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WEAPON SYSTEMS: Concurrency in the Acquisition Process

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Committee on Armed Services
United States Senate

Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss our views on concurrency in the acquisition of weapon systems. Concurrency can be used to expedite the development and production of weapon systems. However, our work on several systems has illustrated that rushing into production before critical tests are successfully completed have resulted in the purchases of systems that do not perform as intended. We believe that the Department of Defense (DOD) can no longer afford to concurrently develop and produce high cost systems without knowing early in the process whether the desired capability can be demonstrated. We also believe that the recent changes in the national security environment mean that we can wait until we better know whether weapon systems work before we commit large sums of money to procure them.

WHAT IS CONCURRENCY?

Concurrency is broadly defined as the overlap between the development and production phases of an acquisition program. More specifically, it means that for a given weapon system, some parts or subsystems are being developed while others are being produced. It also means that some parts or subsystems are being developed and produced at the same time. When subsystems in development are especially important to the overall effectiveness of a weapon system, or are technologically complex, the risks associated with concurrency increase. The growing dependency of weapon systems on software is perhaps the best illustration of these kinds of risks.

From whatever perspective (system or subsystem) one views concurrency, the best way to reduce risk in a system's acquisition is to get early indications, before production, of whether a system will perform as intended. Early operational testing is a key internal control to ensure that decisionmakers

have the best information available on a weapon system's performance to minimize risks of buying costly and ineffective systems. Determining if systems work after production starts can significantly increase the cost of such systems if major problems are discovered as a result of the testing process. Also, you may end up with less than was desired at the outset of the program.

The extent of operational testing before the production decision is generally the way the Congressional Budget Office (CBO), and more recently, DOD have measured the degree of concurrency in major weapons systems. A non-concurrent system, by their measurements, is one in which planned operational testing has occurred before the production decision. And a highly concurrent system is one in which little or no operational testing has occurred before the production decision.

THE RESULTS OF OUR WORK

Deciding to procure numerous, expensive, and concurrent systems over the last decade has created a predicament. Weapon systems currently in development or production are expected to cost over $1 trillion. The growing cost of many of these systems, some with uncertain or unproven capabilities, together with changes in the national security environment has presented us with tough policy choices: to stretchout, reduce or cancel some of these systems will have an economic impact in localities where they are built, but not to do so is to continue costly development of systems that may not be able to perform their missions. These kinds of choices must be avoided in the future.

Over the years, our work has demonstrated the importance of identifying the risks associated with concurrency. We have reviewed programs with planned concurrency as well as those that have become concurrent because production decisions were made prior to the accomplishment of significant operational testing.

HIGHLY CONCURRENT SYSTEMS

Recently the Under Secretary of Defense for Acquisition issued a report that found 6 of 34 major weapon systems to be "highly concurrent" because operational testing began after the initial production decision. Twenty-five other systems had lesser degrees of concurrency, including eleven judged to be "moderately" concurrent. The six are the B-2, the Peacekeeper Rail Garrison, the Seawolf attack submarine (SSN-21), and its combat system the AN/BSY-2, the C-17A, and the Trident D5 missile.

I would like to briefly summarize some of the problems we have identified concerning 5 of the 6 systems termed highly concurrent by the Under Secretary. In our reports we have discussed the risks associated with producing a system, or part of a system, before it is operationally tested. I would like also to discuss another highly concurrent program--the DDG-51 destroyer--that the Under Secretary did not identify.

In February of this year, I testified before the House Armed Services Committee that it would be prudent to reduce the pace of funding and production for the B-2 until critical performance elements of the aircraft, such as its integrated offensive and defensive avionics, were adequately demonstrated.[1] Under the DOD acquisition plan, 31 B-2 aircraft would be on order and over $48 billion would be appropriated before anyone knows whether this airplane will do its job. As you know, Secretary of Defense Cheney recently announced his intention to buy 75 rather than 132 stealth bombers. Under Secretary Cheney's plan, the fiscal year 1991 buy is reduced from 5 to 2 aircraft and the 1992 buy from 10 to 6 aircraft. As a result, 25 rather than 31 B-2s will be on

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[1] Strategic Bombers: B-2 Program Status and Current Issues, (GAO/NSIAD-90-120, February 22, 1990).

order before testing is completed. We remain concerned, however, that production of this plane is continuing without adequate assurance that it can perform its mission.

In our December 1989 report on the Rail Garrison for the Peace Keeper missile we stated that at the time the initial production decision was scheduled, no operational test and evaluation of the complete weapon system (including the missiles and rail launch cars) would have been conducted.[2] Additionally, the Air Force plans to purchase about 73 percent of the launch cars before operational testing is completed. Such a large purchase would, in effect, amount to full-rate production without any operational test or evaluation of the complete system. In the same report, we recommended that the Secretary of Defense delay the production start-up decision until the Air Force has conducted some operational test and evaluation of the complete weapon system.

In April 1990, we reported that as many as 15 of 29 planned SSN-21's, worth more than $21 billion, are to be on contract or under construction before the first ship is available for operational testing.[3]

The AN/BSY-2 is crucial to the performance of the SSN-21's mission and one of the most technically challenging and complex software development efforts for a submarine which will require up to 800 personnel to develop and integrate about 3.2 million lines of computer code. Timely operational test and evaluation on critical subsystems such as the AN/BSY-2 should be conducted. We reported that the Navy cannot demonstrate the AN/BSY-2 combat

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[2]Rail Garrison Production Decision and Launch Car Acquisition Should be Delayed, (GAO/NSIAD-90-19, December 7, 1989).

[3]Status of SSN-21 Ship Construction Program, (GAO/NSIAD-90-163, April 19, 1990).

system's potential for improved effectiveness over prior systems until it is operationally tested.[4] Such tests are scheduled for two years after the delivery of the first system. Problems encountered during such tests could require redesign and/or configuration changes to SSN-21s delivered and under construction, which could further delay deliveries and increase costs. And this has already occurred.

In our August 1989 report on the C-17 airlift aircraft we showed that concurrent development and low-rate initial production will overlap from 1988 to 1992.[5] Before the scheduled first flight of the development aircraft in 1990, 12 production aircraft were planned to be on contract. By the end of the flight test program, 9 production aircraft were planned to have been delivered, and assembly of the 18th aircraft was scheduled to have begun. We further noted that the Air Force must resolve assembly and avionics development problems and manage the program's concurrent schedule to avoid delays that would increase the likelihood that key milestones would not be met.

The DOD Inspector General report on the C-17A in April 1989 suggested that the low rate initial production was tantamount to a full-rate production decision. As a result, several C-17As would have been produced before operational testing was completed. Although Secretary of Defense Cheney recently decided to cut the C-17 aircraft procurement from 210 to 120 transports, we are still concerned over delays in the flight test program and the production of aircraft before completion of initial operational test and evaluation.

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[4]Submarine Combat System: Technical Challenges Confronting Navy's Seawolf AN/BSY-2 Development, (GAO/IMTEC-89-35, March 13, 1989).

[5]C-17 Faces Schedule, Cost, and Performance Challenges, (GAO/NSIAD-89-195, August 18, 1989.

And finally in January 1990 we reported that the DDG-51's contractor has experienced problems in designing and constructing the lead ship.[6] Because of these problems and because the Navy has changed the contract's requirements, costs have increased substantially, and the expected delivery schedule has slipped about 17 months from the original estimate.

Although the first follow-on ship is only 1 percent complete, the estimated cost to complete it is already over the ceiling price by 11 percent, according to the contractor, and by 22 percent, according to the Navy. In our report on the DDG-51 program we recommended that the Secretary of Defense delay the contract award for follow-on ships until he could provide assurance as to the development and affordability of the program.

In February, 1990, the Navy awarded contracts for 5 follow-on ships and now has a total of 12 follow-on ships under contract. Furthermore, the Navy could have as many as 17 ships under construction or awarded before the lead ship has finished testing and has been delivered in February 1991.

OTHER GAO WORK

In a report issued in June 1985, we identified the consequences of DOD's decisions to start production on five concurrent systems without having adequately demonstrated whether performance requirements were met in a representative operational environment.[7] For example, with the F/A-18 aircraft, expensive

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[6]Navy Shipbuilding: Cost and Schedule Problems on the DDG-51 AEGIS Destroyer Program,(NSIAD-90-84, January 17, 1990).

[7]Production of Some Major Weapon Systems Began With Only Limited Operational Test and Evaluation Results, (GAO/NSIAD-85-68, June 19, 1985).

retrofits were required on production models to correct problems identified during operational testing.

As you recently pointed out Mr. Chairman, the story of the B-1B's defensive avionics subsystem is a "classic" story of the risks associated with concurrency. Production and development started at the same time. The B-1B did not begin operational test and evaluation until 3 years after the October 1981 production decision. And, despite costly attempts to fix its critical avionics subsystem, the plane will not do what it was expected to do.[8]

Today we are issuing a report to the Secretary of Defense on the importance of planning and conducting more timely operational testing.[9] We found that the military services generally are not conducting or planning to conduct operational testing on weapon systems until after production start-up. In our examination of six weapon systems we found that in four cases, planned operational testing lags behind the actual or planned initial production decision by one to three years.

Mr. Chairman, the information in our report raises a question about the wisdom of spending relatively large sums of money on weapon systems before it is determined whether they will work. I doubt that we can afford to continue in this way. And the changing national security environment means we don't have to. Our reports on the problems of concurrent weapon systems have led me to conclude that the most crucial problem and greatest risk is in the development of the relevant software. Software development will determine the pace of development and ultimately the

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

[9] DOD Needs to Plan and Conduct More Timely Operational Tests and Evaluations, (GAO/NSIAD-90-107, May 17, 1990).

production of weapons like ships and planes. If the software doesn't work, then the weapon system as a whole is not going to work the way it should. This means that we have to have greater assurance that these highly complex subsystems which are crucial to overall system performance will do what they are supposed to do before committing large sums of money to procure the overall system. If we don't structure acquisitions this way, we risk having systems like B-1Bs sitting on the runway unable to do the job they were designed to do. I think you would agree that we can ill afford a repetition of that story.

This concludes my prepared statement, Mr. Chairman. I will be happy to answer any questions you may have.