (pp. 2-3, pp. 13-17/GAO Draft Report)

Now on pp. 3, 12-16.

DOD RESPONSE: Partially concur. The DoD does not agree with the GAO statement that "...the Air Force accepted B-1Bs with deficiencies" without additional explanation and clarification. The "deficiencies" referred to were officially authorized waivers and deviations. Each waiver is documented and approved by the Air Force Plant Representative Office (AFPRO) and Program Office. Additionally, funds are withheld pending completion of the efforts required to clear the deviation. Furthermore, a waiver/deviation can range from scratched paint to late delivery of components. The acceptance of equipment with a waiver or deviation does not necessarily mean the system is deficient or can not perform its mission. Deviations occur when the contractor is permitted to depart temporarily from documented requirements (e.g. using different manufacturing techniques) for a specific number of units or period of time, in order to meet cost/schedule requirements. A waiver is approval for an item that does not conform to the configuration identification and requires follow-up action by the contractor to correct. Waivers and deviations are normal practice.

See comment 1.

The B-1B aircraft met its operational alert target when it went on operational alert in September 1986. The GAO comment that 24 of the 80 B-1Bs planned for the bombardment wings needed to be on alert to meet the historical 30 percent alert rate is in error. Only 73 B-1Bs are assigned to the bombardment squadrons: 11 at Dyess Air Force Base (AFB), 30 at Ellsworth AFB, 16 at Grand Forks AFB, and 16 at McConnell AFB. Of the 27 remaining delivered aircraft, 17 are in the training squadron at Dyess AFB, 4 are in backup inventory, 3 are test

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aircraft and 3 other aircraft were destroyed in mishaps. Given 73 B-1Bs in the bombardment squadrons, the historical 30 percent would be 22 aircraft on alert. The historical 30 percent on-alert criterion applies to mature weapon systems. It is inappropriate to apply this criterion at initial aircraft deployment. Furthermore, the determination of numbers and types of bombers required on alert to meet the SIOP is made by the Commander-in-Chief, SAC based upon the current situation and priorities. The referenced "planned" figure does not represent a fixed alert commitment, but the capability to place bombers on alert.

While it is true that aircraft not on alert would likely be destroyed in the unlikely event of a surprise attack, in the event of heightened tensions, B-1B aircraft could and would be generated to continuous alert in specified times as demonstrated during operational readiness inspections.

Now on pp. 3, 17.

- **FINDING C**: **On-Board Test System Is Improving**. The GAO reported that the B-1B maintenance concept depends on a properly working Central Integrated Test System (CITS). The GAO observed that, while the desired goal of not more than two false failures per flight has not been met, in April and October 1988, the number of CITS false failures per flight had been reduced to 16 and 12, respectively. The GAO noted that, as of December 1988, software to monitor the defensive avionics system had not been developed. The GAO observed, however, that some aspects of parts supply and maintenance operations, such as the CITS, show improvement. (p. 4, pp. 17-18/GAO Draft Report)

  DOD RESPONSE: Concur. The effectiveness of CITS has improved. Initial CITS software for the ALQ-161 Defensive Avionics System was delivered in December 1988, and testing is underway. The Air Force plans to continue upgrades of this capability as part of the "core" improvements to the Defensive Avionics System. Both the Boeing and Rockwell CITS software packages are now operational and fully employed at SAC B-1B bases to detect and isolate system malfunctions.

- **FINDING D**: **Not Mission Capable Maintenance Rates Indicate Maintenance Problems Continue**. The GAO reported that the total not mission capable maintenance rate is the sum of (1) the percent of the time the aircraft cannot perform its mission due to maintenance alone and (2) the percentage due to both supply and maintenance. The GAO found that the Air Force has not established such goals because it considers the aircraft too

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immature. The GAO observed that the goal for mature aircraft, such as the B-52 and the F-111, is for the total not mission capable because of maintenance rates to be below 25 percent. The GAO charted the B-1B not mission capable because of maintenance rates for the B-1B (for the period October 1987 through September 1988) against this goal. The GAO concluded that, while the comparison shows fluctuation, there has been no improvement since October 1987 in the B-1B total not mission capable rates. The GAO further concluded that the Air Force has been faced with significant B-1B maintenance problems and that the non mission capable maintenance rates are an indication that maintenance problems continue. (For example, the GAO reported that the total not mission capable maintenance rate increased from 30 percent in October 1987 to 48 percent in September 1988.) (pp. 3-4, pp. 17-19/GAO Draft Report)

Now on pp. 3, 18-20.

DOD RESPONSE: Concur. Significant challenges still exist in maintaining the B-1B, however, progress is being made in many areas which affect the maintainability of this important weapon system. While, as cited by the GAO, the total not mission capable maintenance (TNMCM) rate for September 1988, was 48 percent, the most recent data does reflect improvement. The TNMCM rates from December 1988 and January 1989, were down significantly to 40.0 and 36.4 percent, respectively.

- **FINDING E: Not Mission Capable Supply Rates Indicate Continued Parts Shortages.** The GAO noted that, as of the end of 1987 and as of November 1988, 75 percent and 56 percent, respectively, of the purchased B-1B parts had not been delivered. The GAO explained that the total not mission capable supply rate is the total time aircraft are not available while waiting for spare parts. The GAO noted that this goal for mature aircraft is 20 percent, and charted this goal against the B-1B rates. The GAO observed that, to obtain the parts necessary for the aircraft to perform its mission, the Air Force (1) issues high priority requisitions and (2) cannibalizes parts. The GAO concluded that significant parts problems remain to be resolved before the B-1B can achieve a rate comparable to mature aircraft. The GAO reported that Air Force data shows a daily average requisition of 700 high-priority parts during FY 1988. The GAO found that 76 percent of these parts would have grounded the aircraft for at least a portion of day (although Air Force officials claimed some of these aircraft could carry out some missions). The GAO also found that the Air Force has not established goals for B-1B cannibalization per 100 flying hours. The GAO again concluded that, while the chart of cannibalizations per flying hour (for the period October 1987 through September 1988) shows monthly fluctuations, no significant improvement is indicated.

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(The GAO did note, however, that the Air Force was close to the interim goals of 1 cannibalization per sortie set by SAC for October 1988.) The GAO concluded the Air Force has been faced with serious parts problem, which have required extraordinary effort in order to support operation. The GAO further concluded, however, that the mission capable rates indicate the readiness and supportability problems continue. (pp. 3-4, pp. 17-22/GAO Draft Report)

Now on pp. 3, 20-23.

DOD RESPONSE: Concur. Limited spares investments were made at the beginning of the program because of the unstable configuration. Now that the configuration has stabilized additional spares have been procured. For example, 64 percent of the dollar amount of spares procured to date were delivered as of October 1988 as compared to only 26 percent in October 1987. Improvements in the Not Mission Capable Supply rates are anticipated due to increased spares procurements and the delivery of spares currently on order. In addition, for the period October 1, 1988 through January 31, 1989, the daily average of high priority requisitions was 357. This is reflected in the cannibalization rate, which has continued to show improvement. The cannibalization rate for January 1989 was 1.1 per sortie, very close to the SAC B-1B goal of 1.0 per sortie.

- **FINDING F: Achieving System Maturity.** The GAO reported that, as the Air Force prepares to transfer B-1B program management responsibility from the Air Force Systems Command (AFSC) to the Air Force Logistics Command (AFLC), attention is focused on improving the readiness and supportability of the B-1B. The GAO observed that efforts to obtain sufficient flying hours to mature the B-1B will be challenged by aircraft availability and by cost. The GAO noted that, according to DoD officials, logistics support--i.e., reliable parts, support equipment, and repair instructions--will need to be in place by maturity. The GAO found, however, that thus far, logistics and operational problems, plus a heavy modification schedule, have delayed the flying hours needed to mature the aircraft, train crews and increase alert aircraft. The GAO observed that, to achieve its revised goal of 200,000 flying hours by 1994, the Air Force will have to increase flying hours significantly. The GAO noted that, in FY 1989, the Air Force plans to increase by 8,285 flying hours or about 43 percent more than the FY 1988 level. Noting that SAC estimates cannibalizations will ground 12 aircraft per month and the modification schedule as many as 20, the GAO concluded that the increased flying hour schedule will be a challenge. The GAO also reported that, based on Air Force Cost Center estimates, B-1B operations and support costs

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will total approximately $2.6 billion for FY 1988 through FY 1994 (not including the cost of improvements to defensive avionics, flight controls, and other modifications, nor military personnel costs). In summary, the GAO concluded that achieving mature operations will take years and require billions of dollars. (pp. 3-4, pp. 23-25/GAO Draft Report)

Now on pp. 3-4, 24-25.

DOD RESPONSE: Partially concur. The DoD concurs that the maturation will take longer to achieve than originally estimated. However, the $2.6 billion cited in the GAO report reflects normal aircraft operating and support costs between FY 1988 and FY 1994, and is not intended to solely support the achievement of maturation. Funding constraints, such as the FY 1988 $40 million congressional cut in B-1B operations and support (which equates to 8208 flight hours) have delayed the date on which the B-1B will achieve its maturation goal. This flight hour program is approximately the same number of flight hours that the Air Force intended to achieve prior to the FY 1988 congressional budget cut. The Air Force commitment to achieve this flight hour program has considered the current modification schedule and anticipated cannibalizations. The achievement of the 200,000 flight hours for maturation and the date when it will be achieved will continue to be dependent on availability of funding and aircraft.

- **FINDING G: Transferring Maintenance From The Contractors.** The GAO reported that the Air Force plans for all B-1B maintenance to be organic, which means maintenance will be performed within the Air Force by Air Force personnel. The GAO found, however, that for the most part, contractors continue to provide most base and depot level repairs for B-1B parts. The GAO further found that delays in obtaining support equipment and instructions have extended the reliance on contractor support, resulting in increased estimates for contract support costs. (The GAO noted that, in 1981, the Air Force estimated interim contractor support would be needed through FY 1989, and would cost $250 million in FY 1987 dollars. According to the GAO, as of September 1988, the Air Force now expects to rely on contractors through FY 1995, at a total estimated program cost of $736 million. The GAO concluded that Air Force estimates for continued interim contractor support indicate that achieving organic maintenance remains a challenge. (p. 4, p. 23, pp. 25-26/GAO Draft Report)

Now on pp. 3-4, 26.

DOD RESPONSE: Concur. While a challenge still exists in several areas, the Air Force is making steady progress toward achieving organic capability.

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- **FINDING H**: **Identifying Logistics Support Requirements.** The GAO found that the Air Force has identified residual tasks to complete the planned development program and has set aside $294 million in program funds to complete 39 such tasks. The GAO concluded that the supportability of the B-1B will be affected until these tasks are complete. (The GAO noted, for example, that as of November 28, 1988, (1) over 1,800 of the 2,471 repair instructions on contract remained to be developed and/or verified, (2) over 600 waivers and deviations for parts and components remained unresolved, and (3) over 500 engineering changes had not been accomplished.) The GAO also found that, in addition to residual tasks, there are seven requirements needed to improve system supportability (for which the Oklahoma City Air Logistics Center (OC-ALC) preliminary cost estimate was more than $1 billion). The GAO found that the subsequent post production team estimate for support requirements, for the period FY 1989 through FY 1996, was over $1.7 billion beyond currently programmed funds. The GAO concluded that the Air Force preliminary assessments of efforts and activities, necessary to support the B-1B efficiently and effectively, indicate these will be costly and will take years to complete. (p. 4, p. 23, pp. 26-28/GAO Draft Report)

Now on pp. 3-4, 26-28.

DOD RESPONSE: Partially concur. There are residual tasks that remain for AFSC to accomplish at Program Management Responsibility Transfer (PMRT) but the Air Force believes that the cost estimates cited in the GAO report may overstate the magnitude and cost of these tasks.

It is not unusual for a major weapon system to have remaining tasks prior to PMRT. For example, the PMRT for the F-16 occurred in October 1985, six years after its Initial Operating Capability (IOC). At that time, the F-16 residual tasks included 686 Service Reports and 640 Contract and Engineering Change Proposals. These figures are comparable to the residual tasks remaining on the B-1B program which is a more complex weapon system.

Technical order delivery and verification efforts are showing improvement. As of January 31, 1989, 1298 repair instructions have been delivered, with 707 verified. The remaining 1173 are in development with final delivery by June 1991 (excepting ALQ-161 requirements).

The cost estimates cited in the GAO report were the product of a fiscally unconstrained AFLC planning exercise to identify potential B-1B improvements. However, no improvements are made to any weapon system without a validated requirement.

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The source documents detailing these projects were largely the result of "brainstorming" exercises done to improve the AFLC knowledge of the weapon system, and were conducted to assure coordination of funding submissions into Air Force requirements and budgeting systems. The numbers and requirements associated with them were preliminary estimates. System supportability and support requirements (i.e. the $1 billion and $1.7 billion items) were not subjected to the close scrutiny in the requirements and funding process. For example, of the seven items in the $1 billion supportability "requirement" only two items remain, and those are at substantially reduced funding requirements. These figures do not reflect an official Air Force requirement. However, the $294 million required to clean up residual tasks is covered by the program funds. An updated B-1B Weapon System Master Plan, to be available in mid-1989, will reflect approved aircraft modifications.

- **FINDING I: Establishing Priorities And Funding For Contractor Engineering Support And For Reliability And Maintainability Enhancements.** The GAO reported that the Air Force Logistics Command (AFLC) uses contractor engineering support to ensure needed engineering expertise for design and performance improvements. The GAO found that, as of October 1988, these estimated costs totaled $711 million, a $100 million increase over the January 1988 estimate. The GAO also reported that the SAC has identified over 50 reliability and maintainability improvements, estimated at $586.3 million. (Note: these estimates are not additive to those in Finding H.) The GAO concluded that the AFLC is faced with increasing contractor engineering support and with achieving reliability and maintainability improvements, which will be costly and take years to complete. (p. 4, p. 23, pp. 28-29/GAO Draft Report)

Now on pp. 3-4, 28-29.

DOD RESPONSE: Partially concur. The costs to address the reliability and maintainability improvements are not yet known. Estimates prepared by SAC need to be evaluated in terms of requirements and cost effectiveness. The update to the B-1B Weapon System Master Plan, expected by mid-1989, will reflect anticipated reliability and maintainability enhancements.

- **FINDING J: Management Emphasis On Readiness And Supportability Needed.** The GAO reported that providing effective, efficient, and economical logistics support to a weapon system is a major concern, because logistics determines whether a weapon will be able to perform its mission and is a major

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component of life cycle costs. The GAO observed that DoD policy states a primary objective of the acquisition process is improved readiness, and resources needed to achieve readiness will receive the same emphasis as those required to achieve schedule and performance objectives. The GAO recalled it had reported previously that the B-1B logistics planning had been adversely influenced by an earlier decision to defer the development of logistics in the B-1A program. The GAO further recalled that, in addition, it had reported the decision to concurrently develop and produce the B-1B forced Air Force planners to make logistics support decisions with insufficient data. The GAO remarked that two other decisions by the Deputy Secretary of Defense also indicated a potential for adverse impact on B-1B logistics support--i.e., the decision not to exceed the 6 percent engineering change order budget. The GAO concluded that (1) the Air Force deferred integrating logistics into the B-1B early acquisition planning and (2) the logistics issues had difficulty competing for attention and dollars in the development program. Finally, the GAO concluded that the B-1B acquisition program indicates a continuing need for additional emphasis on logistics throughout system development and production. (pp. 2-4, p. 10, pp. 30-32/GAO Draft Report)

Now on pp. 4, 30-31.

DOD RESPONSE: Concur. The concurrent nature of the development and production of the B-1B program required difficult trade-offs between fielding the aircraft on schedule and providing full logistics support. The design instability of some components warranted delaying logistics support. It should be emphasized that $1.8 billion (in FY 1981 dollars) was originally spent for B-1B logistics support. Development, production and logistics requirements and activities were optimized within the congressional cost cap and the compressed acquisition schedule to provide a supportable B-1B aircraft.

- **FINDING K: Program Decisions And Approach Impeded Logistics Support.** The GAO observed that deferring logistics support is probably not unique to the B-1B. The GAO noted an Air Force lessons learned report pointed out that program managers typically defer program support requirements when faced with unexpected development problems. The GAO noted that, according to a Cost Analysis Improvement Group official, program managers often move funds out of the logistics budget to fund other activities. The GAO concluded that, while deferring logistics tasks might reduce costs early in a program, the cost of addressing logistics issues often increases as the program matures.

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Now on pp. 4, 31-34.

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The GAO identified a series of examples of supply management and maintenance management problems that adversely impacted the B-1B program. In addition, the GAO identified other decisions that complicated B-1B support (such as permitting contractors to use various parts in order to meet delivery schedules). In summary, the GAO concluded that, during B-1B development and acquisition, the Air Force made program decisions that impeded or complicated supply and maintenance operations needed to ensure the readiness and supportability or the aircraft. (p. 4, pp. 32-36/GAO Draft Report)

DOD RESPONSE: Concur. The concurrent B-1B development, testing, and production necessitated that the aircraft configuration and associated support require constant change as the design evolved. In turn, this necessitated rephasing the ordering of logistics as the aircraft configuration was changing.

o **FINDING L: Ensuring B-1B Readiness and Supportability.** The GAO reported that the DoD has recently established a Milestone IV, Logistics Readiness and Support Review--to help ensure adequate weapon system logistics support. According to the GAO, this review (which was added to the DoD acquisition process in September 1987) is planned to occur 1 to 2 years after initial deployment and is designed to identify actions and resources needed to ensure that operational readiness and support objectives are achieved and maintained for the first several years of the operational support phase. The GAO observed that primary Milestone IV review considerations are, as follows:

- logistics readiness and sustainability (peacetime and wartime);
- weapon support objectives;
- the implementation of integrated logistics support plans;
- the capability of logistics activities, facilities, and training and manpower to provide support efficiently and cost-effectively;
- disposition of displaced equipment; and
- affordability of life-cycle costs.

The GAO reported that, another objective of Milestone IV is to review the logistics efforts and identify the lessons learned

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from the acquisition of a specific weapon system. The GAO noted that, as of December 1988, a Milestone IV Review had not yet been conducted for any DoD weapon system. The GAO concluded that, while the Air Force has faced numerous challenges and taken significant actions to ensure the readiness and supportability of the B-1B, a comprehensive review, which would ensure complete evaluation of B-1B support objectives and their achievability, has not occurred. (p. 4, pp. 36-37/GAO Draft Report)

Now on pp. 4, 34-35.

DOD RESPONSE: Concur. On January 27, 1989, the Under Secretary of Defense (Acquisition) announced that a B-1B Milestone IV Logistics Readiness and Support Review will be conducted. This review is being planned for about mid-1989.

- **FINDING M: Other Opportunities To Emphasize Readiness, Maintainability, and Supportability.** The GAO agreed that the new DoD Logistics Readiness and Support Review could be useful in improving attention to readiness, maintainability, and supportability during the development and production of a weapon system. The GAO observed, however, that because such reviews are not scheduled until 1 to 2 years after deployment, there are other actions that might help ensure that logistics receives adequate attention throughout a system's development and production and could be especially important in acquisition environments where cost and delivery schedules become imperative. The GAO explained that such actions could be directed at establishing visible readiness and supportability goals and emphasizing accountability for these goals. The GAO pointed out that the B-1B delivery schedule was specific, measurable, and very visible, however, B-1B readiness objectives were not. The GAO concluded that officials, with decision-making and oversight responsibilities, had limited information on the adequacy and status of B-1B logistics planning and support early in the program. The GAO further concluded that logistics measures would have been useful in determining whether the Air Force met IOC readiness and supportability goals for the B-1B (including the use of high priority requisitions, the not mission capable supply rates and the not mission capable maintenance rates). The GAO concluded that well defined and visible goals for logistics support during development and production could help those with managerial and oversight responsibility identify and resolve support problems early, as well as help achieve the DoD policy of giving equal emphasis to logistics (which in turn, should help ensure that more weapon systems can be operated and supported in a cost effective manner). (pp. 4-5, pp. 38-39/GAO Draft Report)

Now on pp. 4, 35-36.

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DOD RESPONSE: Concur. Well defined and visible goals for all areas of logistics support are essential. The B-1B Milestone IV review will address the progress that has been made toward meeting established logistics and readiness goals.

RECOMMENDATION

Now on p. 35

- **RECOMMENDATION 1**: The GAO recommended that the Secretary of Defense conduct a Logistic Readiness and Support Review of the B-1B. (p. 38/GAO Draft Report)

DOD RESPONSE: Concur. On January 27, 1989, the Under Secretary Of Defense (Acquisition) directed that a B-1B Milestone IV Logistics Readiness and Support Review be conducted. The DoD has scheduled a B-1B Milestone IV Logistics Readiness and Support Review for about mid-1989.

Now on p. 36

- **RECOMMENDATION 2**: The GAO recommended that the Secretary of Defense ensure that decision makers establish and use visible and measurable operational readiness goals for early operations of new systems, especially for systems where cost and schedule are imperatives. (p. 39/GAO Draft Report)

DOD RESPONSE: Partially concur. The DoD already has a framework to establish and monitor the achievement of readiness and support goals as well as the establishment of a logistics support program of new weapon systems in DoD Directive (DoDD) 5000.1, DoD Instruction 5000.2 and DoDD 5000.39. Guidelines for conducting development and operational testing to ascertain the achievement of program goals and thresholds as well as evaluation of support criteria have been established in DoDD 5000.3. As noted in previous GAO reports, the B-1B was not managed through the traditional procurement process due to extraordinary circumstances and was exempt from the traditional DoD documentation requirements and Milestone reviews which are used on essentially all major weapon system programs and have proven effective in monitoring and redirecting programs as necessary.

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The following is GAO's comment on the Assistant Secretary of Defense's letter dated April 14, 1989.

GAO Comment

1. A draft of our report identified the deployment of B-1Bs based on 80 primary assigned aircraft. After receiving DOD's comments, we have changed our report to identify the deployment of B-1Bs based on 73 primary assigned aircraft. Of the 18 aircraft we said were assigned to Dyess AFB, 7 were assigned to the training squadron at Dyess and are not included as primary assigned aircraft. We also changed the number of aircraft assigned to backup inventory from 7 to 4 and added that 3 were assigned to testing.

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Strategic Bombers: B-1B Cost and Performance Remain Uncertain (GAO/NSIAD-89-55, February 3, 1989).

Strategic Bombers: B-1B Maintenance Problems Impede Its Operations (GAO/NSIAD-89-15, October 24, 1988).

Strategic Bombers: B-1B Parts Problems Continue to Impede Operations (GAO/NSIAD-88-190, July 26, 1988).

Air Force Procurement: More B-1B Spares Should Have Been Brought Directly From Manufacturers (GAO/NSIAD-88-13, November 18, 1987).

Strategic Bombers: Estimated Costs to Deploy the B-1B (GAO/NSIAD-88-12, October 7, 1987).

Strategic Forces: Supportability, Maintainability, and Readiness of the B-1B Bomber (GAO/NSIAD-87-177BR, June 26, 1987).

The B-1B Aircraft Program (GAO/T-NSIAD-87-4A, February 25, 1987).

Costs Projections for the B-1B Bomber Program (GAO/NSIAD-85-15, November 27, 1984).

Logistics Support Costs for the B-1B Aircraft Can Be Reduced (GAO/NSIAD-84-36, September 20, 1984).

Analysis of the DOD Request for Multi-year Contract Authority for the B-1B Weapon System (GAO/PLRD-83-86, June 16, 1983).

The B-1B Bomber Program – A New Start (GAO/MASAD-83-21, April 13, 1983).

B-1B Bomber Program Baseline Costs (GAO/MASAD-82-32, July 22, 1982).

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