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REPORT ON REVIEW
OF
CONTRACTS
FOR
T-36A TRAINER AIRCRAFT

UNITED STATES GENERAL ACCOUNTING OFFICE
DIVISION OF AUDITS

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REPORT ON REVIEW OF CONTRACTS FOR T-36A TRAINER AIRCRAFT

This material contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, sections 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

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UNITED STATES GENERAL ACCOUNTING OFFICE
DIVISION OF AUDITS

GAO Wash., D.C.

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON 25, D.C.

SECRET

DIVISION OF AUDITS
B-118676

[redacted]

Honorable Dudley C. Sharp
Assistant Secretary
Department of the Air Force

Dear Mr. Sharp:

Enclosed for your consideration are two copies of the draft of a report on our review of contracts with Beech Aircraft Corporation and Canadian Commercial Corporation (Canadair Limited) for the development and production of the T-36A twin engine trainer aircraft, involving an expenditure of more than 77 million dollars, excluding the cost of engines and other accessories separately procured.

These contracts were terminated before completion of any airplanes. We believe that much of this waste of funds could have been avoided if procurement for production of the aircraft had been withheld pending development of proper specifications for the plane desired, particularly in view of the controversy within the Air Force over the basic design of the plane.

Furthermore, we believe that the use of a fixed price incentive type contract for procurement of 60 aircraft from Beech was inappropriate inasmuch as a reasonably close target price could not be negotiated at the inception of the contract. The contract provided for negotiation of a firm target price after acceptance of the twentieth airplane; inasmuch as no airplanes were completed, the contract contained no price ceiling and, in fact, it is reported that the termination cost will exceed by more than 7 million dollars the estimated cost of tooling and production of the 60 aircraft ordered under the contract.

The draft is forwarded for your comment or suggestions on the material presented before the report is put in final form and released by the General Accounting Office.

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The draft has been given a security classification according to the highest classification on documents from which the facts were obtained. Please advise whether the classification can be removed at this time.

We will appreciate receiving your written comments on our findings by November 15, 1955, and will be happy to discuss them with you if you so desire.

Sincerely yours,

Irwin S. Decker
Associate Director of Audits

Enclosures

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Contents

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REPORT ON REVIEW OF CONTRACTS FOR T-36A TRAINER AIRCRAFT

The Division of Audits, General Accounting Office, has reviewed contracts awarded by the United States Air Force (USAF), to the Beech Aircraft Corporation, Wichita, Kansas, and Canadian Commercial Corporation (Canadair Limited), Montreal, Canada, for the development and production of the T-36A twin engine trainer aircraft.

SUMMARY OF FINDINGS

Our review disclosed that this procurement will result in an estimated cost of more than 77 million dollars, excluding the cost of engines and other accessories separately procured, without receiving any aircraft.

During the period of the contracts, the cost of development of the aircraft steadily increased and eventually reached approximately 100 percent over that originally estimated. Some of the factors which led to the increased cost were:

1. Controversy within USAF over the basic design of the airframe for a period of approximately 16 months, which resulted in many engineering changes and contributed to the delay in development of the final engineering data by Beech Aircraft Corporation.

2. Tight delivery schedules which forced Beech Aircraft Corporation to subcontract the major portion of the work. In this

connection, USAF reported that the program was retarded due to the inability of Beech to furnish basic engineering data to the subcontractors and that control over the subcontract program was inadequate.

3. Delay by USAF of almost two years after the initial contract had been awarded in making the determination that the design would not meet the requirements for the twin engine trainer aircraft desired.

The T-36A airplane as originally envisioned was to be an advanced twin engine trainer powered by reciprocating engines, to be adaptable to alternate turboprop engine installation when the turboprops became available.

On June 30, 1951, the Director of Procurement and Industrial Planning, AMC, proposed that the requirement for alternate turboprop engine installation be deleted due to the technical problems involved and the necessary limitations on the performance of the plane. The Director of Training, DSC/P, on August 23, 1951, determined that alternate turboprop installation was required to permit full exploitation of the aircraft, and recommended that if this could not be done, all procurement action be suspended until appropriate model specifications could be developed.

Nevertheless, letter contracts previously awarded for production of 100 aircraft were converted to definitive contracts and additional contracts for 322 aircraft were executed.

The controversy over the basic design of the aircraft continued and on October 22, 1952, Headquarters, USAF, announced the

desired characteristics of the turbojet version of the T-36 airplane, advising that Air Research and Development Command would be responsible for determining the extent of required modification of the previous T-36A, and that Air Materiel Command would be responsible for determining the most economical method of phasing this model improvement into production.

Despite this major change in specifications, contract operations continued with costs increasing steadily because of the considerable number of changes and the contractor's inability to cope with these changes.

On April 10, 1953, Headquarters, USAF, determined that the T-36A would not meet the requirements for the multiengine trainer. On June 9, 1953, Headquarters, USAF, directed that 420 T-36A aircraft be cancelled and that 2 T-36A aircraft be completed as prototypes. Subsequently, it was decided to abandon the two prototypes and complete termination notice was issued July 30, 1953.

The termination costs under these contracts are estimated to exceed 77 million dollars. We believe that much of this waste of funds could have been avoided if procurement action on a production basis had been withheld until proper specifications had been developed for the aircraft desired, as suggested by the Director of Training, DSC/P, on August 23, 1951, almost four months prior to execution of the first definitive contract. Also, in view of the lack of a suitable basic design there appears to have been no valid reason for the award of additional contracts in May and June 1952, at which time considerable controversy existed over the

basic design. Furthermore, there was no apparent basis for the award of a similar contract in January 1953 when there was considerable doubt that the original design would meet the requirements.

We recognize that the emergency conditions in 1951 undoubtedly influenced the decision to procure these aircraft. However, it would appear that the number and type of the aircraft desired would have necessitated more careful planning especially since the type was to be an advanced "handbook" model to be used for several years in the future. We believe that the uncertainty of the design and the desire for an advanced model should have limited the production to several flight models before other contracts were let, which would have prevented any needless expenditure of funds prior to establishment of the basic design requirements.

A further lack of protection of the Government's interests arose through the use of a fixed price incentive type contract with Beech Aircraft Corporation despite the fact that the design requirements were not sufficiently established to permit a close estimate in fixing the unit target cost. The contract provided for negotiation of a firm target price after acceptance of the twentieth airplane. Inasmuch as no airplanes were completed, the contract contained no price ceiling and, in fact, it is reported that the termination cost will exceed by more than 7 million dollars the estimated cost of tooling and production of the 60 aircraft ordered under the contract.

HISTORY OF PROCUREMENT

The following is a summary of the actions taken on this procurement.

Authority for procurement

On September 1, 1950, Headquarters, USAF, advised the Air Materiel Command (AMC), Dayton, Ohio, of the need for a twin engine trainer aircraft that would satisfy the requirements of the USAF and the United States Navy, stating that the Air Training Command had been requested to make an evaluation of all available primary basic type training aircraft to select the most suitable for tooling and production during the fiscal year 1951.

A board of officers was established to make a study of training aircraft and to make recommendations on the procurement of such aircraft. At the tenth meeting of this board on December 20, 1950, it was decided that sufficient B-25's were available to meet training requirements for the immediate future but that additional twin engine training aircraft would be required in the event of mobilization. The board concluded that facility tooling for production of a twin engine trainer aircraft should be provided immediately.

A procurement directive was issued to AMC on December 28, 1950, granting authority to establish a source for the production of a twin engine trainer and to procure 100 of such aircraft meeting certain specified characteristics.

Selection of contractors

Invitations to bid were sent to selected companies on January 5, 1951. Proposals from seven companies were received by

February 1951. Beech Aircraft Corporation and Canadair Limited submitted the most suitable proposals. AMC considered the proposal submitted by Canadair as the best suited to meet all specified military characteristics and selected this firm as the best source because of the decided decrease in cost as compared to the next lowest proposal, and the facilities available at Canadair. However, USAF Headquarters decided to select Beech Aircraft Corporation in order to have an American manufacturer as the prime supplier, and to offer Canadair Limited a contract as a second source of supply of this plane.

Award of contracts

Letter contracts were awarded to Beech Aircraft Corporation on June 26, 1951, and to Canadian Commercial Corporation for Canadair Limited on July 10, 1951. Another letter contract was awarded to Beech Aircraft on August 24, 1951. These contracts were superseded by the following definitive contracts:

Beech Aircraft Corporation

AF 33(038)-30031 dated December 14, 1951, for 60 aircraft.
AF 33(600)-5894 dated May 14, 1952, for 78 aircraft.
AF 33(600)-22807 dated January 29, 1953, for 57 aircraft.

Canadian Commercial Corporation for Canadair Limited

AF 33(600)-5021 dated June 6, 1952, for 40 aircraft.
AF 33(600)-5893 dated June 12, 1952, for 187 aircraft.

Under Contract AF 33(038)-30031, Beech Aircraft Corporation was to furnish 60 aircraft with spare parts, special tools and ground handling equipment, technical data, and tooling to accomplish a production rate of 15 airplanes per month and to be of the design and quality to accommodate a production of 35 airplanes per

month for a minimum period of two years. This contract also provided that Beech Aircraft Corporation was to furnish technical assistance to Canadair Limited.

All of the contracts with Beech Aircraft Corporation were fixed price incentive type contracts which provided for negotiation of prices after acceptance of the twentieth airplane completed under Contract AF 33(038)-30031, or at such earlier time as the contracting officer may direct in the event of termination.

The contracts with Canadian Commercial Corporation were cost reimbursable type contracts.

Controversy over basic design

Beginning on June 30, 1951, and continuing through most of the calendar year 1952, there was considerable controversy over the basic design requirements between various offices of USAF that were directly concerned with the design, procurement, and utilization of the aircraft. The greater part of this controversy concerned the adaptability of the design to accommodate either turboprop engines or reciprocating engines, and changes that would enable the aircraft to fulfill a secondary mission as a utility aircraft for transporting personnel and light cargo.

Clarification was requested on certain portions of the basic design by memorandum dated June 30, 1951, from the Director, Procurement and Industrial Planning, AMC, to the Director, Procurement and Production Engineering, Headquarters, USAF. In this memorandum it was proposed to delete mention of the turboprop installation because in considering space, structural, and aerodynamic aspects of a turboprop installation it was necessary to

design around a specific engine, and a turboprop engine of appropriate power was not available. It was also pointed out that to build in provisions for an alternate power plant would involve a reduction in range, a structural penalty, possible performance reduction, structural complications and delays in the design program.

The Director of Training commented on the foregoing recommendation in memorandum dated August 23, 1951, to the Director of Research and Development, Headquarters, USAF, and stated that the provision for alternate turboprop installation remained unchanged in order to permit full exploitation of the aircraft. It was also stated that in the event the end article under existing model specifications had little growth potential, it was recommended that all procurement action be suspended until model specifications could be developed which would insure ultimate satisfaction of the basic characteristics required for the aircraft.

Memorandum dated October 5, 1951, from Directorate of Requirements, Headquarters, USAF, to the Director, Procurement and Production, AMC, stated that the T-36A as originally envisioned was to be an advanced twin engine trainer of a type that could be used in the Air Force for a considerable number of years in the future. This memorandum stated that a turboprop engine would be available during the 1955-1960 era and recommended that the T-36A be designed for conversion to turboprops at a later date and that the contractor be advised of this at the earliest possible date to eliminate as much delay in design as possible.

The Mock-up Inspection Board recommended redesign of the T-36A to permit installation of T-38 3750 h.p. turboprop engines,

[redacted]

and also provisions for the installation of R-2800-52W engines, in memorandum dated November 29, 1951. The reason given for this recommendation was that redesign at this time would eliminate costly redesign and retrofit at a later date when turboprop engines would become available, and would provide for production of an aircraft having the desired growth potential through a long period. This memorandum stated that the aircraft was envisioned to be used for many years and should therefore be designed for the ultimate power requirement throughout its lifetime.

In December 1951 an investigation was made into the contemplated installation of the T-38 turboprop engine, the results of which were reported by the Chief, Aircraft Section, Weapons Systems Division, in memorandum dated December 29, 1951. The investigation disclosed that the installation of the T-38 turboprop engine in the present T-36A aircraft only provided an overpowered aircraft for take-off and climb and high altitude capabilities. The memorandum stated that the T-36A airplane with the present power plant was not compatible with the high increase in power of the turboprop engines, and recommended that when T-38 turboprop engines were available for production aircraft, that a new aircraft be designed to take full advantage of turboprop engines instead of penalizing the present aircraft.

The Director, Procurement and Production, stated in a memorandum dated January 2, 1952, to the Director, Procurement and Production Engineering, Headquarters, USAF, that the Mock-up Inspection Board acted upon 144 requests for alteration or study, four of which required specific direction by Headquarters, USAF.

[redacted]

This memorandum pointed out that redesign of the aircraft to accommodate both turboprop and reciprocating engines would involve a total of six months delay in initial deliveries if the change were incorporated; that the change would considerably increase the gross weight of the plane, and that production deliveries of the T-36A equipped with T-38 engines could not be supported until late in 1955. It further pointed out that "to attempt to design a single configuration airplane which can use a 50 percent power increase results in severe compromises in over-all suitability in one or both power plant configurations." Also, it stated that "Since the T-36 is now being designed to the fullest extent feasible for convertibility of power plants it will become a logical and practical change to program a model improved T-36 airplane which is capable of effectively utilizing the power available by T-38 engines." Recommendation was made accordingly.

By memorandum dated February 26, 1952, the Director, Procurement and Production, AMC, advised Headquarters, USAF, that a plan for model improvement of the T-36A to incorporate T-38 turboprop engines would be forwarded by July 1952.

Despite the fact that specifications had not been developed to meet the basic characteristics of the desired aircraft, 365 aircraft were ordered by June 1952. Also, as indicated herein, procurement action continued under the original design contrary to recommendations made by the Director of Training on August 23, 1951.

Further delay in deciding on the design arose through the proposal of a jet version of the T-36A by Beech Aircraft Corporation.

In memorandum dated June 18, 1952, Headquarters, USAF, requested the Air Research and Development Command to make a study of the Beech proposal to determine the ability of the aircraft to fulfill the requirement of a high speed, high altitude, bombing and navigational training aircraft.

Headquarters, USAF, furnished the desired characteristics for the turbojet version of the T-36A airplane in memorandum to AMC dated October 22, 1952, and advised that Air Research and Development Command would have the responsibility to determine to what extent modification of the present T-36A was necessary to comply with the characteristics desired. This memorandum also stated that AMC would have the responsibility to determine the most economical method of phasing the model improvement into production, and to furnish Headquarters, USAF, with an estimated cost and production plan.

Although this change to a jet version would appear to have necessitated a major change in the specifications that would require development under the original design to be stopped, work continued with the costs increasing daily because of the considerable number of changes and the inability of the contractor to cope with these changes.

Production program

The contract file reveals that Beech Aircraft Corporation was restricted to a personnel ceiling in order to avoid creating undue competition for laborers among the aircraft manufacturers located within its labor area. This restriction and tight delivery

schedules forced Beech [redacted] Corporation to subcontract a major portion of the work which eventually totaled approximately 60 percent of the airframe.

A portion of the work under subcontract was placed with Canadair Limited who was capable of furnishing engineering assistance and producing portions of the airframe. However, some of the other subcontractors had no experience in aircraft production which created a problem in coordinating several thousand engineering changes and contributed to delays in production and increased costs.

The production program at Beech Aircraft was surveyed by AMC and reported to Headquarters, USAF, by memorandum dated February 2, 1953. The report disclosed that the program was retarded due to Beech's inability to furnish basic engineering data to organizations directly involved in the program; that Beech was procuring the engineering phase as well as the production phase from subcontractors, and that management control over the subcontract program was inadequate.

The files reveal that technical assistance tooling which was to have been provided to Canadair by Beech Aircraft Corporation was actually furnished to Canadair by four other subcontractors to Beech.

Decision that T-36A would not meet requirements

In a memorandum dated April 10, 1953, Headquarters, USAF, advised AMC as follows:

[redacted]

[redacted]

"1. The Air Force has a requirement for a multi-engine pilot and navigation bombardier trainer with the capabilities of the T-36X as soon as possible. The present T-36A will not meet the requirements for the multi-engine trainer.

"2. It is requested AMC and ARDC jointly make recommendations to this headquarters concerning the procurement of an airplane that will perform the mission considering time, cost and facilities.

"3. The desired performance is attached as inclosure No. 1."

Decision to not justify the need for the T-36A

The Deputy Chief, Production Engineering Division, Headquarters, USAF, stated in a memorandum for the record dated June 8, 1953, that in revising the Air Force program from 143 wings to 120 wings, the T-36A could not be justified when compared to other aircraft to meet more urgent requirements. In this memorandum it was stated that the Director of Training would not attempt to justify the T-36A because it was only a slight improvement over the B-TB-25 aircraft already available. The following factors were pointed out in the memorandum: (1) the craft would be inefficient from a training viewpoint due to gross weight of 27,000 pounds to carry three student pilots and an instructor pilot, (2) the cost increased substantially over that originally contemplated, (3) the design has a limited cargo carrying capacity, and (4) turboprops or more powerful reciprocating engines could not be used. The memorandum also stated that the Director of Training planned to drop the T-36A requirement and substitute B-25, TB-25, and TC-47 aircraft, and that T-36A termination action must be initiated in view of the decision to not justify the need for T-36A aircraft.

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Cancellation of program

On June 9, 1953, Headquarters, United States Air Force, directed that immediate action be taken to cancel 420 T-36A aircraft under contract and that two T-36A aircraft would remain on procurement with Beech Aircraft Corporation and be completed as prototypes. The contractors were notified accordingly on June 9, 1953. It was later decided to abandon the two prototypes and complete termination notice was sent to Beech Aircraft Corporation by telegram dated July 30, 1953.

Termination costs

Although only two aircraft were almost completed at the time the contracts were terminated, Beech Aircraft Corporation submitted a claim for more than 51 million dollars representing costs incurred under Contract AF33(038)-30031 which did not include all amounts due under the subcontracts.

Termination settlements agreed to by Beech Aircraft Corporation total approximately 46.6 million dollars. In addition 6.8 million dollars has been held in reserve to settle claims of subcontractors excluded in the settlement with Beech. This will result in an expenditure of over 7 million dollars more than the original estimated cost of tooling and production of 60 aircraft which were to have been furnished under the contract.

No agreement had been reached as of October 12, 1955, on settlement costs for work performed by Canadair Limited under contracts awarded to Canadian Commercial Corporation. Recent estimates of this settlement exceeded 23 million dollars. No information was available with respect to the extent of work performed by Canadair under these contracts.

The following table reflects the total amount of the contracts and the estimated costs at termination:

[redacted]

	Amount of contract as amended	Estimated total cost at termination	
Beech Aircraft Corporation			
AF33(038)-30031	$ 46,317,406.12	$53,368,423.59	(a)
AF33(600)-5894	28,925,193.32	208,932.33	
AF33(600)-22807	19,773,170.22	no cost	
Subtotal	95,015,769.66	53,577,355.92	
Canadian Commercial Corporation for Canadair Limited			
AF33(600)-5021	32,851,482.14	23,567,000.00	(b)
AF33(600)-5893	71,779,565.47	no cost	(c)
Subtotal	104,631,047.61	23,567,000.00	
Total	$199,646,817.27	$77,144,355.92	

(a) Includes a reserve of 6.8 million dollars to settle excluded claims of subcontractors.

(b) Estimated amount of contractor's claim as of August 31, 1955.

(c) Any settlement cost due under this contract will be included in settlement under contract AF33(600)-5021.

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Use of incentive type contract

As previously indicated herein, the contracts with Beech Aircraft Corporation were fixed price incentive type with provisions for redetermination of price after acceptance of the twentieth aircraft completed under contract 33(038)-30031, or at such earlier time as the contracting officer may direct in the event of termination.

The Armed Services Procurement Regulation (ASPR) in effect at the time the contracts were executed provided that such contracts contain provisions for a tentative base price or target price and a maximum price, with price redetermination after completion of the contract, for the purpose of establishing a final price based on contractor's actual costs plus a sliding scale of profit or fee. The regulation at that time provided and still provides that in no event shall the final price or fee exceed the maximum price stated in the contract. The regulation restricted the use of this type of contract to instances where a reasonably close contract price can be negotiated.

The interests of the Government were not protected in using this type of contract because the basic design requirements had not been sufficiently established to permit a close estimate in fixing the unit target cost. Furthermore, no protection was afforded in the provisions for redetermination of price because a maximum price was not specified in the contracts.

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