

144431



144431

United States General Accounting Office
TESTIMONY

GAO

For Release
on Delivery
Expected at
9:30 a.m. EST
Wednesday
July 17, 1991

THE B-2 PROGRAM: Procurement Decisions
Should Be Based on Demonstrated Performance

Statement of
Nancy R. Kingsbury, Director, Air Force Issues
National Security and International Affairs
Division

Before the
Subcommittee on Procurement and Military
Nuclear Systems
Subcommittee on Research and Development
Defense Policy Panel
Committee on Armed Services
House of Representatives

051969 / 144431

Mr. Chairmen and Members of the Subcommittees and Panel:

We are pleased to be here today to summarize our views on the status of the B-2 program and, in a closed session to follow, to provide specific information on certain classified B-2 subsystems.

BACKGROUND

The effort to develop and produce the B-2 bomber has been under way for more than a decade. Congress has appropriated \$30.8 billion for the program, and to date, two non-flying durability airframes and three flight test aircraft have been delivered. Three more development aircraft and 10 production aircraft are in various stages of assembly, and advance procurement funds have been authorized for an additional 5 aircraft. The B-2 program is currently estimated to cost a total of \$64.8 billion for 75 deployable aircraft.

The extraordinary investment in this program, along with a natural enthusiasm for a revolutionary aircraft that has had success in the very early stages of flight test, creates an understandable pressure to step up production of the remaining aircraft. The Department of Defense (DOD) is proposing that Congress authorize moving from the current low production rate of 2 aircraft a year to 4 a year in 1992, 7 a year in 1993 and 1994, and 11 a year in 1995. At that rate, 50 aircraft, or 71 percent of the B-2 production aircraft, will have been authorized before the initial operational flight tests are completed as scheduled in August 1996.

To manage program progress and set milestones to support production decisions, the Air Force established a B-2 maturity matrix that outlines the demonstrated capabilities that should be met to support program events. The current maturity matrix, dated August 1989, is based on a program to acquire 132 aircraft. The reduction in the program to 75 aircraft has changed the acquisition plan, and the Air Force is currently updating the matrix. The matrix, however, clearly shows that the B-2 capabilities that are most

critical to its mission effectiveness will not be demonstrated for at least several years.

GAO CONCERNS ABOUT INCREASING
THE B-2 PRODUCTION SCHEDULE

On the basis of our reviews of the B-2 program, as well as our reviews of many other weapon systems over the past decades, we continue to have questions about whether this program is at the point where an increasing production schedule is warranted. Specifically, we are concerned about (1) whether the manufacturing processes can be stabilized and production efficiencies achieved before production rates are increased; (2) whether the flight test schedule can be met, given the delays in aircraft deliveries and continued difficulties in fully meeting flying hour schedules; and (3) whether the risks of increasing investment rates at such early stages of flight testing are greater than the potential benefits of reaching higher production rates on the assumption that no major additional technical or other problems will have to be resolved. This assumption seems particularly uncertain given the unusually high number of unanticipated problems that could arise with such a revolutionary aircraft.

Manufacturing Progress

Manufacturing experience with the six development aircraft has been troublesome. Our work shows that the B-2 contractors are generally not meeting their manufacturing goals on these aircraft. They are continuing to experience significant problems in reducing the number of labor hours, defects, and engineering drawing changes, and in completing work at major section assembly sites, rather than transferring it to the final assembly site or to the test site. The trend data on labor hours, defects, engineering changes, and transferred work indicate that manufacturing processes are improving but still unstable, and a disciplined and rigorous

production management program is not fully in place. Therefore, until the manufacturing processes become more reliable, there is risk that the contractors will not achieve predicted efficiencies at higher production rates and cost and schedule problems will continue.

Flight Test Program

Since the B-2's first flight 2 years ago, the flight test program has not progressed as planned because (1) test aircraft are being delivered to the Air Force both late and incomplete, (2) the Air Force is conducting unplanned diagnostics testing with aircraft number 1 to isolate minor problems discovered during earlier flight tests and determine solutions, and (3) cracks found behind engines during early flight tests may need to be periodically fixed on each aircraft. To date, only 240 hours, about one-half of the flight test hours planned at the start of the flight test program, have been flown. More importantly, the completion of the test program has slipped from 1993 to August 1996.

In February 1990, we testified that it would be at least 3 years before critical operational testing, including integrated offensive and defensive avionics, is completed.¹ As noted above, completion of this testing has slipped to August 1996. The delays in flight testing, unless matched by delays in the production schedule, will further limit the amount of information available to decisionmakers as the production growth rate is proposed to increase.

The delay in deliveries of test aircraft is a major cause for the slip in the scheduled completion of the test program. The delays were a result of difficulties in assembling the aircraft and a strike at a major subcontractor. If aircraft number 3 had been

¹Status of the B-2 Bomber Program (GAO/T-NSIAD-90-16, Feb. 22, 1990).

delivered on schedule, it could possibly have accumulated about 6 months of flight test experience that had been planned for it at this time, rather than its current one or two flights. The three remaining test aircraft may be delivered as much as 11 months later than planned when the flight test program began in July 1989. The delivery of the last two test aircraft is critical because, under the current schedule, the majority of operationally realistic testing of the total integrated system is to be accomplished with these aircraft in 1995 and 1996.

According to Northrop, the first three development aircraft required additional manufacturing work when they were delivered to the Air Force. For example, more than 100,000 hours of manufacturing work, which should have been completed during the normal manufacturing process, was completed on the first aircraft after it was delivered to the flight test program. The manufacturing activities included structural modifications, mechanical work, and updates to the flight control software. As a result, flight testing was delayed about 6 months. The next test aircraft, although delivered more complete, also required manufacturing work after delivery to the test site.

The unplanned diagnostic testing on aircraft number 1 will continue for about a year, limiting the use of this aircraft to complete test objectives in the 3,600-hour flight test program. This unexpected testing has caused the Air Force to transfer some flight tests to other test aircraft, slowing down the pace of the current flight worthiness tests.

Finally, testing identified cracks in the aircraft surface behind the engines. The contractor has identified a potential solution. Until the fix is incorporated, the cracks must be periodically inspected and repaired as necessary, which will make the test aircraft unavailable for flight testing. The Air Force has

extended the test schedule for each aircraft by 3 months to make these periodic repairs.

Program Investment Rate

The Secretary of Defense in April 1990 announced a reduction of the B-2 program from a planned procurement of 127 production aircraft to 70 production aircraft. The reasons cited for the reduction were the need to reduce overall defense budgets and the promising trends in the Soviet Union. The Secretary also rephased the program at that time to reduce the funding for procurement of the B-2 in future fiscal years. As a result, the maximum number of B-2s to be included in any one annual procurement budget was 12. The maximum number was later reduced to 11. The proposed procurement profile is shown in table 1.

Table 1: DOD Proposed Procurement Profile for the B-2

	<u>1991 and prior</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
Quantity	10	4	7	7	11	11	11	9
Cumulative	10	14	21	28	39	50	61	70
Percentage of total	14	20	30	40	56	71	87	100

Even though the Secretary of Defense reduced procurement quantities for the B-2 and rephased the procurement plan, the funding commitment to procurement prior to completing initial operational test and evaluation (IOT&E) remains substantial. Overall, under the revised program the Air Force plans to have authorization for 71 percent of the production bombers, a production investment of \$33.8 billion, before IOT&E is planned to be completed in August 1996. Accordingly, we believe the Air Force could make commitments to acquire well over two-thirds of the production bombers before there is reasonable assurance through operational tests that the B-2 can accomplish its expected mission.

Continuing flight tests are likely to identify some problems that will require correction and cause delays in the flight test program. Absent a change to the planned production rate, the result could be an even greater commitment to production prior to the end of flight testing. In addition, problems identified during flight testing will likely require redesign, retest, additional production costs, and possible retrofit of needed changes into aircraft being produced and delivered. The result would be delayed operational capability and increased cost.

Although the Secretary of Defense reduced the size and production pace of the B-2 program, the current plan exceeds the level of concurrency of the B-2 program in 1985, when 59 percent of the 127 production B-2s planned at that time were expected to be authorized by the end of initial operational test and evaluation. Table 2 compares the commitment to production as measured by the percentage of total procurement quantity and total procurement investment at the time initial operational tests were planned to be completed.

Table 2: Comparison of Commitment to Production and Investment at Completion of IOT&E

<u>Year</u>	<u>Total planned procurement</u>	<u>Commitments at IOT&E completion</u>	
		<u>Percentage of procurement</u>	<u>Investment^a</u>
1985	127	59	\$20.6 billion
1989	127	56	\$34.1 billion
1991	70	71	\$33.8 billion

^aExcludes \$21.97 billion, which is the total program research and development estimate.

Air Force officials told us authorization for four aircraft in fiscal year 1992 is needed to maintain continuity of production at the prime and subcontractor plants. These officials said five B-2 subcontractors are threatening to pull out of the program if annual aircraft production does not increase. The reason cited was that the subcontractors built production lines and hired

personnel under the assumption that the aircraft would be produced at the rate planned by the Air Force. We were told that maintaining production facilities and personnel is too expensive without the increased production rates. According to the Air Force, the five subcontractors are Textronix (cockpit displays), National Semiconductor (microprocessors), American Cyanamid (nickel-plated fibers), Rockwell International (1553 data bus), and a contractor manufacturing a classified product. We have not verified the business status of these subcontractors.

Unconventional Aircraft Design
May Surface Unanticipated Problems

All development programs have problems. Some problems are "known unknowns," problems anticipated based on experience. Testing serves to quantify the problem so an appropriate fix can be designed or operational restriction imposed. Other problems are "unknown unknowns," problems not anticipated. Although flight testing today increasingly serves to verify predictions made through simulation and modelling, it is a critical step in ensuring that problems are fully understood under operational conditions and solutions identified--ideally, before production, but if not then, as soon as possible after production begins.

The B-2 has a radically new aircraft design, and there is much uncertainty about whether its critical performance characteristics will be proven. Even in programs in which the aircraft design is more traditional, such as the B-1B bomber, significant problems, unknown and unanticipated in its early development, surfaced during the flight test program. For example, the B-1B had serious flight control problems requiring three different fixes, several years, and tens of millions of dollars to resolve. Specifically, the B-1B has little inherent stall warning to notify pilots that they may inadvertently lose control of the aircraft and crash. To ensure safety while flight control improvements were developed, restrictions were placed on B-1B operation, for example, limiting

pilots to 80 percent of the designed flight envelope and reducing the amount of weight (munitions and fuel) it was supposed to carry.

The B-2 flight test program is currently planned to be completed in August 1996. During the next 5 years, the most critical testing required to determine if the B-2 can perform its required missions is planned. For example, testing the B-2 in its more demanding mission-related flight envelope, in weapons and survivability, and in integration of offensive and defensive avionics is planned to start in 1992 and not be completed until August 1996.

The unconventional nature of the B-2 design, the development experience of other weapon systems, and the amount of testing yet to be accomplished argue, we believe, for the minimum commitment to production until the major milestones of the flight test program are completed.

OBSERVATIONS

The status of the B-2 is largely the result of the defense spending philosophies of the early to mid-1980s. At that time, the Soviet threat was of paramount concern, defense funding was readily available, and DOD developed, tested, and procured new weapon systems in a highly concurrent fashion. Today, the Soviet threat has diminished significantly, defense funding has leveled off, and DOD's budget plan shows a small decrease, in real terms, over the next several years. As a consequence, DOD's acquisition strategies should, in our view, become more conservative, permitting more operational testing before commitments are made in increasing the pace of production. Also, as problems and delays occur in development and testing, corresponding adjustments should be made to the production program. In short, we believe today's changed circumstances require a fundamental reassessment of system acquisition strategies.

The B-2 is already committed to production. If production is continued, it should be limited to the lowest level needed to sustain production operations until all initial operational testing is satisfactorily completed. The argument is made that failure to "ramp up" production early adds to total program cost and may lead to additional production inefficiencies, such as layoffs of trained workers. While some cost increases could occur, this concern is predicated on the assumption that manufacturing processes are stable and efficient and no major problems will develop. It seems likely to us that greater production efficiencies can be gained by having an economical production rate after the system has demonstrated it can perform its mission and production problems, such as those now evident in the B-2 program, have been resolved.

When subsystems in development are especially important to the overall effectiveness of a weapon system or technologically complex, the risks associated with concurrency increase. Our testimony concerning selected B-2 subsystems is classified Secret-Special Access Required and cannot be presented in an open hearing. I can tell you, however, that development and production of one of the subsystems is highly concurrent. The commitment to produce all of that subsystem is planned to be made before its laboratory testing is completed.

This concludes the unclassified portion of my prepared statement, Mr. Chairmen. I will be happy to answer any questions you may have before proceeding into the classified statement on B-2 subsystems.