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U.S. GENERAL ACCOUNTING OFFICE

STAFF STUDY

HARRIER WEAPON SYSTEM

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DEPARTMENT OF THE NAVY

FEBRUARY 1973

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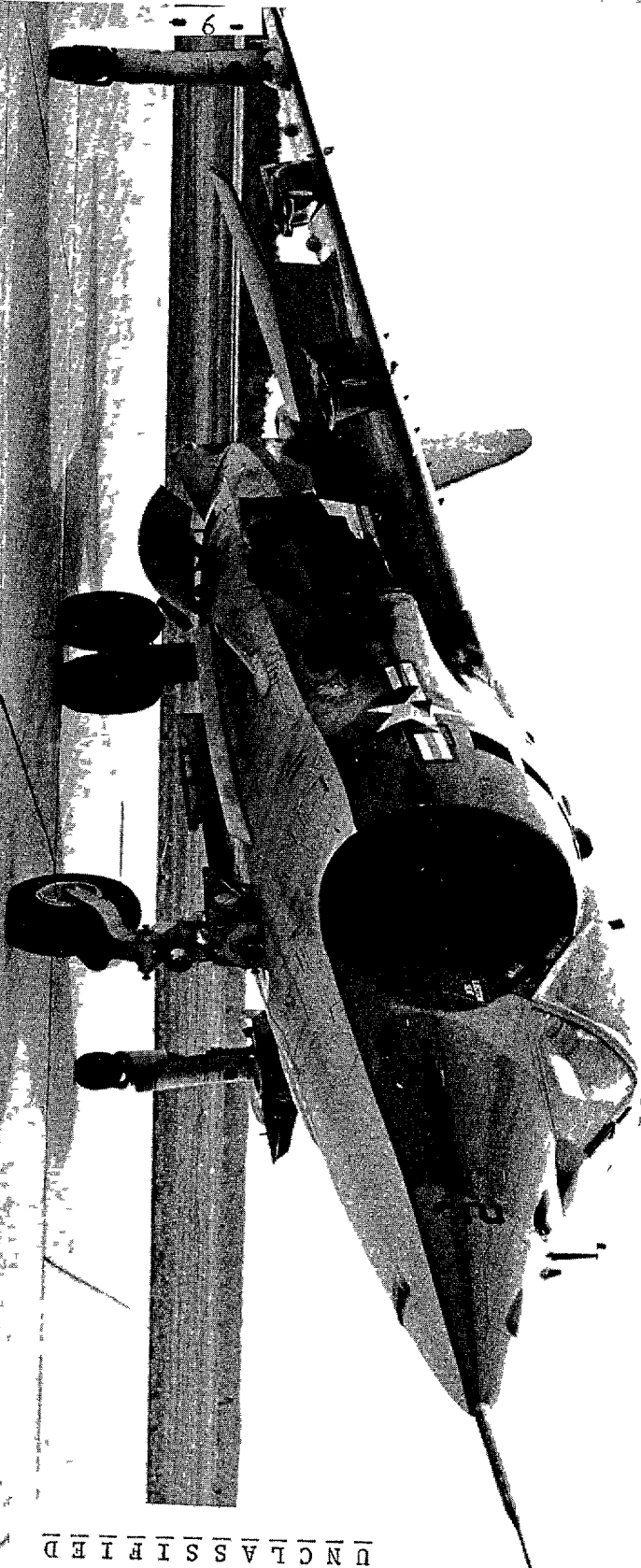
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The Harrier aircraft

APPENDIX 11



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## SYSTEM DESCRIPTION AND STATUS

The Harrier, designated by the Navy as the AV-8A, is a single-engine, single-seat aircraft capable of vertical or short take-off and landing. It is intended to provide improved responsiveness to the combat requirements of landing forces through the use of temporary and austere bases, both ashore and afloat, in close proximity to friendly ground forces.

The Marine Corps has contracted for 90 aircraft through fiscal year 1973, and plans to contract for 20 aircraft in fiscal year 1974 for a total program of 110 aircraft. As of September 1972, 20 aircraft have been accepted by the U.S. Marine Corps.

A resume of the program history is included in our initial study dated March 1972. This second study describes the status of the program at June 30, 1972, and discusses the major accomplishments and changes that occurred in the program during the year ended June 30, 1972. Significant changes which occurred between June 30, 1972, and September 30, 1972, have been footnoted.

## COMING EVENTS

The Harrier is scheduled to become fleet-operational in June 1974. In early 1973, six Harrier aircraft will be assigned to the USS Guam (the Navy's Interim Sea Control Ship) for further testing.

## COST

At June 30, 1971, the Harrier System Acquisition cost was estimated to be \$490.5 million. The system acquisition cost at June 30, 1972, was estimated to be \$525.5 million, an increase of \$35 million.

This difference is due mainly to a \$28.9 million increase resulting from a revised exchange rate between currency of the United States and the United Kingdom (\$2.61 vice \$2.40 per pound) and a \$6.1 million increase for a new ejection seat. Subsequent to June 30, 1972, the Navy directed that an exchange rate of \$2.50 be used. The use of this exchange rate will result in an estimated decrease of \$4.6 million in the system acquisition cost estimate.

There were no major changes in the logistics support/additional procurement costs as reported in the SAR except for a \$1 million increase for the retrofit of the new ejection seat and \$6.4 million increase resulting from a Department of Defense (DOD) memorandum, dated May 25, 1972. This memorandum required the deletion of replenishment spares and the inclusion of component improvement costs.

#### Logistics Support/Additional Procurement Costs

	SAR		Increase (Decrease)
	<u>June 30, 1971</u>	<u>June 30, 1972</u>	
	-----\$ millions		-----
Aircraft modification	\$ .5	\$ 1.5*	\$ 1.0
Replenishment spares	8.9	- -	(8.9)
Component improvement	<u>- -</u>	<u>15.3*</u>	<u>15.3</u>
Total	<u>\$9.4</u>	<u>\$16.8</u>	<u>\$ 7.4</u>

\* The September 30, 1972, SAR shows an increase of \$16.8 million for aircraft modifications and \$9.5 million for component improvements. These funding estimates were revised to include program costs for FY 71 through FY 78 vice FY 71 through FY 74.

The logistics support/additional procurement costs are not included in the June 30, 1972, current estimate of \$525.5 million.

Allowance for inflation

An amount for estimated inflation for the Harrier is not identified in the June 30, 1972, SAR. However, the SAR does state that inflation at a rate of about 10 percent per year is included in the current estimate. Based on the estimated rate of 10 percent, we calculated the allowance for inflation included in the current estimate would be about \$47.8 million. (See appendix I.)

Status of funding

As of June 30, 1972, \$254.1 million has been appropriated, \$251.9 million obligated, and \$82.1 million expended on the Harrier system. In addition to the \$254.1 million appropriated funds, \$21.1 million was reprogrammed into the Harrier program for a total current program of \$275.2 million.

CONTRACT DATA

The Harrier system is being procured under a government-to-government agreement (Letter of Offer) between the Department of the Navy and the United Kingdom Ministry of Defense. This agreement serves in place of a definitive contract for the United States. The actual contract is between the United Kingdom and the manufacturers.

The Letter of Offer price for the fiscal year 1972 buy, dated July 23, 1971, was initially \$96.3 million. However, it was increased by \$2.9 million due to the revision of the exchange rate.

#### PERFORMANCE

During fiscal year 1972, all but three performance characteristics were tested. These were speed, ceiling/altitude, and maximum conventional take off weight. These characteristics are scheduled to be demonstrated in the first half of fiscal year 1973. The demonstrated performance characteristics for the Harrier program which were cited in the June 30, 1972, SAR are based on data obtained informally from an abbreviated test program completed in March 1972.

The performance characteristics for the Harrier program, as presented in the June 30, 1972 SAR showed significant variances for reliability (operational readiness), combat radius, and maintenance man-hours per flight hour from those shown in the June 30, 1971 SAR.

Estimated reliability for the Harrier aircraft decreased from 75 percent at June 30, 1971 to 71 percent at June 30, 1972. The demonstrated performance at June 30, 1972, however, was shown as 67 percent. The September 30, 1972 demonstrated reliability figure decreased to 50 percent.\*

The combat radius estimate increased by 50 nautical miles over the 230 nautical miles shown on the June 30, 1971, SAR. The Navy revised its early estimate based on actual performance.

\* The Navy attributes the low September 30 demonstrated reliability figure to the small number of aircraft involved in the sample.

The 12 maintenance man-hours per flight hour figure previously shown under the "Development Estimate" column of the SAR has been deleted. The reason given for the deletion was that a "maintainability standard had not yet been established due to acceptance of 'off the shelf' aircraft manufactured to British specifications which do not contain specific reliability or maintainability standards." The decision to drop the maintenance man-hour figure was arrived at by discussions between the project office and Naval Air Systems Command personnel and concurred in by the CNO. Although DOD Instruction 7000.3 states that once a development estimate baseline is established, it will not be changed unless specific permission is granted by the Assistant Secretary of Defense (Comptroller), approval was not obtained.

The demonstrated performance for maintenance man-hours per flight hour as of June 30, 1972, was reported at 21.3 hours. However, 12 hours is shown in the "Current Estimate" column of the SAR. In this regard, we were informed that the 21.3 was not considered the true demonstrated capability since it included nonrepetitive items such as training of new maintenance personnel. Therefore, according to project office officials, the current estimate did not warrant changing until more reliable data became available. \*

\* The September 30, 1972, SAR shows a demonstrated performance for maintenance man-hours per flight hour of 19.8. The decrease from 21.3 is attributed to additional experience gained by maintenance personnel.



### PROGRAM MILESTONES

The scheduled milestones for the Harrier aircraft have had only one slippage since the June 30, 1971, SAR. Deployment to the Western Pacific has been delayed 1 year to make the aircraft available for Interim Sea Control Ship trials. Two new milestones--Begin Sea Control Ship Trials and DOD Sortie Rate Test (to determine the number of possible sorties per day, for a ten day period, under simulated combat conditions) were added since the June 30, 1971 SAR. The DOD sortie rate tests were completed in March 1972.

### RELATIONSHIP TO OTHER SYSTEMS

The Harrier aircraft was deployed aboard the Interim Sea Control Ship, U.S.S. Guam, to develop ship and aircraft control procedures. Subsequently, the House Committee on Appropriations report, dated September 11, 1972, indicated that the Navy has no plans to procure Harriers for the Sea Control Ships because the aircraft are considered too large and range-limited for the Sea Control Ship mission. However, six Harrier aircraft will be assigned to the U.S.S. Guam for Mediterranean deployment early in 1973 for further testing. This testing involves the concept of operating vertical and short take-off and landing aircraft from a sea control type ship. We were informed by the Navy that continued support of the Interim Sea Control Ship by the Harrier is contingent upon provisions for adequate logistic support.

## SELECTED ACQUISITION REPORTING

In our opinion, the Harrier SAR has been prepared in accordance with applicable DOD instructions and fairly presents the total program acquisition costs other than the exceptions noted previously in this report. However, as reported in our prior review, the development estimate cost baseline of \$503.6 million does not reflect the program's estimated cost at the appropriate point in the system's life cycle.

In our opinion, the baseline estimate should be about \$385 million. The Navy continues to disagree with our analysis. Both the Navy's and our position on this matter are included in our study dated March 1972.

## AGENCY COMMENTS

A draft of this staff study was reviewed by the Navy officials associated with the management of this program and comments were coordinated at the Headquarters level. The Navy's comments are incorporated as appropriate. As far as we know there are no residual differences in fact.

## SCOPE

The primary basis for the information in this study was the June 30, 1972, SAR for the Harrier. We obtained additional information by reviewing plans, correspondence, and other reports and by interviewing Department of the Navy officials. We did not make detailed analyses or audits of the data supporting program documents.

ALLOWANCE FOR PRICE ESCALATION  
IN PROGRAM ACQUISITION COST ESTIMATES

	<u>Planning estimate</u>	<u>Development estimate</u>	<u>Cost change</u>		<u>Current estimate</u>
			<u>Quantity</u>	<u>Other (decrease)</u>	
Allowance for price es- calation (\$ millions)		\$49.9 <sup>a</sup>	--	(\$2.1) <sup>a</sup>	\$47.8 (note a)
Percent of program acquisi- tion cost		11		(1)	10

<sup>a</sup>Amounts of inflationary allowances are included in the development and current estimates and are a part of the total cost change between the development and the current estimates. The percentage figures were provided by the project office.