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

~~DEFENSE DIVISION~~
Procurement and Systems
Acquisition Division

MAR 23 1972

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The Honorable
2 The Secretary of Defense 5

Attention: Assistant Secretary of Defense
(Comptroller)

Dear Mr. Secretary:

The General Accounting Office has completed its survey of the activities of the Air Force Flight Test Center (AFFTC), Edwards Air Force Base, California (GAO Code 57109). We noted certain practices which may reduce the usefulness of test results in the system acquisition decisionmaking process. We are bringing these matters to your attention to assist in your current efforts to strengthen test and evaluation procedures. D. 638

No evidence of test data consideration

Although military urgency may require production decisions before all tests and evaluations are completed, consideration of any available test data should be documented. In the absence of such documentation, higher level management may not have the opportunity to consider and disapprove unacceptable trade-offs of operational effectiveness and suitability.

UH-1N helicopter

The UH-1N is to be used for counterinsurgency, psychological operations, transport of personnel and equipment between medical installations, and protective fire. Although it was a modified Army UH-1D helicopter, the UH-1N is considered a "new" helicopter by Air Force and contractor representatives and has been undergoing extensive testing.

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Development testing at AFFTC began in October 1970 and was scheduled for completion in February 1972. Operational testing began in September 1970 and was completed in February 1971.

Air Force headquarters planned to deploy the UH-1N to a combat zone concurrent with the start of testing. This plan was challenged by the using command (Tactical Air Command), the development organization (Aeronautical Systems Division ASD), and AFFTC. Each organization believed that a deployment decision was premature because sufficient test data was not available.

Although aware of the concern of these organizations, Air Force headquarters deployed the helicopters within one month of the start of testing. AFFTC and ASD representatives could not provide us with documentation to show the consideration given to available test data in establishing sufficient confidence that the helicopter would be suitable for an urgent mission requirement.

According to the UH-1N Chief Test Pilot, pilot safety limitations had to be imposed until certain specifications and aircraft data were verified during development testing at AFFTC and the pilot's handbook prepared. Examples of limitations on operational use of the deployed helicopters are (1) a 15,000-foot ceiling, (2) instrument flying was prohibited, (3) the grenade launcher could not be used, and (4) the hoist capacity was reduced.

According to an ASD official, the deployed helicopter could not achieve its maximum power due apparently to an engine problem. He said that it was necessary to send a task force to Southeast Asia to investigate the problem because data normally obtained during development testing was not available.

Target sighting system for F-4E airplane

In 1969, a requirement was established to improve the Lead Computing Optical Sight System (LCOSS) so it could more accurately compute for maneuvering airborne targets. The manufacturer proposed production of a redesigned LCOSS.

ASD, the Air Force development organization, directed AFFTC to evaluate and verify the contractor's claim of its greatly increased accuracy. AFFTC prepared a plan of 30 flight tests.

In December 1970, ASD decided to incorporate the modified LCOSS into the F-4E production contract. Although only four of the thirty test flights had been made and test data had not yet been evaluated, procurements totaling \$2.6 million were awarded.

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In a report dated September 29, 1970, a Defense Contract Administration Services (DCAS) Production Engineer had recommended that the procurement decision be delayed because sufficient test data was not available to validate theoretical engineering equations used to compute for maneuvering targets. He stated that the Air Force needed to evaluate data from a minimum of 10 flight tests before fixing the engineering design.

Since development flight test results were not available in December 1970, we inquired into the basis for the procurement decision. An ASD official stated that the decision was based on (1) computer analyses and flight simulation studies conducted by the LCOSS manufacturer and the F-4E prime contractor, (2) a recommendation by the prime contractor that the contract be awarded, and (3) AFFTC data. He commented that the LCOSS manufacturer's analyses showed significant improvement in computing the angle of maneuvering targets.

In April 1971, a company developing a competitive gun sighting system told ASD that the conclusions and recommendations in the LCOSS manufacturer's analyses were based on assumed performance and that only highly experienced pilots, if any at all, could make effective use of the modified LCOSS.

We recognize that the competitor's evaluation might be biased. But considered along with the absence of flight test results and the DCAS position that engineering design required evaluation of data from at least 10 test flights, it suggests a high degree of risk that the LCOSS would not be operationally suitable.

ASD and AFFTC officials could not explain the rationale for planning 30 flight tests or provide us with any documentation showing whether performance capabilities were objectively traded off to meet urgent military requirements before completion of testing and whether the risk of impaired suitability for use under combat conditions had been analyzed and found to be acceptable.

Lack of standards for measuring improvement

As described on page 2, most of AFFTC's development flight testing was done after ASD's December 1970 decision to incorporate the modified LCOSS into the F-4E airplane. Production was authorized through engineering change proposals which approved the redesign but did not establish quantitative performance requirements. In October 1971, after evaluating data from 38 test flights, AFFTC recommended that all F-4E airplanes be equipped with the modified LCOSS.

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We did not find any provisions in the test plan for comparing the probability of target hits with the modified LCOSS to the number of hits being experienced either in actual operations or in tests with the conventional LCOSS. AFFTC and ASD representatives stated that standards were not established for measuring the extent of improvement in the modified LCOSS because the accuracy of the LCOSS is affected by pilot judgment and skill and actual flying conditions.

In situations where operational experience may not yield reliable accuracy data, it would seem that the standard for measuring improvement should be comparative testing of existing and modified equipment under the same controlled conditions.

* * * * *

We would appreciate receiving your comments and any additional information considered pertinent, including advice on corrective actions being taken or planned. If you desire, we will be glad to discuss these matters in greater detail with you or your representatives.

Copies of this letter are also being sent to the Deputy Director of Defense Research and Engineering (Test & Evaluation), and the Secretary of the Air Force.

Sincerely yours,



Director