

GAO

United States General Accounting Office

Report to the Chairman, Subcommittee  
on Defense, Committee on  
Appropriations, House of  
Representatives

November 1991

# EARLY WARNING SATELLITES

## Funding for Follow-on System Is Premature





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

National Security and  
International Affairs Division

B-245604

November 7, 1991

The Honorable John P. Murtha  
Chairman, Subcommittee on Defense  
Committee on Appropriations  
House of Representatives

Dear Mr. Chairman:

As you requested, we examined the Department of Defense's (DOD) plans to develop a follow-on system to the Defense Support Program (DSP), including budget implications. This report summarizes and updates the briefings provided to your office on March 21, 1991, and May 9, 1991.

## Background

DSP is a strategic surveillance and warning satellite system with an infrared capability to detect ballistic missile launches (intercontinental and submarine-launched). It provides near real-time detection information in support of DOD's tactical warning and attack assessment (TWAA) mission. Its primary users are (1) the North American Aerospace Defense Command, which is responsible for assessing potential attacks on North America; (2) the national command authorities,<sup>1</sup> who are responsible for making retaliatory decisions; and (3) other major military commands, which participate in the decision-making process and are responsible for strategic offensive forces.

DSP began in 1967, and the first operational satellite was deployed in 1971. The most recent DSP satellite launch (number 15) was in late 1990. In its December 1990 Selected Acquisition Report, the Air Force indicated that it planned to acquire 26 satellites and estimated the total program acquisition costs at \$9.9 billion over a 30-year period (1967 to 1997). It has already acquired up through satellite 22—the last five (18-22) under a multiyear procurement strategy.

DOD stated that the existing DSP system does not satisfy all the validated military requirements for a space-based TWAA sensor. It has wanted to improve or replace the DSP system since 1979. However, the Air Force's planned replacement in the early 1980s, referred to as the Advanced Warning System (AWS), never fully materialized because of immature technology and high costs.

<sup>1</sup>The national command authorities consist of the President and the Secretary of Defense or their successors.

---

In 1984, DOD transferred the AWS effort to the Strategic Defense Initiative Organization. The purpose was to upgrade AWS capabilities to satisfy requirements for both strategic defense and TWAA missions on a single space-based platform, which became known as the Boost Surveillance and Tracking System (BSTS).

After spending about \$1 billion on BSTS, the Organization determined that the system was no longer an essential element of the strategic defense system architecture because of an emerging technology called "brilliant pebbles." In April 1990, the Organization discontinued BSTS efforts, and in October 1990, the Congress directed DOD to transfer BSTS to the Air Force and report to the House and Senate Committees on Armed Services and Appropriations on its DSP follow-on plans. The Air Force eliminated ballistic missile defense from BSTS' planned capabilities, leaving only TWAA, and renamed the system AWS.

In December 1990, the Deputy Secretary of Defense approved a proposal by the DOD Office of the Comptroller to terminate the Air Force's planned AWS efforts because of high costs, technical and schedule risks, and the availability of an alternative system—an enhanced DSP. Representatives within the Office of the Secretary of Defense, Office of the Joint Chiefs of Staff, and Air Force, however, strongly objected to terminating AWS.

In April 1991, after further discussions within DOD, the Secretary of Defense approved an implementation strategy for a scaled-down version of AWS, calling it the Follow-on Early Warning System (FEWS). FEWS is to be less costly, but also less capable than AWS. At that time, DOD advised the Congress that FEWS' initial deployment would not satisfy all the validated space-based TWAA sensor system requirements. However, it did expect FEWS to provide improved performance over the existing DSP and growth potential to eventually meet all the requirements.

On May 30, 1991, the Air Force publicly announced its intentions to award at least two contracts for a FEWS demonstration and validation phase. It plans to do this in March 1992 and expects the effort to take from 18 to 24 months. It then plans to proceed into an engineering and manufacturing development phase.

---

## Results in Brief

DOD's current proposal for FEWS may provide more capability than the existing DSP system, but providing funding to start the development effort in fiscal year 1992 would be premature. DOD has not completed its selection process, which will consider several system alternatives. Although the best alternative is still unknown, there are indications that an enhanced DSP could be nearly as effective and would cost billions of dollars less than a fully capable FEWS. Five separate studies provide a basis for these indications.

The Air Force is faced with an affordability problem for a fully capable system and has proposed a design-to-budget solution for a less capable system. Although the Air Force has estimated the costs of the initial FEWS and an AWS, it has not estimated the incremental costs to transition from the initial FEWS to a fully capable FEWS that would meet the validated requirements. Without these incremental costs, there is incomplete information with which to make a sound decision on FEWS. These factors and the incomplete selection process raise concerns about DOD's plans to spend a total of \$166 million to initiate FEWS development at this time.

---

## Funding for FEWS Development Would Be Premature

DOD has not completed its selection process, which includes a Defense Acquisition Board review. The Board is scheduled to meet on December 11, 1991, to recommend FEWS or some other alternative. Its recommendation will be based largely on the results of an Air Force cost and operational effectiveness analysis, which was completed on October 11, 1991.

The Air Force analysis initially included three alternatives: (1) the current DSP, including completed and planned survivability improvements; (2) FEWS, with some on-board processing capabilities; and (3) a fully capable AWS. The Office of the Secretary of Defense subsequently rejected this analysis and required that two additional alternatives—a fully enhanced version of the current DSP and FEWS with no on-board processing capability—be included.

Office of the Secretary of Defense officials stated that DOD favors FEWS with no on-board processing capability and is emphasizing the system's growth potential to eventually meet all the requirements. However, there are indications this may not be the most cost-effective solution. For example, the cost and operational effectiveness analysis indicated significant cost differences between an enhanced DSP and FEWS. According to an Air Force representative, the analysis showed that life-

cycle costs for an enhanced DSP would be about \$2.4 billion less than a FEWS without on-board processing, about \$3.1 billion less than FEWS with on-board processing, and about \$3.5 billion less than a fully capable AWS. Also, several other studies have concluded that an enhanced DSP could be nearly as capable and more economical than BSTS or AWS. This means that a fully enhanced DSP should also be nearly as capable and more economical than FEWS. The reason is that if FEWS is improved to meet all the requirements, it would be equivalent in capabilities to AWS and would therefore likely cost as much.

In 1991, a draft study on strategic sensors by a Defense Science Board task force compared the merits of developing BSTS to improving the current DSP system as a means of countering ballistic missile and air-breathing threats. It concluded that an enhanced DSP could satisfy most of the TWAA space-based sensor requirements at lower cost and risk than a completely new system. The study stated that the savings would be over \$3 billion in research and development up to 1998 and about \$300 million per deployed satellite after 1998, if BSTS were abandoned and an improved DSP were developed and deployed.

A December 1990 Air Force requirements trade study estimated life-cycle costs for an upgraded DSP at almost \$3 billion less than an AWS. The study recommended establishing open competition during the demonstration and validation phase of the acquisition process and making a decision between AWS and an enhanced DSP prior to proceeding into the engineering and manufacturing development phase.

In analyzing fiscal year 1992 budget alternatives, a late 1990 DOD Office of the Comptroller study concluded that an enhanced DSP would provide increased capability at a much lower cost than BSTS and would meet at least 95 percent of the TWAA requirements. The study became the basis for the Deputy Secretary of Defense's decision to terminate the Air Force AWS program and direct that DSP improvements be made instead. The decision was subsequently reversed, and FEWS was proposed.

In a 1990 classified report, we provided information on space-based infrared sensor options to meet mission requirements for both TWAA and ballistic missile defense and compared the expected capabilities of the options with the approved BSTS system operational requirements document. In that report, we observed that, to varying degrees, improvements to DSP could be made to meet both sets of requirements, except survivability. DOD generally agreed with this observation.

---

## Design-to-Budget Strategy and Requirements Review

According to Air Force representatives, limited funds have required them to establish a design-to-budget acquisition strategy for FEWS. This means reducing planned capabilities to what the Air Force can afford. The Air Force expects, however, that funds would eventually be programmed to add capabilities until the full requirements are met.

This acquisition approach, while reducing estimated costs in the short term, raises potential problems in the long term. Although the Air Force has estimated the costs of the initial FEWS and an AWS, it has not estimated the incremental costs to transition from the initial FEWS to a fully capable FEWS that would meet the validated requirements. Without these incremental costs, there is incomplete information with which to make a sound decision on FEWS.

As part of the DOD review process, the Joint Requirements Oversight Council within the Office of the Joint Chiefs of Staff is to review FEWS relative to the requirements that were validated in January 1990 and clarified in February 1991. The Deputy Secretary of Defense directed that this be done before the Defense Acquisition Board meets.

---

## Sources of Funding for FEWS

In October 1990, when the Congress directed DOD to transfer BSTS to the Air Force, the Congress also provided \$210 million to the Air Force in fiscal year 1991 appropriations for an orderly phase-out of BSTS contracts and AWS development. However, in terminating AWS, DOD expected the AWS funds to be used for DSP improvements. Subsequently, when FEWS was proposed, the Air Force decided to use \$84 million of the \$210 million to initiate FEWS development.

The Air Force did not request any funds for FEWS in the original fiscal year 1992 budget because it was formulating plans for FEWS outside of DOD's regular budget cycle. However, in the amended fiscal year 1992 budget, which the President submitted to the Congress on April 26, 1991, the Air Force requested that \$82 million be added for FEWS research, development, test, and evaluation.

Altogether, the Air Force plans to spend \$166 million (\$84 million plus \$82 million) to initiate the FEWS program in fiscal year 1992.

---

## Recommendations

The Defense Acquisition Board plans to recommend whether to proceed with the initial capabilities proposed for FEWS based in part on the results of (1) a cost and operational effectiveness analysis and (2) a

review of the capabilities relative to the space-based TWAA sensor requirements for ballistic missiles. However, DOD has not addressed the incremental costs necessary to bring the initial capabilities of FEWS up to the full requirements.

We recommend that the Secretary of Defense require the development of total estimated program incremental costs for a fully capable FEWS. We also recommend that these costs and the Defense Acquisition Board results be provided to the Congress.

---

## Matters for Congressional Consideration

Until the Secretary of Defense provides the Congress with the recommended information, Congress may wish to take actions during the fiscal year 1992 budget deliberations to prevent premature funding of FEWS. This can be accomplished by (1) either rescinding \$84 million in fiscal year 1991 research, development, test, and evaluation appropriations that the Air Force plans to use for FEWS or restricting DOD from obligating these funds and (2) either denying the Air Force's request for \$82 million in the fiscal year 1992 budget for FEWS or restricting any appropriations provided for this purpose. The restriction of funds should be in effect until the Congress receives and reviews the recommended information.

---

## Scope and Methodology

We evaluated DOD's plans to initiate a new early warning satellite program, including consideration given to alternatives. We examined acquisition planning documents and cost and schedule information related to FEWS, TWAA sensor system requirements, and various correspondence. We interviewed DOD officials responsible for FEWS and DSP within the Office of the Secretary of Defense, the Office of the Joint Chiefs of Staff, and the Department of the Air Force in Washington, D.C. We also interviewed officials at the Air Force Space Systems Division, Los Angeles, California.

As requested, we did not obtain written agency comments. However, we discussed the contents of this report with DOD officials and have incorporated their comments where appropriate.

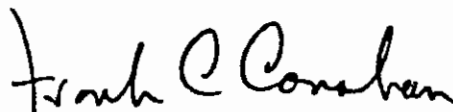
We performed our review from October 1990 to October 1991 in accordance with generally accepted government auditing standards.

---

We are sending copies of this report to the Secretaries of Defense and the Air Force; the Director, Office of Management and Budget; and interested congressional committees. We will also make copies available to others upon request.

This report was prepared under the direction of Louis J. Rodrigues, Director, Command, Control, Communications, and Intelligence Issues, who may be reached on (202) 275-4841 if you have any questions about this report. Other major contributors to this report are Homer H. Thomson, Assistant Director, and Pierre F. Crosetto, Evaluator-in-Charge.

Sincerely yours,

A handwritten signature in black ink that reads "Frank C. Conahan". The signature is written in a cursive style with a large initial "F" and "C".

Frank C. Conahan  
Assistant Comptroller General