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Report to Secretary, Department of Defense; by Jerome H. Stolarow, Director, Procurement and Systems Acquisition Div.

Contact: Procurement and Systems Acquisition Div.
Budget Function: National Defense: Weapon Systems (057).
Organization Concerned: Department of the Army; Department of the Navy; Department of the Air Force.
Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services.

A survey of practices and procedures for follow-on operational testing and evaluation of weapon systems by the military services indicated that follow-on tests have been conducted adequately. However, cases were noted where critical testing was deferred until after a production decision was made, and full-scale operational testing has been conducted after weapon systems have been produced and deployed. In the Army, critical tests needed to support a low-rate production decision were deferred until after production units were available. In the Air Force, most operational testing prior to the initial production decision is combined with testing performed by developers; this does not constitute sufficient operational testing. Unlike the Army and the Air Force, the Navy usually performs sufficient operational testing before production decisions, but the Navy also continues to conduct full scale operational testing after systems have been deployed. Some operational testing of complex weapon systems will be necessary after production decisions are made; this could occur when there are changes in threat, major system modifications, or changes in doctrine or tactics. The Secretary of Defense should: assure that operational tests critical to determining system effectiveness and suitability are accomplished prior to initial production decisions; and in cases where systems have undergone full operational test and evaluation, restrict additional testing to cases of significant changes in mission, threat, tactics, or system modifications. (RRS)

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

B-163058

OCTOBER 19, 1978

The Honorable Harold Brown
The Secretary of Defense

Attention: Assistant for Audit Reports
Room 3A336
ASD (Comptroller)

Dear Mr. Secretary:

We recently surveyed the practices and procedures for follow-on operational testing and evaluation of weapon systems by the military services. Generally we found that follow-on tests have been conducted adequately; however, we have some concerns we would like to bring to your attention. Specifically, we found that (1) some operational tests that should have been performed before a production decision have been deferred by the Army and Air Force until after the decision was made, and (2) the Navy's independent test agency continues to conduct full-scale operational tests after weapon systems have been produced and deployed. To minimize the acquisition of weapon systems that cannot achieve required performance, we are recommending that tests critical to system effectiveness and suitability be accomplished before initial production decisions. In addition, we are recommending that operational testing of deployed Navy systems be done only when there are significant changes in mission, threat, tactics, or system modifications.

BACKGROUND

Operational testing is an important input for key decisions in the acquisition process, especially the decision to proceed from development to production. While laboratory and other types of controlled testing done by system developers and contractors are important, two unique aspects of operational testing make its results particularly valuable to

decisionmakers. First, it is conducted by an independent agency having no vested interest in acquiring the weapon system. Secondly, it is performed in an environment that is supposed to duplicate as closely as possible the actual conditions the system and the using personnel will have to operate in after deployment. Under these conditions, operational testing gives decisionmakers the best possible information available at the time on how well a new system will actually work before they decide to buy and deploy it.

After procurement decisions are made and the system is deployed, the need for operational testing diminishes. Once a system is in daily use by operating units, there is less need to fully duplicate operational conditions. Actual use by the operating forces should indicate whether the system works as intended.

Independent test agencies conduct two phases of operational testing: initial operational testing and evaluation--that is, all operational testing before the first production decision; and follow-on testing and evaluation--all operational testing after the production decision. Since operational test results are essential to decisionmakers in assuring that new weapon systems will perform their missions, operational tests critical to determining a system's effectiveness and suitability should be conducted and the results made available before initial production decisions.

In recent years, reports of the Commission on Government Procurement, the General Accounting Office, and the Department of Defense (DOD), have emphasized the need for operational testing. As a result, DOD directives now require that independent test agencies estimate, prior to production, the operational effectiveness and suitability of major weapon systems. 1/ These directives permit testing after production decisions only when necessary to refine earlier

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1/Operational effectiveness may be defined as the ability of a system to accomplish its mission when placed in use, whereas operational suitability is the degree to which a system can be satisfactorily placed in field use considering, among other factors, the ability to produce, operate, maintain, and support the system.

estimates of operational effectiveness or to evaluate system modifications or changes in the system's mission. DOD also requires the military services to pace their acquisition processes according to the completion of critical tests and evaluations.

TESTING PRACTICES IN THE MILITARY SERVICES

We found that follow-on tests have been adequately conducted by the military services; however, we noted cases where (1) critical testing was deferred until after a production decision was made, and (2) full scale operational testing has been conducted after weapon systems have been produced and deployed. Some examples of testing practices in each of the military services are shown below.

In the Army, we found that critical tests needed to support a low-rate production decision were deferred until after production units were available. This occurred on the AN/TPQ-37 Radar, the Tactical Fire Direction System, and an air defense system. For example, the Army suspected, on the air defense system, that the total system, including its associated radars, had little ability to withstand electronic countermeasures, yet it did not test against this threat. Instead, the Army approved a low-rate of production without testing the entire system, including the radars, to electronic countermeasures. The system has since undergone two phases of follow-on operational test and evaluation and has been approved for full-scale production. The system has been scheduled for deployment, yet it has not successfully demonstrated the ability to perform its mission in an electronic countermeasures environment. In the future, operational testing after a low rate production decision has been made should be reduced because of a May 1978 revision to current Army test regulations which authorize low-rate production only in unusual circumstances.

In the Air Force, most operational testing prior to the initial production decision is combined with testing performed by developers. In our opinion, this does not constitute sufficient operational testing. We discussed this issue in detail in our recent report on the Air Force's Test and Evaluation Center (PSAD-78-102, dated June 2, 1978). According to DOD instructions, operational testing is, among other

things, to be conducted with typical military personnel that are expected to operate and maintain the systems. However, during the Air Force's combined testing, the systems are operated and maintained by either contractor representatives or specially trained military personnel. Only after production has begun do typical military personnel engage in the testing. This occurred on the F-4G aircraft, the Cobra Dane Radar, and the A-10 aircraft. For instance, the A-10 close air support aircraft was not tested for operational effectiveness using typical Air Force personnel until after production units were available. Representatives from the Air Force's Test and Evaluation Center advised us that during combined testing, personnel with above average qualifications are needed to estimate a system's operational effectiveness and suitability. They stated that typical operational (including maintenance) personnel cannot make these initial estimates.

Unlike the Army and Air Force, the Navy usually performs sufficient operational testing before production decisions; however, the Navy also continues to conduct full scale operational testing after systems have been deployed. We identified 31 Navy systems in follow-on-testing that were still being tested to determine operational effectiveness and suitability. For example, the S-3A anti-submarine warfare aircraft and the Versatile Avionics Shop Test systems were deployed in calendar year 1974, yet the Navy continues to test these systems for operational effectiveness and suitability. Deployed operational commands use these systems daily and, through various reporting systems, appraise their performance. Therefore, the basic operational data necessary to assess a system's effectiveness and suitability should be available from the fleet.

In a Report of the Acquisition Cycle Task Force issued by the Defense Science Board on March 15, 1978, one problem noted was that testing is expensive and highly time consuming, yet operationally unreliable items are still passed with a fairly high frequency. The report cited that the achievement of satisfactory test results should be recognized as being a pivotal factor in validating the initial decision to move into production upon completion of full scale development, but once satisfactory results have been achieved, repetitive test cycles should not be imposed as a condition for moving into production rate buildups. The report further stated that testing subsequent to a full production decision should be

considered to be primarily in the nature of confirmatory tests rather than a vehicle for reopening already settled questions of design adequacy, system or mission need, and other such basic issues relating to the program.

AGENCY COMMENTS

We informally discussed the problems cited in this report with representatives of the Office of the Secretary of Defense and they agreed that critical operational testing has been deferred and/or reduced in scope. They said that, in many cases, a production decision is driven by economic or time considerations. They also said that operational testing may have been deferred until after production decisions because of a lack of criteria as to just what testing is critical to a production decision.

We also discussed this report with representatives from the military services independent test organizations. Their comments were incorporated as appropriate.

CONCLUSIONS AND RECOMMENDATIONS

We recognize that some operational testing of complex weapon systems will be necessary after production decisions are made. This could occur when there are changes in threat, major system modifications or changes in doctrine or tactics. We also recognize the need to know whether deployed systems are performing their missions effectively. However, our concern is that operational tests critical to the initial production decision have been deferred by the Army and Air Force until after procurement funds are committed. In addition, full scale assessments of operational effectiveness and suitability are being made by the Navy after systems have been deployed when the basic performance information should be available from the operating forces. We believe the cost of testing the deployed Navy systems may unnecessarily drain the resources needed for operational testing earlier in the acquisition process.

We therefore recommend that the Secretary of Defense

--assure that operational tests critical to determining system effectiveness and suitability are accomplished prior to initial production decisions. In cases where all major testing cannot be accomplished, the Secretary should require that the services justify in writing the rationale for proposed deferrals or omissions of such tests.

--in cases where systems have undergone full operational test and evaluation, restrict additional testing to cases of significant changes in mission, threat, tactics, or system modifications and require the services to concentrate more on early operational testing.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal Agency to submit a written statement on actions he has taken on our recommendations to the House Committee on Government Operations, the Senate Committee on Government Affairs, and the House and Senate Committees on Appropriations. We would appreciate receiving a copy of your statement when it is provided to the congressional committees.

Copies of this letter are being sent to the Director, Office of Management and Budget; the Chairmen, Senate and House Committees on Appropriations and Armed Services; the Chairman of the House Committee on Government Operations; the Chairman of the Senate Committee on Governmental Affairs; and the Secretaries of the Army, Navy, and Air Force.

Sincerely yours,

J. H. Stolarow

J. H. Stolarow
Director