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STATUS OF THE NAVY'S NEW SEAWOLF ATTACK
SUBMARINE AND ITS NEW COMBAT SYSTEM

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Before the
Legislation and National Security Subcommittee
Committee on Government Operations
U.S. House of Representatives



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Mr. Chairman and members of the Subcommittee:

I am pleased to appear before the Subcommittee today to discuss the status of the Navy's new Seawolf attack submarine (SSN-21) program and its combat system, the AN/BSY-2.

Both the SSN-21 program and the BSY-2 program are scheduled for an OSD Program Review in June 1990. Two weeks ago the Secretary of Defense called for a major review of the SSN-21 program. The results, with recommendations, are due May 30.

The SSN-21 and its combat system are multibillion dollar programs. To field the weapon as fast as it can in order to counter a perceived Soviet quiet submarine threat, the Navy has planned the use of concurrency not only between the SSN-21 and BSY-2 programs but within the SSN-21 and BSY-2 programs themselves -- a practice that has proven costly in previous DOD programs.

Although Soviet submarine capability is increasing, I believe that in recognition of the realities of Defense budget projections as well as today's changing world environment, concerns over affordability and concurrency need to be given careful attention and thorough debate.

BACKGROUND

The Seawolf will be larger, quieter, tactically faster and deeper diving than Los Angeles class attack submarines (SSN-688) - the last 19 of which are currently under construction. The Seawolf will also carry more weapons than earlier classes of attack submarines.

Critical to the SSN-21 achieving its mission requirements is the successful development of the BSY-2 combat system, an advanced computer system designed to enable the submarine to detect and locate targets faster than existing submarine combat systems can, allow operators to perform multiple tasks and address multiple targets concurrently, and reduce the time between detecting a target and launching weapons. This is to be accomplished through computer-aided detection, classification and tracking, the use of a wide aperture array hull mounted sensor and enhanced information management.

The SSN-21 and BSY-2 are being developed as separate programs, each under the direction of its own program manager and subject to its own management system. The BSY-2 is to be provided as government furnished equipment to the shipbuilder building the submarines.

The Navy is using two shipyards to design the SSN-21--the Electric Boat Division of General Dynamics Corporation and Newport News Shipbuilding. Newport News is responsible for the submarine's overall design under a \$343 million cost-plus-fixed-fee contract. Electric Boat is designing the engine room and its equipment under a \$212 million cost-plus-fixed-fee contract. Some research and development and detailed design efforts will continue concurrently with construction of the first SSN-21.

In January 1989 the Navy awarded Electric Boat a construction contract for the first SSN-21. Delivery is scheduled for May 1995 with an estimated cost of \$1.9 billion. The Navy expects the unit cost of the next three SSN-21's will decline and that the fifth and subsequent SSN-21s will not exceed \$1 billion each in 1985 base year dollars which would equate to \$1.3 billion in today's dollars. For fiscal year 1991, the Navy is requesting \$3.5 billion for the second and third ships, two combat systems, and long leadtime items for the fiscal year 1993 program.

The BSY-2 is critical to the submarine achieving its full mission and performance capabilities. The Navy has no alternate planned should the BSY-2 development be delayed. In March 1988, the Navy awarded General Electric a fixed-price incentive fee contract worth up to \$1.84 billion to develop the BSY-2 combat system and produce the first unit for the lead submarine, with options for two more systems and related items. Full-scale engineering development is

scheduled to proceed into fiscal year 1996. Total development and procurement costs for 29 planned BSY-2 combat systems are estimated to be \$7.4 billion then year dollars.

PRIOR GAO WORK ON

SSN-21 AND BSY/2

Over the past 3 years we have issued seven products on the SSN-21 and the BSY-2 programs. In summary, these were

- a March 24, 1987, testimony on the SSN-21 and BSY-2 programs during which we expressed concerns about affordability and concurrency.

- an April 28, 1987, letter to Senator Warner comparing similarities between the SSN-21's combat system and the B-1B's avionics system programs. We concluded that when production drives the development schedules of critical state-of-the-art subsystems, technical problems identified during development testing typically impact program cost, schedule and performance.

- a March 13, 1989, report on technical challenges in development of the BSY-2. We concluded that there were several areas of risk where increased Navy management attention should be focused to meet the BSY-2 performance requirements within the tight time frames and cost.

- a November 27, 1989, report on the SSN-21 construction program in which we discussed the program's status and its affordability. This report was originally issued in classified form and has just been released in an unclassified version.

- a December 28, 1989, report on the SSN-21 propulsor and other aspects of the SSN-21 in which we presented a status of propulsor testing.

- a January 31, 1990, report on the Navy's submarine combat systems. On the BSY-2 we discussed cost increases, schedule slippages and a phased delivery of the first system's software.

- a February 14, 1990, report on advanced submarine technology where we concluded a better process needs to be established to ensure the transfer of such technology into current submarine construction programs.

AREAS OF CONCERN

Today our concerns remain remarkably the same as reported in our earlier products. I would like to summarize the major issues we believe must be addressed at this point in the SSN-21 and BSY-2 development.

Concurrency

To meet its planned Initial Operational Capability date of May 1995, the SSN-21 program is using a concurrent scheduling approach which has construction ongoing while design is continuing. Current plans call for as many as 15 ships to be on contract or under construction before the first ship is available for operational testing.

The SSN-21's construction schedule is driving the development and production schedule of its combat system. In 1988 the Navy stipulated that the delivery of the first BSY-2 was required by November 1993 to meet the scheduled delivery of the first SSN-21. However, when the Navy awarded the full-scale development contract for the combat system, it agreed to have all system hardware and about 86 percent of its software delivered to the Navy by that date. The remaining 14 percent of software would be delivered in November 1994.

DOD reported that the combat system program is a low performance and schedule risk but a moderate cost risk. However, as currently scheduled, this program could be a high risk because of the large quantity of software that will be required for system development. Development of the BSY-2 is one of the most technically challenging and complex software development efforts ever undertaken for a submarine. The BSY-2 combat system will require up to 900 software personnel to develop and integrate about 3.2 million lines of code--over 2 million of which is planned to be written in the new Ada programming language.

The SSN-21 is to be built using modular construction techniques. For this technique the detailed drawings for a particular ship section must be accurate even down to pipe and cabling runs before construction of that section begins. The SSN-21's detailed design drawings are being validated through incremental testing of subcomponents, program reviews, and construction of full-scale model mockups. Changes in system and subsystem configuration designs can be costly. Problems have already been experienced in this area. Because of two BSY-2 design changes, portions of the SSN-21 had to be redesigned at an estimated cost of \$5 million. Depending upon the SSN-21's construction status, further design changes to the BSY-2 combat system or any other system could involve costly redesign, rework or both.

Affordability

The Navy plans to buy 29 SSN-21s by the year 2000 at an estimated cost of about \$44 billion in then-year dollars.

Fiscally constrained budgets and the cost of the SSN-21 may not allow the Navy to buy all 29 SSN-21s. The Navy's SSN construction plan is based upon several assumptions which, in our opinion, may not be achievable.

To execute the SSN construction plan within a shipbuilding budget that would grow at an annual real rate of 3 percent, the Navy would have to:

- increase the percentage of shipbuilding funds allocated to SSN construction from 19 to 26 percent;
- reduce average planned SSN construction time from 65 months to about 52 months;
- receive authorization and funding for an average of about 3 ships per year; and,
- incur no cost overruns requiring supplemental funding.

Further, during a period of zero or 3 percent negative real growth budgets, the Navy's planned SSN program could consume up to 36 percent of its shipbuilding budget.

CONCLUSIONS

Without aggressive funding, the Navy will probably have difficulty executing its SSN-21 acquisition program. SSN-21 affordability issues will likely require the Navy to make important trade off decisions. It is our hope that the Secretary of Defense's mandated review of the program will provide the high level attention a program of this importance deserves.