GAO

Briefing Report to the Chairman,
Committee on Armed Services,
House of Representatives

April 1986

SUPPORT AIRCRAFT

Analysis of Air Force Decision to Replace CT-39 Aircraft

GAO/NSIAD-86-92BR

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

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-209682

April 1, 1986

The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

On November 6, 1985, you sent us a file containing background information on the CT-39 aircraft and asked us to review the Air Force's 1983 decision to retire the CT-39 aircraft fleet and replace it with a mix of C-12F and C-21A leased aircraft. This report provides the results of our review.

The CT-39 aircraft was to meet the Air Force's operational support airlift aircraft requirements during peacetime and wartime. The CT-39, acquired in the late 1950s and early 1960s, is a turbojet aircraft, capable of transporting up to seven passengers. In 1983 the Air Force decided to retire most of its CT-39 aircraft and to replace them with 120 leased aircraft--80 Gates Learjet 35A Turbofan (C-21As) and 40 Beech Aircraft Super King Air B200C Turboprop (C-12Fs). The C-21A is a business jet capable of transporting up to six passengers. The C-12F is a twin engine, light utility aircraft capable of transporting up to eight passengers.

We have previously addressed the subject of replacing CT-39 aircraft. In our November 1982 report,[1] we responded to several congressional concerns about the validity of the Air Force's estimated cost savings associated with leasing replacement aircraft for the CT-39. We pointed out that the Air Force, in its estimates, had not considered the option of purchasing such aircraft. In subsequent revisions of its economic analysis of options to replace the CT-39, the Air Force included lease-versus-buy comparisons. These revised analyses showed that it was less costly to lease rather than buy replacement aircraft.

To respond to your request, we reviewed the revised Air Force analyses prepared in April and September 1983, interviewed Air Force officials, reviewed supporting documentation, and

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[1]The Air Force Has Not Compared Costs of Alternative Ways to Replace CT-39 Aircraft (GAO/PLRD-83-18, Nov. 22, 1982).

examined applicable regulations and guidelines. We focused on determining whether the latest Air Force economic analysis of options to replace the CT-39 was realistic, accurate, and complete. We also obtained information on (1) the fuel consumption rates of the CT-39 and the leased aircraft, (2) the performance features on the leased aircraft that do not exist on the CT-39 aircraft, (3) the flight hours accumulated on the CT-39 fleet, and (4) the estimated cost to remove the CT-39 aircraft from storage.

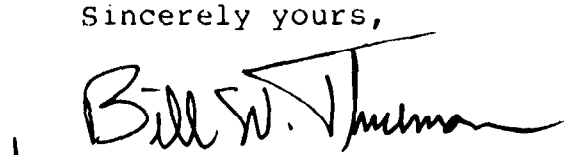
In brief, we found that the Air Force's economic analysis was generally accurate and complete and its assumptions were generally realistic, although we did not agree with certain aspects of the methodology used by the Air Force. However, using our methodology would not have changed the overall results of the analysis. The analysis demonstrated that, even without any modifications to extend the CT-39s' service life, leasing new aircraft was more economical than continuing to operate the CT-39 fleet. Although we did not determine the full cost to further extend the service life of the CT-39 fleet, the cost to do so would have provided additional economic justification for the Air Force's decision to retire the CT-39. Further details are provided in the appendix.

We performed our work at Air Force Headquarters in Washington, D.C., between December 1985 and February 1986 in accordance with generally accepted government auditing standards.

As requested, we did not obtain official agency comments. We did discuss the results of our review with knowledgeable Air Force officials and their views have been included in this report where appropriate.

We are sending copies of this report to the Secretary of the Air Force; the Director, Office of Management and Budget; and other interested parties.

Sincerely yours,



for Frank C. Conahan
Director

ANALYSIS OF AIR FORCE DECISION TO REPLACE CT-39 AIRCRAFT

ECONOMIC ANALYSIS OF OPTIONS TO REPLACE THE CT-39 AIRCRAFT

In September 1983 the Air Force prepared its latest economic analysis of the cost of continued operation and in-house maintenance of 120 CT-39 and T-39 aircraft (hereafter referred to as CT-39) for its operational support airlift aircraft requirement, compared to the cost to lease an equal number of new aircraft and to purchase logistics support. The analysis, based on the total cost to the government, demonstrated that leasing new aircraft was less costly than continuing operations of the CT-39. Over a 22-year period, the discounted cost[1] to operate and support the leased aircraft would amount to $685.47 million, 24 percent less than the discounted cost to operate and support the CT-39 fleet ($903.83 million). The Air Force assumed that the CT-39 fleet could operate for another 20 years without modifications to extend its service life. As discussed below, that assumption caused the CT-39 costs and the estimated cost savings by leasing new aircraft to be understated by an undetermined amount which increases the advantage of the leasing alternative.

The September 1983 analysis also compared the costs of leasing versus buying new aircraft to replace the CT-39s. In this comparison, the Air Force assumed that it would purchase the necessary logistics support for both the leased and purchased aircraft. The Air Force also analyzed the impact of different purchase prices for the aircraft. Depending on the purchase price assumed, leasing was from 12.4 to 19.6 percent less costly, on a 20-year discounted basis, than buying.

Our review of the Air Force's economic analysis found that generally it was realistic, accurate, and complete. However, we

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[1]The Air Force used an annual discount rate of 10 percent applied to estimated future years' expenditures that excluded estimates of inflation, as required by guidelines of the Office of Management and Budget (OMB). We have long maintained that a more appropriate approach is to apply a discount rate based on the average yield of outstanding marketable Treasury obligations that have remaining maturities similar to the period involved in the particular analysis to the estimated expenditures in future years that include estimated inflation. OMB is in the process of revising its procedures to call for a method of discounting similar to ours. However, application of our method in this particular instance would still show that leasing is the best alternative.

disagree with the Air Force's method of calculating the federal tax decrease and, therefore, the cost to the government under the leasing options. To estimate the tax revenue to the government, the Air Force calculated depreciation by using the difference between accelerated depreciation and straight line depreciation. We believe it would have been more realistic to assume that the lessor would use accelerated depreciation alone. Air Force officials agreed with us in principle, but in practice said they did not want to get into second-guessing what all tax implications can be on a particular study. The use of the Air Force's method instead of using the accelerated depreciation estimate alone reduced the estimated cost of leasing new aircraft by about 8 percent over a 22-year period. Assuming a discount rate of 10 percent, this reduced the discounted total leasing cost by $55.12 million. However, this reduction did not affect the analysis results which supported the decision to replace the CT-39 with leased C-12F and C-21A aircraft, nor did it affect the results of the buy versus leasing analysis.

A significant difference in fuel consumption was a key factor leading to the Air Force's decision. The CT-39 consumes about twice as much fuel as the C-21A and about four times as much fuel as the C-12F. Table I.1 provides the fuel consumption rates estimated in the 1983 economic analysis and the most recent fuel consumption rates for all three aircraft based on operational data.

Table I.1: Aircraft Fuel Consumption Rates

	Gallons of fuel per flight hour		
Date	C-12F	C-21A	CT-39
1983	85[a]	165[a]	308
1986	68	136	308

[a]Data provided verbally by Air Force officials.

We found that the Air Force used a fuel cost of $1.17 per gallon in its analysis rather than the $2.20 per gallon fuel cost noted in the background information provided to us. The effect of using the higher fuel cost would be to further increase the relative operational cost advantage of the C-12F/C-21A aircraft.

PERFORMANCE FEATURES ON THE C-12F AND C-21A THAT DO NOT EXIST ON THE CT-39

In addition to the cost difference identified by the Air Force in its economic analysis, there are significant

differences in operational capabilities. An Air Force official told us that none of the aircraft in the CT-39 fleet have any of the following features common on both the C-12F and C-21A.

--Thrust/prop reversers.

--Cockpit voice recorder.

--Wing anti-icing.

--Flight data recorder.

--Automatic pilots.

--Dual flight directors.

--Dual very high frequency navigation radios.

--Altitude alerter system.

--Auxiliary navigation unit.

--Battery temperature indicator.

--Weather avoidance radar.

--Strobe lights.

The Air Force required these and other features in its replacement aircraft, but the cost to upgrade the CT-39 with these features was not included in the September 1983 economic analysis.

STATUS OF CT-39 AIRCRAFT, INCLUDING SERVICE HOURS, ACTIONS NEEDED TO EXTEND SERVICE LIFE, AND COST TO REMOVE FROM STORAGE

The Air Force acquired the original fleet of CT-39 aircraft from 1959 to 1962. Table I.2 shows the status of the CT-39 and T-39 fleet as of December 31, 1985. An Air Force official told us that the difference between the two aircraft is that the CT-39 aircraft are used to carry passengers and cargo; whereas, the T-39 aircraft are used for special missions, such as training, testing, and flight facility inspection.

Table I.2: Status of CT-39 and T-39 Fleet as of December 31, 1985

Category	Number of aircraft
Retired to the Aircraft Maintenance and Regeneration Center[a]	95
Transferred to residual force[b]	14
Donated to museums or on display	21[c]
Other[d]	6[c]
Total	136

[a]These are all CT-39 aircraft. The remaining categories include some T-39 aircraft.

[b]An Air Force official told us that the residual force includes 4 CT-39s operated by the Air National Guard and 10 T-39s used for testing, flight facility inspection, or training.

[c]Data provided verbally by Air Force officials.

[d]An Air Force official told us that the other category includes aircraft that are not flyable because of accidents, etc. For example, one aircraft in this category is used to train maintenance personnel.

Originally, the CT-39 aircraft was expected to have a service life of about 11,250 flight hours but was extended to 22,500 flight hours through a major modification program during the period from 1971 through 1973. As of December 31, 1985, the average flight hours for the 95 retired CT-39 aircraft was 19,462 hours per aircraft. The average flight hours for the 14 active aircraft (residual force) was 12,987 hours per aircraft. Table I.3 provides the range of flight hours for the active and retired fleet of CT-39s. Information was not available on the accumulated flight hours of the 27 aircraft shown in the last two categories in table I.2.

Table I.3: Accumulated Flight Hours as of December 31, 1985

Number of flight hours	Number of CT-39s and T-39s Active	Retired
Over 22,000	0	7
20,001 to 22,000	3	41
18,000 to 20,000	1	29
Less than 18,000	10	18
Total	14	95

A statement in the background information provided to us referred to a cost of $90,000 per aircraft to extend the maximum service life of most of the fleet of CT-39s from 22,500 to 45,000 flight hours. To extend the CT-39s service beyond 22,500 flight hours, the Air Force believes that it would be necessary to implement (1) an extensive inspection and repair program, (2) a corrosion treatment program on a 5-year recurring basis, and (3) a series of safety and structural modifications.

Based on information furnished by the Air Force, the $90,000 cost to extend the service life is significantly understated. The Air Force advised us that the cost of the corrosion treatment program alone is $600,000 for each aircraft and must be repeated on a recurring 5-year cycle. The Air Force based its $600,000 estimated cost on its actual cost to corrosion treat one of the residual force aircraft in mid-1985. The Air Force established the requirement for corrosion treatment at 5-year intervals through analysis of aircraft that underwent analytical condition inspections and field failure data, among other things.

In addition to the costs to inspect, repair, and modify the CT-39s, the Air Force estimated that the cost to remove a CT-39 from storage is about $23,000. Among other things, all of the aircraft's fluid systems (oil, fuel, hydraulic, oxygen, etc.) and landing gear would have to be serviced. The costs to obtain and reinstall items removed from the aircraft when the aircraft were retired are not included in the $23,000 estimate. An Air Force official told us that examples of items which had been removed include receiver transmitters, altimeters, generators, and bearing indicators.

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