

MINISTERE DES TRANSPORTS

SERVICE AERIEN

AVION-AMBULANCE

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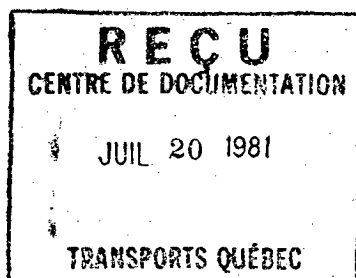
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MINISTÈRE DES TRANSPORTS
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MINISTÈRE DES TRANSPORTS

SERVICE AÉRIEN

AVION-AMBULANCE



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Ste-Foy, le 19 juin 1978

Monsieur Hugues Morrisette
Sous-Ministre
Ministère des Transports
700 est, boul. St-Cyrille
Québec

Objet: Avion-ambulance

Cher Monsieur,

Il me fait plaisir de vous transmettre, ci-joint, un mémoire concernant l'acquisition d'un avion-ambulance et la modification des moteurs de notre avion exécutif HS-125.

Nous avons la possibilité actuellement de faire installer des moteurs "turbo-fan" en remplacement des moteurs "réactés" actuels de notre avion.

Un deuxième avion du même type avec la même modification des moteurs constituerait le meilleur compromis financier pour doter le Service Aérien d'un avion ambulance.

Deux objectifs seraient atteints, le transport des malades serait effectué avec un équipement adéquat et notre service passagers pourrait s'effectuer en respectant la planification des vols.

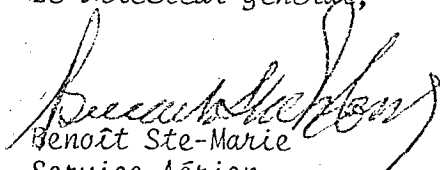
Quant au financement de cette opération, il pourrait s'effectuer en maintenant les déboursés actuels du gouvernement pour le Service Aérien au même niveau pendant deux ans à compter de l'année financière débutant le 1er avril 1979.

Je sou mets bien respectueusement ce mémoire à votre attention pour décision.

Veuillez agréer, Monsieur le Sous-Ministre, l'expression de mes meilleurs sentiments.

Votre bien dévoué,

Le Directeur général,


Benoît Ste-Marie
Service Aérien
/LDM

MINISTERE DES TRANSPORTS

SERVICE AERIEN

Le contenu

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-

MISSION DU SERVICE AERIEN

MINISTÈRE DES TRANSPORTS

SERVICE AÉRIEN

1- Mission du Service Aérien - Transport des personnes

a) Vols exécutifs

Le transport des membres du Conseil exécutif, des invités officiels du Gouvernement et des groupes de fonctionnaires fut la première mission du Service Aérien dans le domaine du transport des personnes au moment de sa formation en 1960.

En 1977, ce groupe d'avions exécutifs a effectué un total de 3725 heures de vol et transporté 10,465 passagers.

La difficulté majeure inhérente aux vols exécutifs réside dans la planification des vols. C'est un service de taxi aérien qui fait, qu'à certains moments, nos appareils sont inactifs et qu'à d'autres moments nous aurions besoins de deux fois plus d'appareils pour satisfaire toutes les demandes.

Nous réussissons tout de même à planifier nos vols quelques jours à l'avance.

L'utilisation d'un avion exécutif, dans l'ensemble de l'Amérique du Nord et les manufacturiers utilisent ce chiffre dans leurs études, se situe à 600 heures de vol par année. Or, le Service Aérien réussit une utilisation jusqu'à 1200 heures de vol par année par appareil.

b) Le transport des malades

Cette mission s'est greffée à notre opération d'une façon structurée en 1972. Notre rapport annuel 1977 nous indique les chiffres suivants:

b) Le transport des malades (suite)

1972	40 malades transportés
1973	125 " "
1974	225 " "
1975	502 " "
1976	517 " "
1977	540 " "

32% des heures totales

En 1977, ce transport a nécessité 482 envolées pour un total de 1,218:50 heures de vol soit 32.7% du total des heures de vol de nos avions exécutifs. Le transport des malades équivaut à l'usage d'un avion à plein temps.

Cette mission humanitaire provoque deux problèmes majeurs que ce mémoire propose de régler:

1) Mission prioritaire

La directive du Conseil du Trésor traitant de l'usage des avions accorde la priorité aux urgences maladie. Tout le monde est d'accord.

Cependant, étant donné que sur un appel d'urgence, notre avion prend son envolée dans un délai maximum de une heure, que ce soit le jour, la nuit ou en fin de semaine, notre planification des vols exécutifs se voit chambardée. La priorité joue en sens inverse de la planification.

Or, même si nous admettons la nécessité de cette priorité parce qu'une vie humaine peut être en danger, nous devons aussi admettre l'importance des rendez-vous planifiés des membres du Conseil des ministres et des groupes de fonctionnaires.

ou a transférer
ce service à
quelqu'un
d'autre

La seule solution, justifiée par l'utilisation, consiste à affecter un avion aux urgences. Il nous est impossible, l'expérience a déjà été faite, d'affecter un de nos avions actuels à cette mission. Il nous faudrait y affecter l'avion réacté HS-125, le seul que nous avons lequel est indispensable pour nos vols longue distance de l'exécutif.

SERVICE AERIEN2) Avion ambulance

Dans notre opération actuelle, le premier avion choisi lorsque disponible, pour une urgence-maladie est le réacté HS-125 à cause de sa vitesse. Un vol aller-retour Québec-Fort Chimo

prendra 4 heures avec le HS-125 et 7 heures avec un avion F-27.

Deux objectifs sont atteints, le malade est à l'hôpital plus rapidement et l'avion est disponible pour d'autres vols plus tôt.

Cependant, le fait de remplir cette mission avec nos appareils actuels rend impossible l'aménagement d'un intérieur "ambulance".

Tous savent que le règlement du Ministère des Affaires Sociales concernant les ambulances fait de ces véhicules-automobiles de véritables laboratoires ambulants pour le soin des malades en cours de route.

Or, les malades que nous transportons des localités les plus éloignées des grands centres peuvent être jusqu'à 4 heures à bord de l'avion et 10 minutes dans une ambulance entre l'aéroport et l'hôpital, et nous n'avons aucun équipement médical permettant au médecin de traiter son patient au cours de l'envolée.

Les chiffres précités justifient un avion et cet avion devrait avoir un aménagement intérieur et les équipements médicaux nécessaires aux soins des malades.

SERVICE AÉRIENc) Projet de vols à horaires fixes - Québec-Montréal

L'année dernière, à la demande de l'Honorable Lucien Lessard un comité a procédé à la rédaction d'un mémoire et d'un projet de loi accordant de nouveaux statuts au Service Aérien. A cette occasion, une étude avait été faite sur le mouvement des fonctionnaires entre Québec et Montréal. Il avait été déterminé qu'un potentiel très substantiel existait pour l'organisation de vols planifiés à horaires fixes entre Québec et Montréal.

Une telle initiative permettrait au Gouvernement d'économiser des sommes importantes sur les frais de voyage et en même temps de diminuer les coûts d'opération de nos avions en ayant une meilleure utilisation en heures de vol.

Nous savons que les autorités du Ministère sont intéressées à une telle initiative. Lorsque nous aurons nos nouveaux statuts et qu'il sera possible d'effectuer ce vol cédulé, nous disposerons d'un appareil en moins pour les deux missions ci-haut mentionnées.

Je crois qu'une planification s'impose pour prévoir ces échéances et qu'il faut la faire dès maintenant.

AVIONS DISPONIBLES

SERVICE AÉRIEN2- Avions disponibles

Actuellement le Service Aérien dispose des quatre (4) appareils suivants pour le transport des personnes.

1-	HS-125	Hawker Siddeley	7 passagers
2-	F-27	Fairchild	20 "
			31 "
1	DC-3	Douglas	19 "

L'avion DC-3 est surtout affecté à des missions spéciales telles que l'inventaire aérien du caribou dans le nord, la surveillance de la migration du gibier volant pour le Ministère du Tourisme, Chasse et Pêche, transport de troupes de théâtre et décors pour le Ministère des Affaires Culturelles. Nous utilisons aussi cet appareil sur des aéroports qui ne peuvent recevoir nos autres types d'appareils.

De plus, à l'occasion, cet appareil nous dépanne pour des vols exécutifs et d'urgence maladie sur les vols relativement courts. En fait, pour le sujet qui nous concerne, nous pouvons compter sur trois (3) appareils, c'est peu.

Si nous voulons maintenir un service normal et efficace pour les vols exécutifs, il nous faut de toute nécessité avoir un appareil spécialement affecté aux urgences, disponible en tout temps, à une heure d'avis, avec ce double avantage d'un aménagement intérieur pour le soin des malades.

CHOIX D'UN TYPE D'APPAREIL

SERVICE AERIEN3- Choix d'un type d'appareil

J'inclus un tableau indiquant les différents types d'avions exécutifs les plus populaires sur le marché de l'Amérique du Nord actuellement. Vous pourrez constater que les prix varient de \$1,658,000.00 pour un Cessna Citation qui ne répond pas à nos critères actuels d'utilisation, à \$7,250,000.00 pour le Challenger de Canadair, qui sera le "Cadillac" aérien, construit à Montréal mais dont la livraison serait située en 1981.

quels sont-ils?

La solution de compromis, sur le plan des coûts et de l'efficacité, consisterait à acheter un avion usagé HS-125 Hawker Siddeley, série 1A comme celui que nous possédons déjà dont le prix sur le marché actuellement se situe à environ \$500,000.00 en argent américain. Un tel avion aurait l'avantage de maintenir à un niveau minimum notre inventaire de pièces, d'éliminer les frais d'entraînement de notre personnel volant et d'entretien.

MINISTÈRE DES TRANSPORTS

SERVICE AERIEN

Avions disponibles sur le marché

Avions neufs

Modèles Manufacturiers	Hauteur cabine	Moteurs	Sièges	Rayon d'action	Vitesse	Prix Avril 78	Avantages	Inconvénients
Challenger Canadair	6'1"	Lycoming ALF -502	11 à 15	4250 M.N.	505 noeuds	\$7,250,000.	Technologie de pointe. Avion idéal	Prix élevé Livraison 81
Westwind Israel Aircraft	4'9	Garrett TFE - 731	7	2493	424	2,327,400.	Meilleur achat pour le prix	Porte trop étroite Hauteur cabine
Learjet 35A Gates	4'3"	Garrett TFE-731	7	2289	464	2,224,600.	Performance except Coût d'opération	Cabine très petite Hauteur cabine
Cessna Citation II	4'8	P & W JT-150-4	7	1589	345	1,658,400.	Moteurs fabriqués à Longueuil Coût minimum	Vitesse limitée Rayon d'action Porte trop étroite
HS-125- 700 British Aerospace	5'8	Garrett TFE-731	8	2300	427	3,450,000.	Avion bien rodé Prix raisonnable	Technologie traditionnelle
		-	Notre proposition -					
HS-125 -1A Usagé modifié	5'8	Garrett TFE-731	7	2000	430	500,000. 1,535,000.	Avion bien rodé Meilleur coût	Technologie traditionnelle

CHANGEMENT DE MOTEURS SUR HS-125

SERVICE AERIEN4- Changement des moteurs sur les deux avions

Notre avion HS-125 a été acheté en 1964. C'est un excellent avion dont la cellule a été certifiée récemment pour une durée illimitée sujet évidemment à l'entretien préventif d'usage. Notre avion a effectué de 1964 à ce jour 10,827 heures de vol.

Le problème majeur que nous devons solutionner prochainement concerne les moteurs réactés de cet appareil. Ces moteurs sont dépassés par la technologie.

Depuis plusieurs années le moteur réacté a été remplacé par la turbine turbo-soufflante "turbo-fan" sur tous les avions de ligne aérienne ou exécutifs.

Les 25 et 26 mai dernier, notre chef-pilote Monsieur Thomas Fecteau et moi-même avons participé à un symposium organisé par Airesearch Aviation Co. à Phoenix, Arizona, U.S.A. concernant le remplacement, possible maintenant, des moteurs réactés "Viper" par des turbines turbo-soufflantes de marque "Garrett".

Les avantages et la nécessité de procéder à cette modification sont les suivants:

a) Economie de carburant

L'économie de carburant se situe à 40%.

Dans le cas du Service Aérien, cette économie donne les chiffres suivants:

Moteur Viper	333 gallons à l'heure de vol
Turbo-fan	200 " " "

Economie	<u>133</u>
----------	------------

133 gallons à 1200 heures de vol - 160,000 gallons par année.

160,000 gallons à 0.75

\$120,000.00

Nous pourrions donc baisser notre consommation de carburant de 160,000 gallons par année, pour une même utilisation et ainsi réduire nos coûts directs d'opération de \$120,000.00 par année.†

b) Meilleur rayon d'action

✓ L'économie de carburant provoque une amélioration du rayon d'action qui passe de 1200 milles nautiques à 2,000 milles nautiques. Pour les envolées longue distance, ce nouveau rayon d'action élimine les atterrissages pour fin de carburant d'où une économie additionnelle.

c) Réduction du bruit

Les autorités de l'Aviation civile aux Etats-Unis ont adopté un règlement qui légifère sur le bruit des avions (FAR 36). L'application de ce règlement relève des autorités aéroportuaires locales. On nous avise que Washington sera le premier aéroport à appliquer ce règlement prochainement et ce geste aura nécessairement un effet d'entraînement pour les autres aéroports du pays.

Notre avion HS-125 avec ses moteurs actuels ne rencontre pas les exigences de ce règlement. Il est donc à prévoir que notre opération subira des contraintes.

d) Avantages opérationnels

✓ Le changement des moteurs procurera les avantages supplémentaires suivants:

- 1) La réduction du bruit des moteurs rendra l'intérieur plus silencieux favorisant les sessions de travail des passagers.

- 2) La puissance accrue des moteurs améliorera la performance de l'avion.
- 3) Meilleure altitude de croisière rendant le vol plus économique et plus confortable.
- 4) Plusieurs autres avantages énumérés sur la feuille "731 HS-125 Performance" en annexe.

Notre proposition globale se résume à l'achat d'un avion HS-125 identique à celui que nous possédons déjà et de procéder à la modification des moteurs qui en ferait deux (2) avions modernes dont l'un pour les vols exécutifs et l'autre affecté uniquement aux vols d'urgence-maladie avec un aménagement intérieur d'ambulance comportant les équipements médicaux nécessaires.

COUTS IMPLIQUES

SERVICE AERIEN5- Coûts impliqués

a) Le coût d'un HS-125 série 1A usagé
se situe, en fonds américains, à environ \$500,000.00

77 b) La compagnie Airesearch Aviation a établi
un premier programme de production de 15
appareils s'échelonnant jusqu'au 2 octo-
bre 1979 au prix de (\$E.U.) \$1,385,000.00
Suivra un autre programme de production
pour douze (12) appareils au prix de
(\$E.U.) \$1,480,000.00

c) Les modifications et travaux non inclus
dans ce prix tels que:

Modification au train d'atterrissage

Modification à l'avionique

Peinture de l'avion

Refinition intérieure

pourraient atteindre un maximum de (\$E.U.) \$ 150,000.00

\$2,035,000.00

d) L'avion que nous possédons déjà coûterait \$1,535,000.00 ✓

Total \$3,570,000.00

Note: Le paiement de \$1,385,000.00 s'établit comme suit:

138,000.00	à la signature du contrat	} <i>autour</i>
277,000.00	90 jours avant le début des travaux	
485,000.00	au début des travaux	
485,000.00	sur livraison de l'appareil	

\$1,385,000.00 Total plus taxe si applicable

FINANCEMENT DES TRANSACTIONS

SERVICE AÉRIEN6- Financement des transactions

Le financement de notre proposition pourrait se faire sans budget supplémentaire mais en maintenant pour une période de deux (2) ans à compter du 1er avril 1979, les déboursés actuels du Gouvernement pour le Service Aérien.

a) Paiement des avions CL-215 à Canadair

Les 15 avions-citernes CL-215 ont été achetés en 1970 avec paiements échelonnés sur une période de 9 ans se terminant le 1er avril 1979.

Du 1er avril 1978 au 1er avril 1979, le Gouvernement déboursa,
sous l'item "comptes payables" la somme totale de \$1,434,981.00
Les intérêts sur le capital payés par le budget
du Service Aérien durant l'année en cours \$ 90,366.00

b) Remise à neuf des avions-citernes Canso

Nous avons procédé, sur un programme de 3 ans, à la remise à neuf de nos six (6) avions-citernes Canso.

Les deux derniers avions seront remis à neuf par la compagnie Innotech de Dorval l'hiver prochain donc durant l'année budgétaire en cours.

Le budget pour ces révisions générales est de \$ 650,000.00

\$2,175,347.00

En maintenant les mêmes déboursés du Gouvernement au budget du Service Aérien pour une période de deux (2) années nous permettrait de financer l'ensemble de cette opération laquelle constitue, nous le répétons, la solution la plus économique pour doter le Service Aérien d'un avion ambulance et de mettre à date et ce pour plusieurs années notre avion HS-125 pour les vols exécutifs.

PROCEDURES

SERVICE AÉRIEN7- Procéduresa) Achat d'un autre HS-125

L'achat d'un avion usagé constitue une opération plus complexe que l'achat d'un avion neuf. La rapidité de décision est un facteur très important. Il faut saisir les occasions qui se présentent.

Si les recommandations de ce mémoire sont acceptées, nous acheminerons au Conseil du Trésor un C.T. de principe autorisant le Directeur général du Service Aérien à procéder à l'acquisition d'un avion HS-125, pour une somme ne devant pas excéder un montant de (\$E.U.) de \$500,000.00

L'achat d'un avion usagé suppose une inspection approfondie de l'appareil, la vérification des dossiers d'entretien, des dossiers de vol, des dossiers des modifications imposées par le manufacturier. Nous devons donc être autorisés à procéder dans l'ensemble de ces démarches qui sont préalables à une décision d'achat.

b) Modification des moteurs

Le Directeur général du Service Aérien devrait être autorisé, le plus tôt possible, à réserver la ou/et les positions sur le programme de production de Airesearch Aviation Co. afin que les modifications des moteurs puissent s'effectuer sans délai indus.

En annexe, vous trouverez une photocopie des dates d'acceptation d'un avion pour modification.

Je me dois de souligner que le premier programme prévoit quinze (15) avions dont douze (12) sont déjà réservés.

Actuellement la position no. 5 du 9 décembre 1978 est disponible. La position disponible suivante est le no. 11 le 5 juin 1979.

Cette dernière position se situerait bien dans notre programme mais il faudrait réserver sans délai.

c) Financement proposé

Quant au financement proposé, à cause des délais qui ne s'encombrent pas des périodes budgétaires et de la date fatidique du 31 mars, nous sollicitons le privilège que nos crédits budgétaires non dépensés avant cette date ne soient pas périmés mais reportés à l'année suivante et ce à compter de l'année en cours.

RECOMMENDATIONS

SERVICE AÉRIEN

Recommandations

Nous recommandons aux autorités compétentes les propositions contenues dans ce mémoire.

Ces propositions nous apparaissent les plus économiques à l'heure actuelle et permettraient de doter le Service Aérien des équipements nécessaires à bien remplir les différentes missions qu'on lui a confiées.

En annexe, vous trouverez différentes informations concernant la modification des moteurs.

PROJET DE LETTRE D'ENTENTE
POUR MODIFICATION
DES MOTEURS



AIRESEARCH AVIATION COMPANY

A DIVISION OF THE GARRETT CORPORATION

6201 WEST IMPERIAL HIGHWAY LOS ANGELES, CALIFORNIA 90045 (213) 846-2770

February 8, 1978

Mr. Gilles Simard
Director of Operations
Department of Transport
Air Service
Quebec Airport
Ste-Foy, P.Q. G2E 3L9
Canada

Dear Mr. Simard:

It was interesting to talk with you about our 731 engine program for the Hawker Siddeley 125 aircraft. Enclosed is a Letter Contract which shows the pricing to be \$1,385,000. Guaranteed performance is shown in Section II, pages 5 and 6 of the enclosed Exhibit "A". Also enclosed is information taken from our contract with Hawker Siddeley. This performance information is titled, "HS125F, Estimated Performance of a Newly Constructed Aircraft with Conversion." Please note that the max takeoff weight and zero fuel weight can be increased 500 lbs. by compliance with a service bulletin at the time of re-engining the aircraft. The cost of this demate service bulletin is about \$25,000.

The first available input position for a 1A aircraft would be November 9, 1978; completion would be scheduled March 1, 1979. This unusually long modification turnaround time is because this is the first 1A aircraft scheduled to be re-engined at our facility. Of course, our demonstrator 1A aircraft is being re-engined in Great Britain. The normal turnaround time to convert a customer's aircraft will be about 90 calendar days.

For your planning purposes, please note that a complete new paint job would be about \$9,500, and auxiliary power unit would be about \$72,500, and single point refueling would be about \$23,500. These items are not included in the engine modification project.

I have talked with Jerry Swart who works in our jet resale department. We understand you might consider buying a second 1A aircraft for conversion to the 731 engines, and after this aircraft was placed in service you might consider re-engining the aircraft you now own and operate. Mr. Swart has advised me of the availability of an

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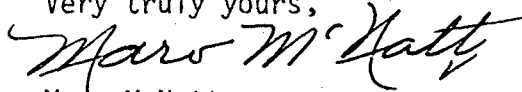
Mr. Gilles Simard

February 8, 1978

unusually good 1A aircraft which has 4000 hours total time and has the 522 engines. One engine is presently at 1485 hours and the other at 2400 hours. The owner seems anxious to sell the aircraft and we believe we could arrange a purchase for you at somewhat less than \$500,000. You could purchase this aircraft and utilize it until November, at which time we could start the 731 engine modification. If desirable, AiResearch could purchase the aircraft for you as a part of a package deal. Should this be attractive, I will be happy to send a complete specification on the aircraft in question.

Thank you very much for your consideration.

Very truly yours,


Marv McNatt

MM:kv

Enclosures



AIRESEARCH AVIATION COMPANY

A DIVISION OF THE GARRETT CORPORATION

6201 WEST IMPERIAL HIGHWAY LOS ANGELES, CALIFORNIA 90045 (213) 646-2770

Gentlemen:

This letter constitutes an agreement between _____ (Buyer) and The Garrett Corporation through its AiResearch Aviation Company Division (AiResearch) for the purchase by Buyer of the TFE731 engine modification (Modification) defined in Exhibit "A", dated _____, attached hereto and made a part hereof, for Buyer's 125 Series _____ Aircraft, Serial No. _____, Registration No. _____ (Aircraft).

WHEREAS, AiResearch and Hawker Siddeley Aviation (HSA) have made extensive studies of the 125 aircraft and the application thereto of the TFE731 engine whereby such studies indicate certain improvements may thereby be achieved, all as set forth in Exhibit "A", and

WHEREAS, AiResearch has contracted with HSA to undertake a development program leading to Supplemental Type Certificate (STC) issued by an appropriate governmental agency, and

WHEREAS, the parties hereto recognize that substantial expenditures will be made by AiResearch in carrying out the development program and such expenditures are undertaken in reliance upon this Agreement and similar agreements with other 125 aircraft owners;

NOW, THEREFORE, for and in consideration of the mutual covenants herein-after set forth, the parties hereto agree as follows:

1. Sale and Purchase

The Buyer agrees to purchase and AiResearch agrees to sell and install the Modification for Buyer's Aircraft subject to the terms and conditions contained herein.

10/13/77

2. Modification Program

AiResearch and HSA, after extensive studies, believe that the improvements as set forth in Exhibit "A" are attainable. As a result, AiResearch has contracted with HSA to undertake a development program and HSA will provide to AiResearch such data as AiResearch requires to obtain an STC from the Federal Aviation Administration (FAA) or other appropriate governmental agency so as to make Buyer's aircraft airworthy upon completion of the Modification. Such STC then will allow AiResearch to retrofit the Aircraft as set forth in Exhibit "A". If during the development program, AiResearch determines in its sole judgment that the improvements cannot be attained, then AiResearch shall have the right to terminate this Agreement upon ten (10) days written notice to Buyer and AiResearch shall refund all sums paid by Buyer. After such refunds are made, neither party will have any further liability hereunder to the other.

3. Purchase Price and Payment

Purchase price of the Modification shall be One Million Three Hundred Eighty-five Thousand (\$1,385,000.00) Dollars and is contingent upon the Aircraft (1) conforming to the specification to which it was manufactured, (2) all mandatory Service Bulletins and Service Letters complied with, and (3) having a valid certificate of airworthiness. The initial STC contemplates the Aircraft having installed within it a Collins AP103 or AP104 autopilot, an AiResearch auxiliary power unit and an AiResearch environmental control system. Aircraft with equipment other than the foregoing will be subject to review and may require separate negotiation.

AiResearch will, if requested by Buyer and at Buyer's sole cost, bring the Aircraft into conformity with the above, however, such work shall be accomplished under a separate agreement.

The purchase price and payment schedule shall become due and payable to AiResearch by Buyer in the following manner:

- a. One Hundred Thirty-eight Thousand (\$138,000.00) Dollars upon execution of this Agreement.
- b. Two Hundred Seventy-seven Thousand (\$277,000.00) Dollars ninety (90) days prior to the scheduled input date as set forth in Paragraph 4 herein.

10/13/77

- c. Four Hundred Eighty-five Thousand (\$485,000.00) Dollars upon receipt of the Aircraft at AiResearch's Los Angeles facility.
- d. Four Hundred Eighty-five Thousand (\$485,000.00) Dollars upon delivery of the Aircraft to Buyer by AiResearch after the Modification is completed.

4. Delivery Schedule

The Aircraft is tentatively scheduled into AiResearch's Los Angeles facility on or about _____ day of _____, 197_, and is tentatively scheduled for redelivery to Buyer at the location set forth in Exhibit "A" on or about _____ day of _____, 197_. AiResearch will use its best efforts to comply with the schedule quoted.

5. Non-Assignment

This Agreement pertains exclusively to the specific Aircraft identified herein and no other, nor shall any other aircraft be substituted for the Aircraft to which this Agreement relates. The Buyer may not assign this Agreement nor transfer its rights hereunder except where Buyer sells the Aircraft and the Modification contract as a single transaction to Buyer's customer, provided such customer is acceptable to and approved by AiResearch. Except as provided above, any purported assignment, transfer or conveyance of Buyer's rights hereunder is expressly prohibited and shall be null and void. Except as provided herein, AiResearch shall not recognize any purported assignee or transferee of Buyer's rights hereunder nor shall AiResearch be obligated in anyway whatsoever to give its consent to any purported assignment or transfer by Buyer. The only other exception to this paragraph shall be where the entire Modification has been completed and the Aircraft has been delivered to Buyer. In the event Buyer sells the Aircraft thereafter, any AiResearch warranties remaining on the Aircraft may be assigned to Buyer's successor or purchaser of the Aircraft.

6. Applicable Law

This Agreement shall be governed and construed by the laws of California.

7. Entire Agreement

This written instrument and the Exhibit "A" attached hereto constitutes the entire Agreement between the parties with respect to the subject matter contained herein and shall not be varied, amended or supplemented except by a writing of subsequent date executed by both parties.

-4-

If the above terms and conditions are acceptable to you, please have an authorized representative execute and date a copy of this letter and return it to me at your earliest convenience.

Very truly yours,

AIRESEARCH AVIATION COMPANY
a Division of The Garrett Corporation

By: _____

Title: _____

Date: _____

AGREED AND ACCEPTED TO:

By: _____

Title: _____

Date: _____

10/13/77

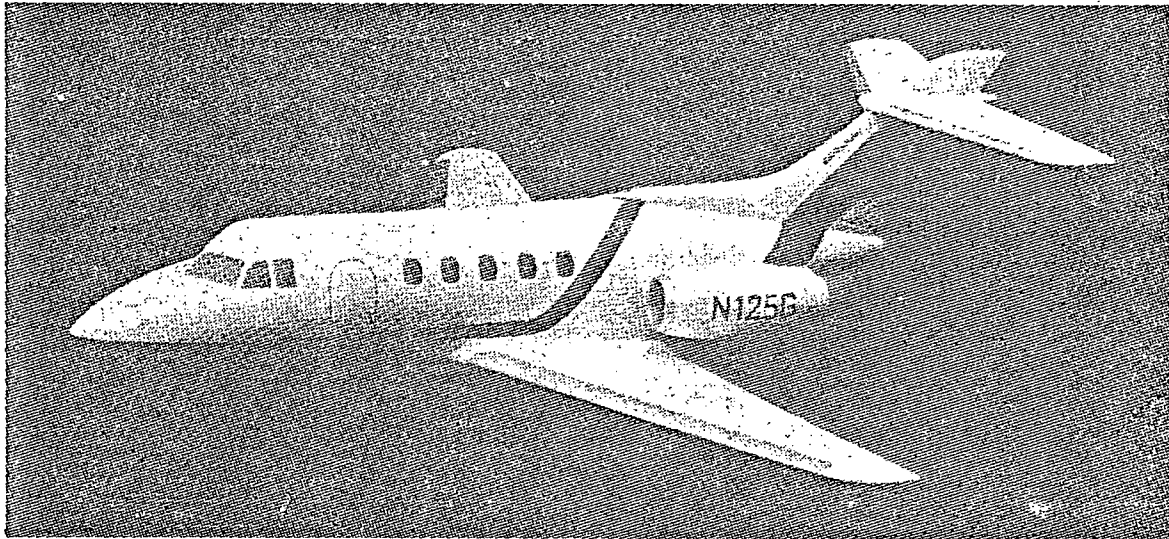
ANNEXE

QUELQUES SPECIFICATIONS

FOURNIES PAR

AIRESEARCH AVIATION CO.

Phoenix, Arizona, U.S.A.



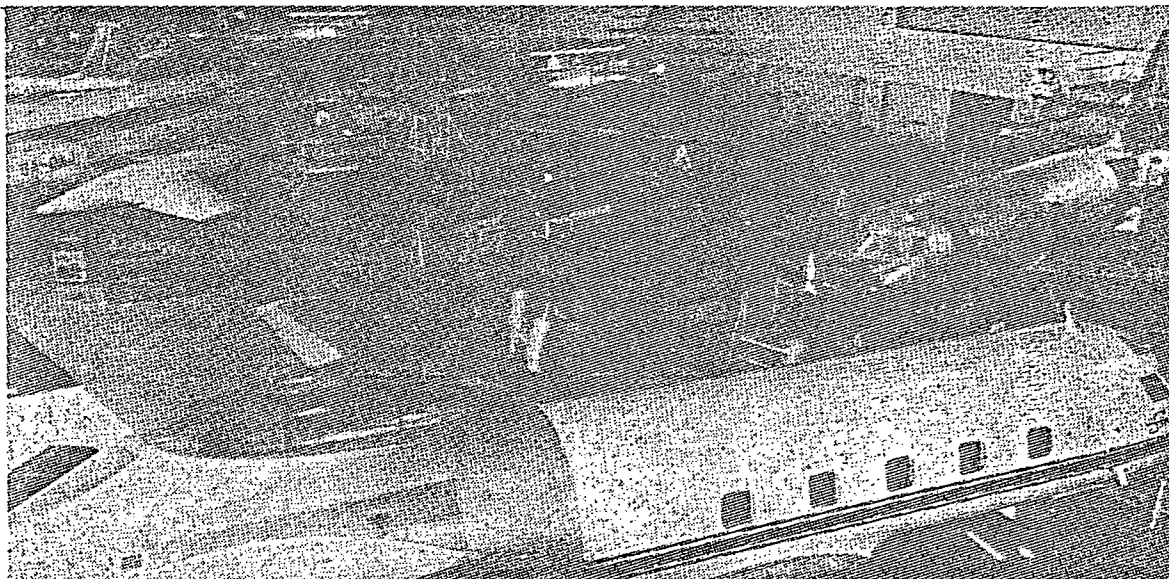
731-HS125 MODIFICATION PROGRAM

The HS modification is AiResearch Aviation's second retrofit program. The first, the on-going 731 JetStar program, has been the most successful engine modification in the history of the industry, with almost 50 orders and 40 deliveries to date.

When the JetStar re-engine program began, the LAX facility was basically a completion service center. Today, the LAX Facility is oriented to both engine modification production and the completion business.

The wealth of experience gained during the JetStar retrofit will be incorporated into the HS program. The same production team of experienced managers, engineers and craftsmen will accomplish the HS engine, airframe, avionics and interior modifications.

The bulk of the engineering and design task for the 731 HS125 has already been accomplished on the HS700 and 600 retrofit programs, which will simplify the prototyping program. Also, unlike the 731 JetStar, the HS modification task will have the advantage of utilizing major components that are all current production items. The production will be more of a "bolt on" process than the JetStar, which required many newly designed components such as nacelles, pylons and auxiliary fuel tanks.



731 HS125 MOD CONCEPT

The decision to modify the 1A through 400 model 125's was based on the following facts:

- #1. A high degree of owner loyalty for the HS 125.
- #2. The cabin size is by far the most popular for this class of aircraft.
- #3. The 125 is a rugged, extremely dependable aircraft with basic systems that provide high reliability.
- #4. Low airframe maintenance costs with good product support.
- #5. A large number of aircraft gives us good market potential and will allow us to amortize non-recurring costs.
- #6. Slight increase of engine weight will appreciably help C.G. of most aircraft.
Present engine is 1950 engine technology with unusually high fuel consumption,
- #7. above average maintenance costs for a mature engine and produces high noise levels in the community.
- #8. The Garrett 731 turbofan is an excellent thrust match for the weights of these model 125's.
- #9. By combining this highly popular proven airframe and modern turbofan performance, the 731 HS 125 will be an exceptional business aircraft for the investment.

MAJOR COMPANIES PARTICIPATING IN THE HS125 MOD DEVELOPMENT

AIRESEARCH AVIATION COMPANY A Division of The Garrett Corporation

The prime contractor with 30 years of modification and maintenance experience. The HS 125 mod program will be developed with the following major subcontractors . . .

BRITISH AEROSPACE (Formerly Hawker Siddeley)

Will be responsible for the design, engineering, prototype construction and certification. Also they will provide all major airframe structural parts, assemblies and hardware.

AIRESEARCH MANUFACTURING COMPANY OF ARIZONA

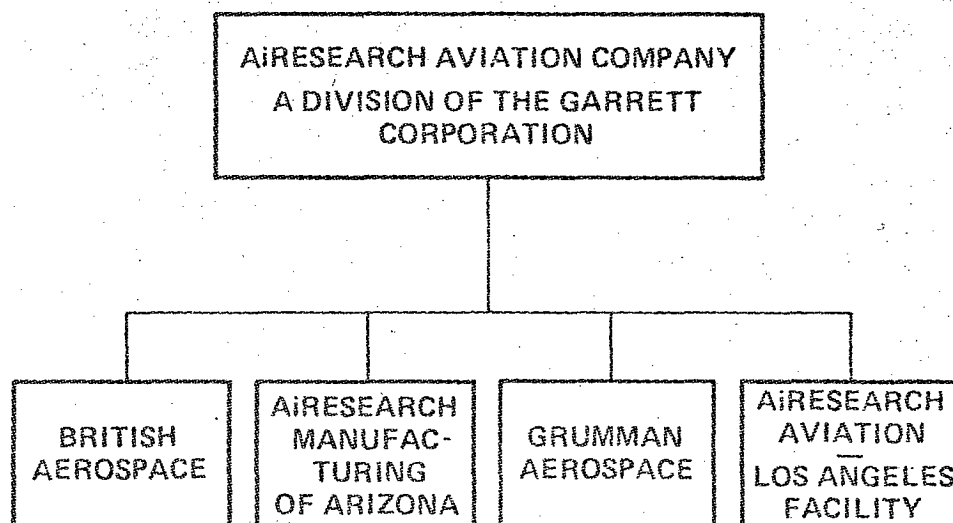
Will provide the TFE-731-3-H turbofan engine and assist with all necessary engine related data.

GRUMMAN AEROSPACE

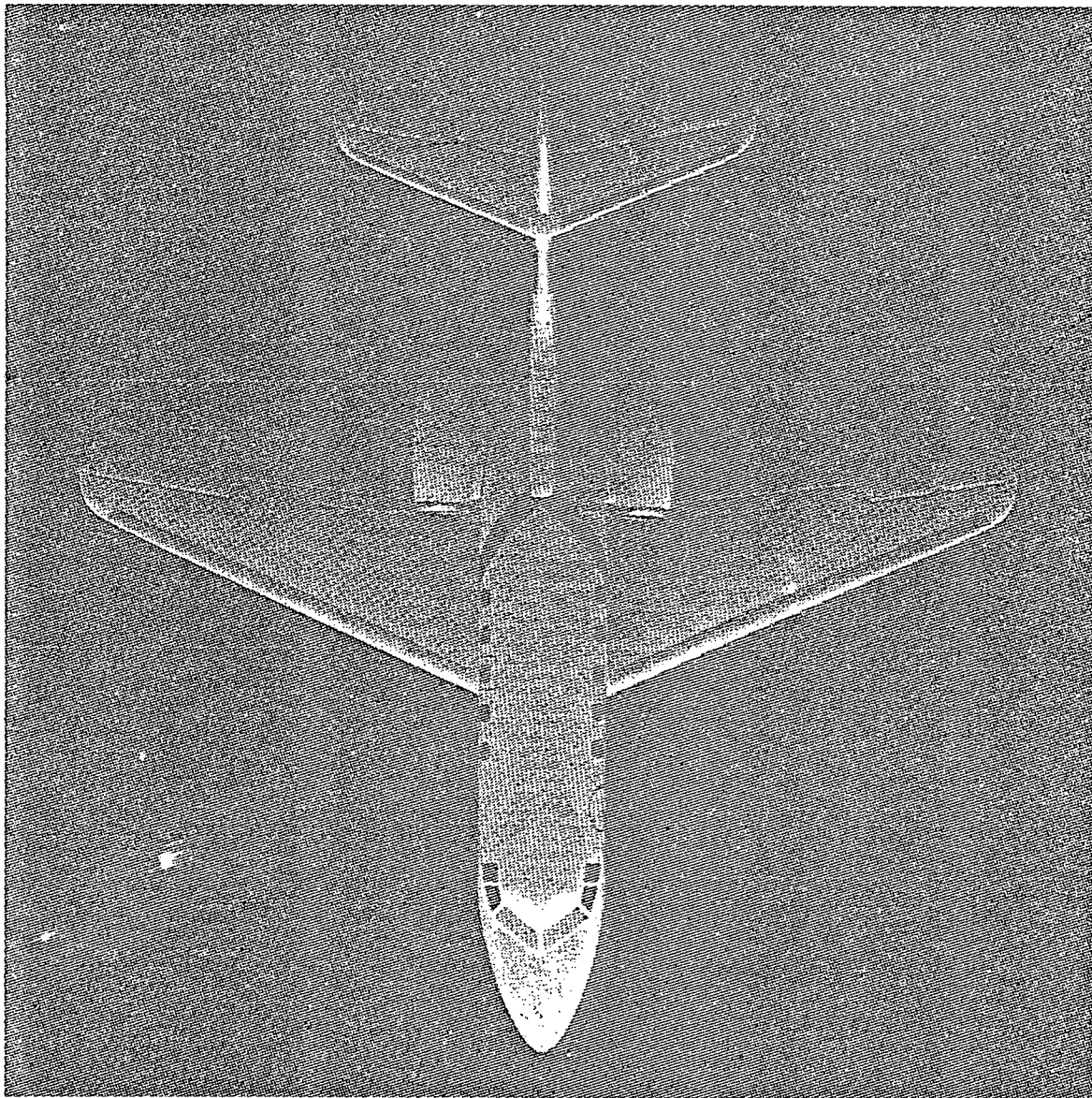
Will provide the engine nacelle assembly.

AIRESEARCH AVIATION LOS ANGELES FACILITY

Will perform the production function.



DESIGN



British Aerospace will perform all engineering, design, construction of 2 prototypes at the factory in Chester, England.

The basic engineering and design work to install the Garrett 731 engine on the HS 125 work was accomplished in the production of the new HS 700 model.

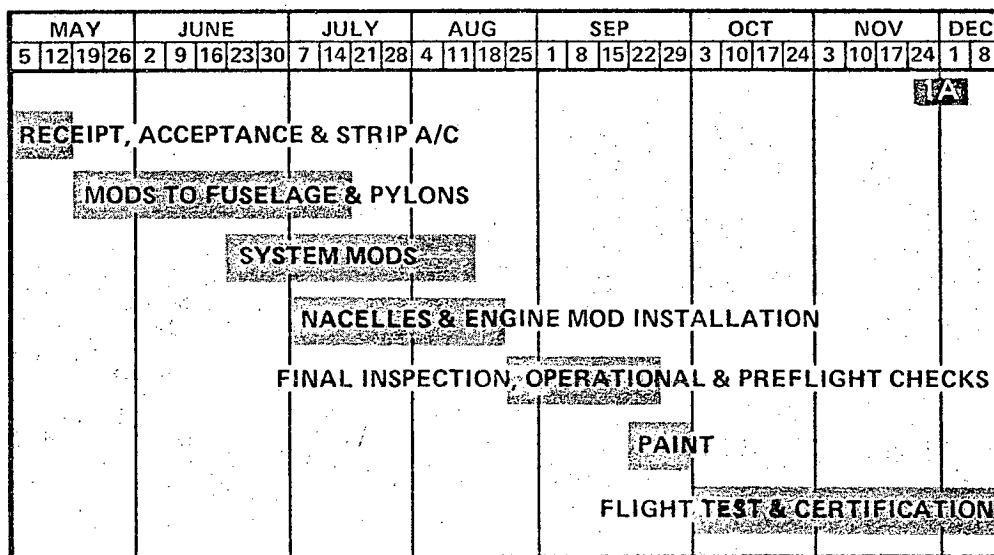
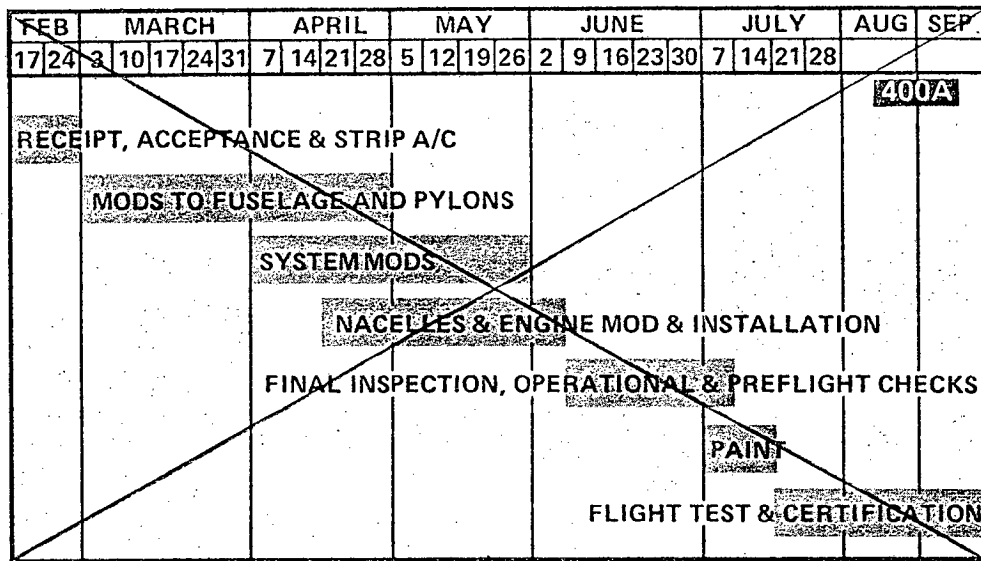
In addition, information is also being derived from the 600 series modification program which is farther along than the 1A through 400 program. This is primarily the interfacing of existing systems to new systems task.

The utilization of the HS 700 & 600 modification data will provide most of the engineering and design task for our program.

Two types will be required for certification.

PROTOTYPES/CERTIFICATION

Two prototypes will be required for certification



DESIGN LIFE

The original structural design criteria for the 125 was a minimum life of 20,000 flights.

Since this time, structural design testing has exceeded this initial goal. For example, flights accumulated on test in some of the major areas are as follows:

1. 135,000 Fuselage Flights
2. 150,000 Undercarriage Flights
3. 200,000 Wing-to-Fuselage Attachment Flights

Based on this extensive testing, there is no life limitation on the 125 and none is expected.

THE 731 HS125 PRODUCTION SCHEDULE

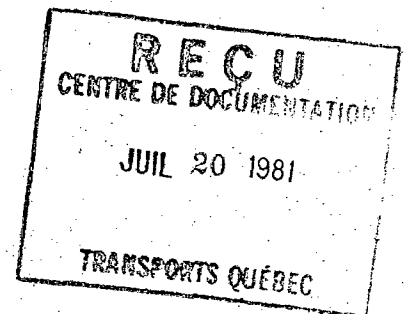
The 731 HS 125 production schedule shows the input schedules and flow times of the first 30 production units.

The first several aircraft have approximately four (4) months down-time, which is gradually reduced to three (3) months at the 8th production unit.

All over-and-aboves can normally be accomplished during the engine modification down-time assuming a reasonable lead time is provided to allow us to accomplish the required pre-engineering.

DELIVERY SCHEDULE

	IN	OUT
#1	8-1-78	12-2-78
#2	9-1-78	1-5-79
#3	10-9-78	2-2-79
#4	11-9-78	3-1-79
#5	12-9-78	4-2-79
#6	1-9-79	5-7-79
#7	2-7-79	5-7-79
#8	3-12-79	6-1-79
#9	4-2-79	7-3-79
#10	5-7-79	8-6-79
#11	6-5-79	8-29-79
#12	7-9-79	10-1-79
#13	8-6-79	10-25-79
#14	9-5-79	11-21-79
#15	10-2-79	12-20-79
#16	11-5-79	1-24-80
#17	12-3-79	2-24-80
#18	1-7-80	3-29-80
#19	2-4-80	4-25-80
#20	3-3-80	5-22-80
#21	4-7-80	6-26-80
#22	5-5-80	7-24-80
#23	6-2-80	8-21-80
#24	7-7-80	9-25-80
#25	8-4-80	10-23-80
#26	9-2-80	11-21-80
#27	10-6-80	12-23-80



731 HS125 WEIGHTS

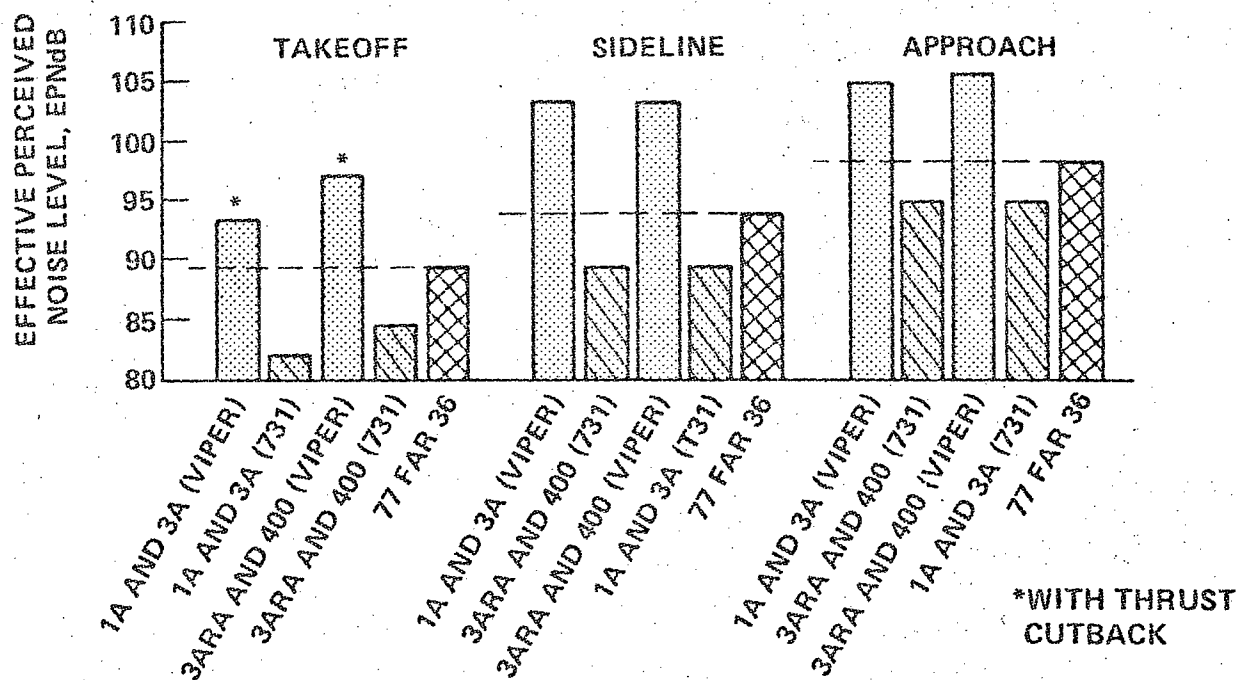
The certification weights of the 731 powered HS 125's will be as follows:

	1A	3A	3 ARA	400
Max Takeoff Weight (Lb.)	21,200*	21,700	23,600	23,600
Max Landing Weight (Lb.)	19,500*	20,000	20,000	20,000
Max Zero Fuel Weight (Lb.)	13,200*	13,700	14,700	14,700
Max Usable Fuel Weight (Lb.)	8,200	8,200	9,100	9,100
Typical Bow** (Lb.)	11,967	12,091	12,741	12,992
Payload to Zero Fuel Weight (Lb.)	1,233	1,609	1,959	1,708
Payload with Full Fuel	1,034	1,408	1,759	1,508

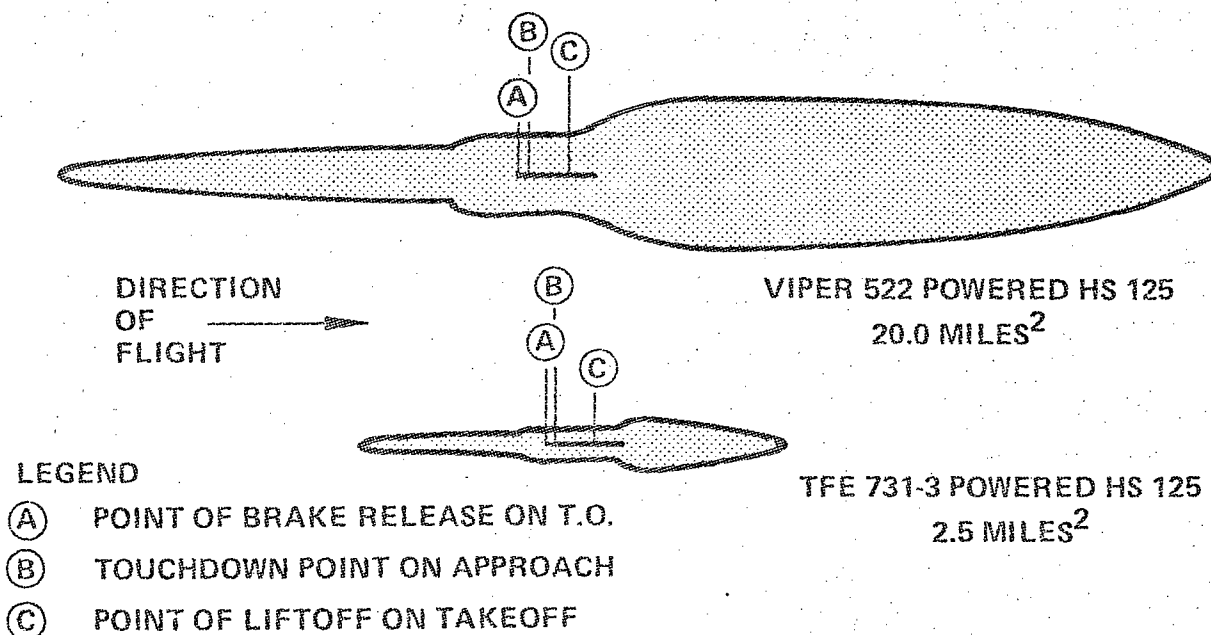
*1A weights can be increased to 3A weights with an Optional Service Bulletin.

**Typical Basic Operating Weights were derived by taking the mean average of the specific models of 125's that were completed by AiResearch Aviation when initially put into service. Added to these empty weights are; 221 additional lbs. for the 731 engine modification and 500 lbs. for crew and operating supplies.

CERTIFICATION NOISE LEVELS COMPARED TO FAR 36 NOISE LIMITS TFE 731 VERSUS VIPER POWERED HS 125



90 EPNdB CONTOUR COMPARISON FOR HS 125 APPROACH AND TAKEOFF CONDITION COMBINED TFE 731 VERSUS VIPER POWERED HS 125



FAR 36 AND NOISE RESTRICTIONS IN THE FUTURE

The FAA is currently asking for comments on a Notice of Proposed Rule Making (NPRM) that would establish stringent night noise limitations on the operation of aircraft that do not meet FAR 36 Amendment 8 noise levels. This is the first instance where the FAA has drawn a clear cut distinction between FAR 36 qualified aircraft and those that do not qualify with regard to curfews and operational limitations. The test case will be at Washington National Airport and could be a precedent that will have National significance. A precedent will probably be set this year.

Local airport authorities now have the authority to set their own aircraft restrictions based on their particular community noise problem. As time progresses, they have become more and more restrictive when faced with community pressure. Some airports have banned jets entirely, while others have enacted strict curfews on jet operations. To head off this problem, which continues to become a bigger threat to our industry, GAMA (General Aviation Manufacturers Association) recognizes the need to preempt local restrictions with a federal ruling. This will allow our industry to design, build and operate aircraft to one standard that will be universally acceptable. Realizing it would be futile to obtain a ruling that will allow all aircraft, regardless of their noise levels to operate unrestricted in all airports GAMA endorses the following three-tier recommendations:

1. Where no airport noise problem exists for business jets, primarily major hub airports, there would be no restrictions on any business jets.
2. At airports where noise problems have caused restrictions, lift the restrictions on FAR 36 aircraft.
3. At very noise-sensitive airports where all jets are banned, allow FAR 36 jets to operate.

This will eliminate jets being banned or restricted when they are as quiet as some prop aircraft.

EXHAUST EMISSIONS

EPA (Proposed Amendment to Standards) Federal Register Vol. 43, No. 58, March 24, 1978:

- Revoke emission standards (HC, CO, NOX) for general aviation engines.
- Requires compliance with smoke standards on January 1, 1981.
- Requires compliance with fuel venting standards on January 1, 1975.

TFE731-3 complies with exhaust emission regulations as amended.

LOWER CABIN NOISE LEVELS

The dramatically quieter Garrett 731 Fan engines will have a noticeable effect on the cabin noise level of the 125. The quieter the cabin the more productive and comfortable it becomes.

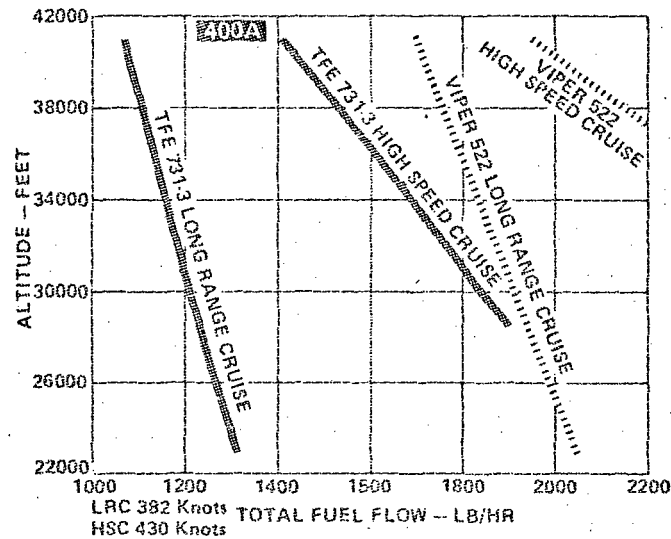
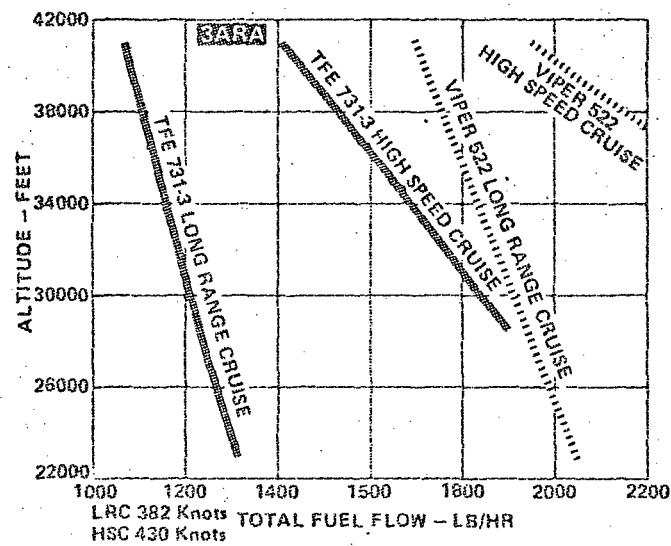
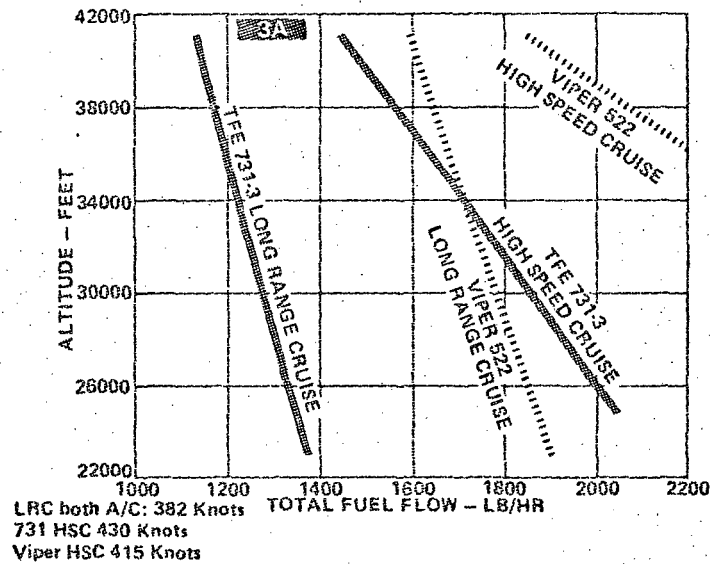
731 HS 125 PERFORMANCE

The following estimated performance data is subject to verification in the flight test program.

Performance graphs showing 731 vs. Viper 125 comparisons . . .

- Payload Range
- Range vs. Cruise Speed
- Fuel Consumption
- Flight Time
- Rate of Climb
- Optimum Cruise Altitude
- Cruise Speeds
- Takeoff Safety Speed (V2)
- Landing Speed
- Takeoff Climb Weight
- Field Length Takeoff Weight
- High Speed Sector Fuel & Time
- Long Range Sector Fuel & Time
- Landing Field Length
- Holding Fuel
- Takeoff Field Length Range
- Engine Out Ceiling

FUEL CONSUMPTION



OPERATING COSTS

FUEL SAVINGS

The 731 engines will provide an average reduced fuel consumption of 40% in a typical corporate operation.

The dollar savings can be computed as follows:

Viper 125	400	gals. per hr.
731 125	240	gals. per hr.
	160	Fuel saved per hr.

$$160 \times .75¢ = \$120.00 \text{ saved per hr.}$$

$$600 \text{ hrs per year} \times \$120.00 \text{ saved per hr.} = \$72,000 \text{ saved per yr.}$$

MAINTENANCE COSTS

The costs to maintain a 731 and a viper engine are within a few dollars of each other today. As time progresses the advantage to the 731 will increase considerably. The Viper is a mature engine that is out-of-production and declining in population. This will make parts more difficult to locate and more expensive to maintain in years to come. The 731, however, will increase in reliability as it matures the way all engines do. In addition, the 731 is on numerous aircraft and has enormous population potential. This will insure parts for years to come. With Viper operating costs increasing and 731 costs being reduced it is easy to predict future maintenance savings.

COST OF 731 HS 125 ENGINE MODIFICATION

Total Cost \$1,385,000 (exclusive of sales tax)

Terms of Payment:

- \$138,000 — with signing of contract
- \$277,000 — 90 days prior to input in hangar
- \$485,000 — when aircraft comes into hangar
- \$485,000 — balance on completion

10% Investment Tax Credit Applies

SUMMARY OF BENEFITS

The following is a quick summary of the benefits derived from the 731 engine modification.

- 1) Increase range of 800 to 900 N.M.'s VFR and 950 to 1100 N.M.'s in the NBAA IFR Format.
 - 2) The 731 powered 125 will meet the newly amended FAR 36 noise standards.
 - 3) Reduced fuel consumption of more than 40% will allow multi-stop trips without refueling.
 - 4) Big cabin size is by far the most popular for this class of aircraft.
 - 5) Reduce direct operating costs — \$72,000 in fuel the first year.
 - 6) Improved overall performance with increased thrust.
 - 7) Quieter engines also mean a lower cabin noise level.
 - 8) 731 engines will make your 125 a modern, turbofan aircraft.
 - 9) Cost of modification is eligible for investment tax credit and a new depreciation schedule.
 - 10) The 731 HS125 is an excellent investment because it's more aircraft for your dollar.
- 

SPECIFICATIONS DES TRAVAUX

A ETRE EFFECTUES SUR

L'AVION HS-125-1A

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- 1.0 INCOMING INSPECTION & PRESERVATION
- 1.1 INCOMING INSPECTION
- 1.2 CORRECTION OF DISCREPANCIES
- 1.3 ADDITIONAL WORK
- 1.4 PRESERVATION
- 1.5 PREFLIGHT CHECK
- 1.6 WEIGHT AND BALANCE

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SECTION I

INCOMING INSPECTION AND PRESERVATION

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1.0 I N C O M I N G I N S P E C T I O N & P R E S E R V A T I O N :1.1 I N C O M I N G I N S P E C T I O N :

Prior to performing any work on the Aircraft, an inspection will be made by AiResearch and Buyer to determine if there are any discrepancies. Any discrepancies found will be recorded and provided to Buyer. All loose equipment, parts, etc., aboard the Aircraft will be inventoried and a record made, a copy of which will be furnished to the Buyer.

1.2 C O R R E C T I O N O F D I S C R E P A N C I E S :

If Buyer elects, AiResearch shall correct any of the discrepancies found in the incoming inspection as provided above. Such corrections shall be to the account of the Buyer and AiResearch shall charge Buyer on a time and material basis at AiResearch's then posted rates.

1.3 A D D I T I O N A L W O R K :

Any work beyond that contemplated herein in which Buyer desires AiResearch to perform, AiResearch will in such event prepare work orders covering the work to be performed. Buyer will signify AiResearch's authority to commence with the work by signing in the space provided within the work order.

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1.4 PRESERVATION:

After inventory and incoming inspection, the Aircraft will be weighed, preserved and prepared for modification.

1.5 PREFLIGHT CHECK:

Upon completion of work as hereinafter outlined in this specification, the Aircraft and engines will be given a pre-flight check which will include the operation of all systems.

1.6 WEIGHT AND BALANCE:

The Aircraft will be weighed prior to the commencement of work and again after completion of the work specified herein. The final weighing will be accomplished three times, with the weighing cells being rotated for each weighing. The empty weight nearest the average of the three weighings will be used as the final empty weight for all records and computations. The Weight and Balance forms, Equipment List and Loading Schedule will be revised to reflect the changes and additions resulting from the completion of the work specified herein.

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SECTION II

SPECIFICATION

FOR

INSTALLATION OF AIRESEARCH TFE 731 FAN ENGINES

ON

BUYER'S 125 AIRCRAFT

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- 2.2 GENERAL REQUIREMENTS
- 2.3 APPLICABLE SPECIFICATIONS AND REGULATIONS
- 2.4 THREE-VIEW
- 2.5 GUARANTEED PERFORMANCE
- 2.6 WEIGHT AND CENTER OF GRAVITY CONSIDERATIONS
 - 2.6.1 Weight
 - 2.6.2 Center of Gravity
- 2.7 WORK STATEMENT
 - 2.7.1 Engines and Nacelles
 - 2.7.1.1 Engine Pylons
 - 2.7.1.2 Pylon Firewalls
 - 2.7.1.3 Nacelles
 - 2.7.1.4 Engine Mounts
 - 2.7.1.5 Nacelle Nose Section
 - 2.7.1.6 Nacelle Aft Section
 - 2.7.1.7 Access Doors
 - 2.7.1.8 Exhaust Pipe
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 - 2.7.2 Hydraulic Systems
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 - 2.7.4 Electrical System

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- 2.7.5 Engine Instruments
- 2.7.6 Fuel System
- 2.7.7 Rudder Bias System
- 2.7.8 Painted Surfaces
- 2.8 ECOLOGICAL CHARACTERISTICS
 - 2.8.1 Noise Levels

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2.1

INTRODUCTION:

This modification consists of replacing the existing engines, nacelles and pylons with new AiResearch TFE 731-3-1H engines, new nacelles, pylons and accessories. All structures and system changes associated with this installation which are incorporated into the Modification upon which AiResearch has secured a Supplemental Type Certificate from the Federal Aviation Administration, will also be accomplished.

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2.2

GENERAL REQUIREMENTS:

The modification shall be performed in accordance with a Supplemental Type Certificate issued by the Federal Aviation Administration (FAA).

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2.3

APPLICABLE SPECIFICATIONS AND REGULATIONS:

The HS.125 Series Engine Modification is designed and constructed to a certification basis of Civil Airworthiness Requirements which, together with the special conditions included by the U.S. Government, including validation Arrangement V.A. Note 1 issue 1 dated 19th April, 1961, equates to CAR4b dated December, 1953, with Amendments 4b-1 through 4b-11 (including SR.422B). Over and above this standard compliance has been shown with the following additional requirements:

CAR Amendments 4b-12 and 4b-14

CAR 4b-640 Ice protection provisions

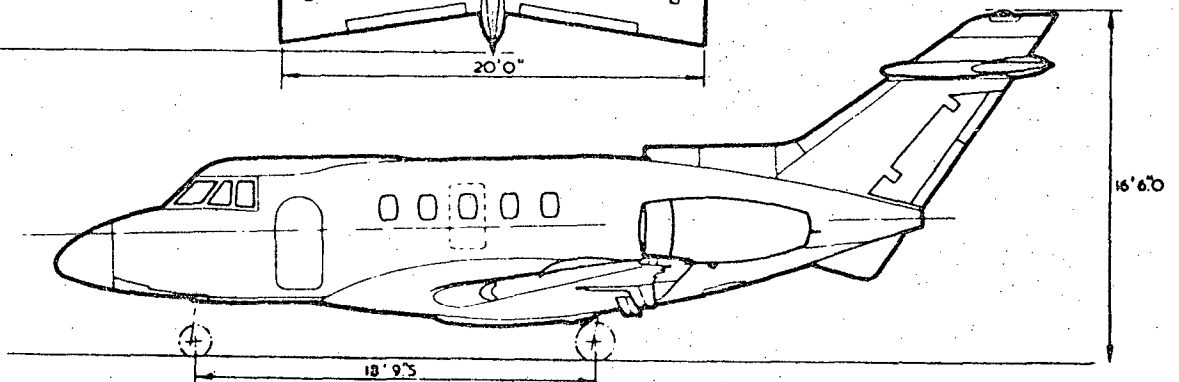
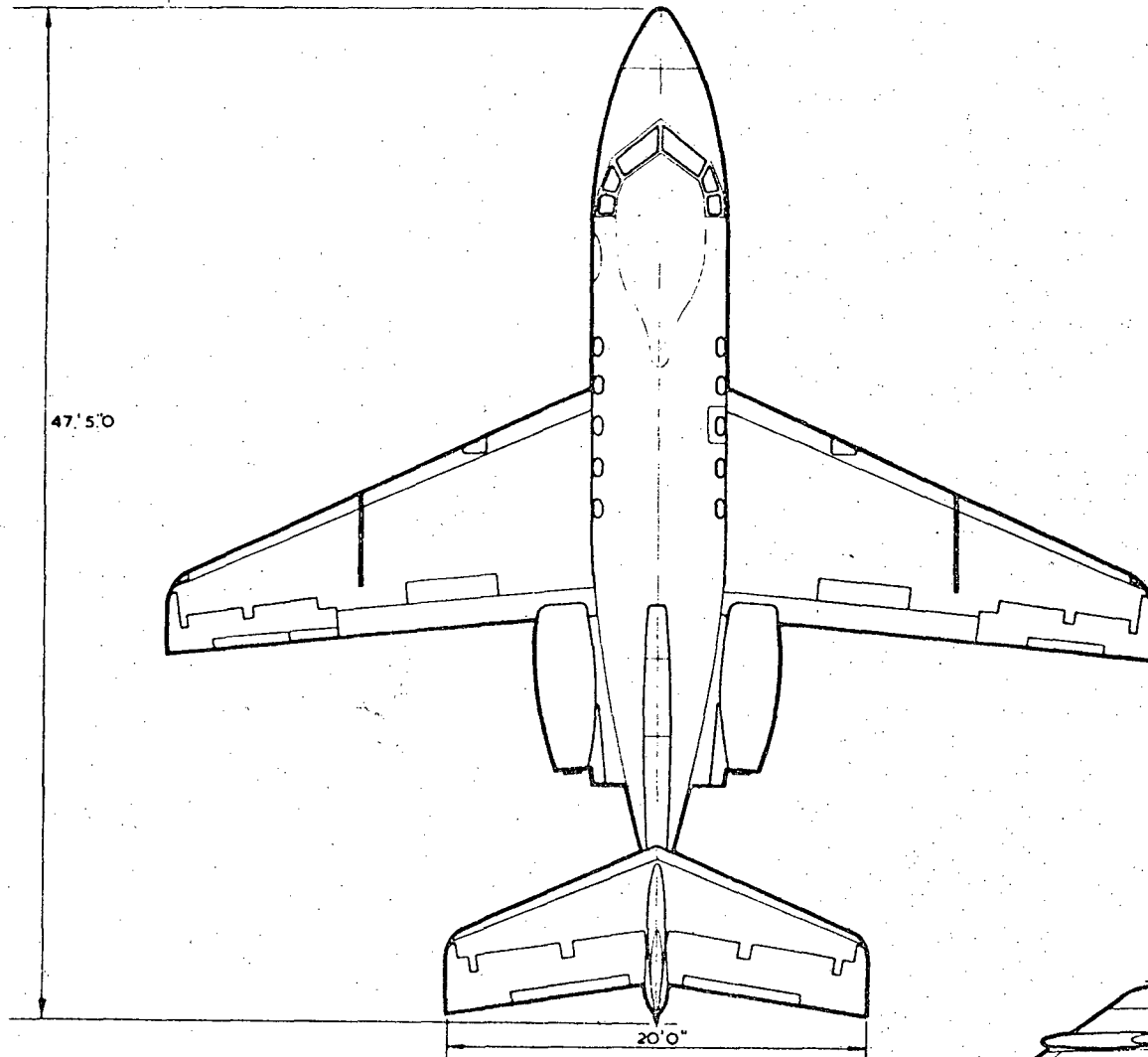
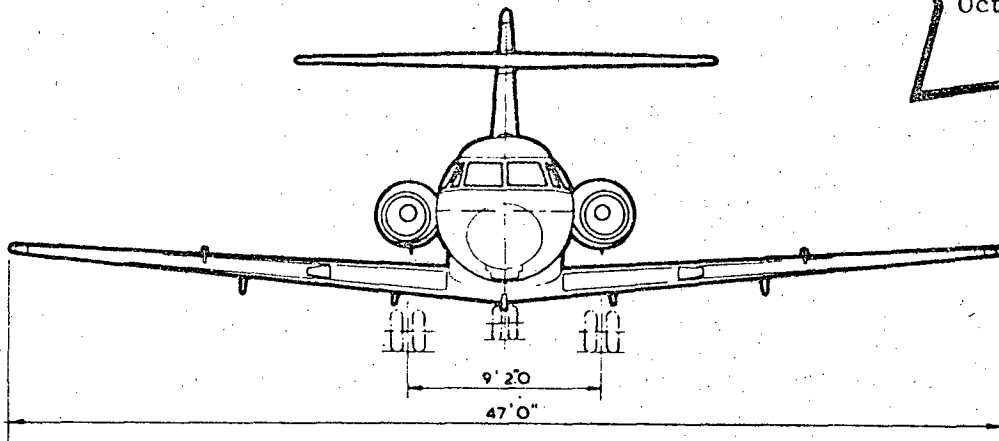
FAR 25 Amendment 25-18 - Fuel jettison requirements

FAR 21.183 (e) Noise requirements

FAR 36.1 (d) (3) Noise standards

AiResearch Specification Nos. SC-74-211271-A and SC-8050-D
for the TFE 731 turbofan engine.

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2.5 GUARANTEED PERFORMANCE:

Aircraft performance values for each FAA certificated model referred to below are given in respect to the Aircraft Certificated Design Weights stated.

There are minor differences in drag between the variants within the NLR or LR groups, but the guaranteed performance is applicable to each of the variants identified for the group.

<u>Series</u>	<u>NLR Models</u>		<u>LR Models</u>		
	<u>1A</u>	<u>3A</u>	<u>3AR</u>	<u>3ARA</u>	<u>400A</u>
a. <u>Certificated Design Weights</u>					
Max. take-off weight	1b	21,200	21,700	22,700	23,600
Max. landing weight	1b	19,550	20,000	20,000	20,000
Max. zero fuel weight	1b	13,200	13,700	14,200	14,700
b. <u>Performance Guaranteed</u>					
(i) Max. cruising true airspeed at 16,000 lb. weight at 31,000 ft.		428 knots $\pm$ 7%	432 knots $\pm$ 7%		
(ii) Cruising nautical air miles per lb. of fuel at 16,000 lb. weight at a true airspeed of not less than 380 knots at 37,000 ft.		0.290 n.m. $\pm$ 7%	0.295 n.m. $\pm$ 7%		

NOTE:

Estimated VFR Range at
sea level I.S.A. N.M./M.P.H. 1990/445 1970/445 2100/450 2100/450 2195/450

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2.5 GUARANTEED PERFORMANCE (continued):

- (iii) Take-off balanced
field length in sea
level I.S.A.
conditions
 - at 21,000 lb. weight 4,800 ft. $\pm$ 7%
 - at 22,000 lb. weight 5,300 ft. $\pm$ 7%
- (iv) Landing runway length
 - at 14,000 lb. weight
 - at sea level for
destination airfield. 3,500 ft. $\pm$ 7% 3,500 ft. $\pm$ 7%

The performance values stated above are for I.S.A. conditions.

NOTE: TAKE-OFF AND LANDING DISTANCES ARE BASED ON LEVEL PAVED RUNWAYS WITH NO WIND AND WILL BE IN ACCORDANCE WITH FAR25 AND FAR121 (UP TO AND INCLUDING 25-32 AND 121-90 RESPECTIVELY) OF MODIFIED AIRCRAFT THAT HAVE INCURRED NO MEASUREABLE PERFORMANCE DEGRADATION DUE TO SERVICE OR AGE.

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2.6 WEIGHT AND CENTER OF GRAVITY CONSIDERATIONS:2.6.1 Weight:

The increase in weight of the Aircraft attributable to the Modification is not expected to exceed 255 lbs. and 300 lbs. for Aircraft with the Viper 522 and Viper 521 engines respectively.

2.6.2 Center of Gravity:

The Modification will have an insignificant impact on the existing aircraft's center of gravity.

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2.7 WORK STATEMENT:2.7.1 Engines and Nacelles:

Existing Viper engines, nacelles, pylon structure, and engine mounting beams will be removed from the Aircraft. New AiResearch TFE 731-3-1H engines, nacelles, pylon structures and engine mounting beam will be installed.

2.7.1.1 Engine Pylons:

The new engine pylons shall be attached to the fuselage and pylon beams. Access shall be provided to the interior of the pylon for inspection and maintenance. Ventilation inlets and outlets and drainage shall also be provided as required.

2.7.1.2 Pylon Firewalls:

Each engine will be isolated from the remainder of the Aircraft by a titanium firewall which will form an integral part of the pylon. Where pipes or controls pass through the firewall, adequate sealing will be provided.

2.7.1.3 Nacelles:

Two separate engine nacelles will be provided. One nacelle will be mounted on each side of the fuselage above and aft of the wing trailing edge. Each nacelle will be cantilevered from the fuselage on a pylon.

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2.7.1.4 Engine Mounts:

A front and rear mounting will attach each engine to the pylon structure. The front mounting will comprise a yoke and a link. The rear mounting will be a flat blade, free to rotate fore and aft.

2.7.1.5 Nacelle Nose Section:

A nose cowl and intake duct assembly will be bolted to the front face of the engine.

2.7.1.6 Nacelle Aft Section:

An aft cowl section will be bolted to the aft flange of the engine fan casing.

2.7.1.7 Access Doors:

An upper and lower cowl door will provide hinged access to each engine.

2.7.1.8 Exhaust Pipe:

A core exhaust pipe assembly will be attached to the rear of the engine by a "V" band clamp.

2.7.1.9 Nacelle Firewalls:

Engine nacelles will be separated into two zones: Zone 1 and Zone 2. Zone 1 will cover the region of the fan compressor and auxiliary equipment; Zone 2 the combustion area, the turbine area and most

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2.7.1.9 Nacelle Firewalls (continued):

of the jet pipe. A transverse fireproof bulkhead will be situated at each end of Zone 1. Independent ventilation will be provided for Zones 1 and 2. The fireproof bulkheads will be of sufficient thickness to withstand engine fire.

2.7.2 Hydraulic System:

Two new engine mounted variable displacement hydraulic pumps will replace the existing pumps. The existing hydraulic system will undergo other minor modifications.

- a) Reservoir tank pressurization system will be changed to provide pressurization from the engine bleed system.
- b) Elimination of cut in/out system and flow indicators.

2.7.3 Air Conditioning and Pressurization System:

The system in the rear equipment bay is revised to suit the combined LP/HP bleed air supplies from the engine and shielding is provided to protect important structure from possible impingement of hot air leakage from duct joints. Temperature sensing is provided in the equipment bay and pylon.

2.7.4 Electrical System:

Changes are made to the rear equipment bay, cockpit roof panel, cockpit main panels, pedestal installation, D. A. panel, A.P.U. electrics (when fitted), cockpit lighting, avionic

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2.7.4 Electrical System (continued):

and controller lighting, together with installing new lightweight 400 amp starter generators manufactured by Lear Siegler will be installed.

2.7.5 Engine Instruments:

Instruments and indicators on the flight desk associated with the Viper engines are deleted and replaced by those required with the TFE 731-3-1H engines. In addition, an N_2 tachometer and N_1 tachometer will be installed for purposes of setting engine power.

2.7.6 Fuel System:

No significant changes will be made to the fuel system. Some relocation of fuel lines to suit engine interfaces will be accomplished.

The methanol fuel filter de-icing system is deleted and is replaced by low pressure fuel filters, one in each fuel control that are heated by a fuel/oil heat exchanger.

Fuel from the Aircraft tanks will be supplied to fuel control units on each engine. Each control will be activated by throttle lever movement and by signals from a remote electronic computer. A manual/auto selector switch for each computer will be provided.

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2.7.6 Fuel System (continued):

An electronic control unit is provided to synchronize the speed of the engines.

2.7.7 Rudder Bias System:

The existing single rudder bias strut is removed and is replaced with struts each of which are supplied with low pressure (L.P.) air from independent engine bleed ports.

The two automatically operated rudder bias struts are each connected to the quadrant at the base of the rudder. The L.P. compressor air from each engine will be fed to sides of a piston in each strut. Under asymmetric power conditions the air pressure differential between the engines will operate the pistons, moving the rudder against the asymmetric thrust. In the event of a line failure, both sides of the related piston will be vented to each other by a solenoid valve on the bias strut controlled by individual on-off switches on top of the central control pedestal. Anti-icing of the strut will be provided. A spring strut will be connected to the base of the rudder torque shaft, to provide a centering force at the extreme travel.

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2.8 ECOLOGICAL CHARACTERISTICS:2.8.1 Noise Levels:

The use of acoustical attenuation techniques, including sound absorbent materials in the fan tip region, low fan speeds and greater than usual spacing between the fan and its stator, provides the modified Aircraft with a significantly reduced noise level. The Aircraft, as modified in accordance with this specification, meets the requirements of Federal Air Regulation, Part 36, dated 3 November, 1969.

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SECTION III

TERMS AND CONDITIONS

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3.0 TERMS AND CONDITIONS

3.1 GOVERNING REQUIREMENTS:

3.1.1 Work Performance Standards:

The work on the Aircraft as outlined in the specification and as performed by AiResearch, will be in accordance with Federal Air Regulations and Federal Air Manuals as applicable. Proof of compliance will be submitted to the Federal Aviation Administration (F.A.A.) by AiResearch. The installation of items not covered by Federal Air Regulations and Bulletins will be in accordance with AiResearch's standard practice and/or accepted standards of the industry.

3.2 BUYER SUPPLIED SERVICES, MATERIALS AND DATA:

3.2.1 Aviation Fuel:

AiResearch will provide such aviation fuel and oil as required to complete the work specified herein and to conduct such delivery and test flights as provided herein. Charges for such aviation fuel and oil will be paid for by the Buyer as an additional item.

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3.2.2 Buyer Furnished Property:

One (1) each Aircraft.

Other miscellaneous materials as noted in body of specification.

3.2.3 Removed Equipment:

Existing equipment removed from Buyer's Aircraft which will not be reused on the modified aircraft will be, upon removal, returned to Buyer. All cost of crating and shipping of such removed equipment will be at Buyer's expense. Upon arrival of the Aircraft at AiResearch's Los Angeles facility, Buyer shall advise AiResearch of the address to which the removed equipment shall be shipped.

3.2.4 Insurance and Indemnity:

- 3.2.4.1 Buyer shall indemnify and hold AiResearch, its employees and agents harmless for loss of or damage to the Aircraft, including the work accomplished on the Aircraft under this agreement for any reason or cause whatsoever while the Aircraft is (1) in the possession and/or control of AiResearch or (2) on the premises of AiResearch.

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3.2.4.1 (continued):

Notwithstanding the foregoing, AiResearch shall indemnify and hold Buyer harmless for loss of or damage to the Aircraft occurring while it is not in flight providing such loss or damage to the Aircraft is solely, directly and proximately caused by the negligence of AiResearch. In the event Buyer has hull insurance on the Aircraft, AiResearch shall be named as an insured party for all in-flight operations of the Aircraft. In-flight shall include flight testing, flight instructions and/or crew training and the entire period of the delivery flight. Buyer shall furnish evidence of such insurance in form and amounts satisfactory to AiResearch prior to the dates flights are participated in or conducted by AiResearch.

3.2.4.2 Buyer shall indemnify and hold AiResearch, its employees and agents harmless for any loss, damage, injury, death or other liability resulting from the use of the Aircraft in flight testing, flight instruction and/or crew training and the entire period of the delivery of the Aircraft or any other time when the Aircraft is in flight while in the possession and/or control of AiResearch. Buyer, at its

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3.2.4.2 (continued):

sole cost shall provide aircraft liability insurance with limits of not less than \$10,000,000 combined bodily injury and property damage liabilities. Such insurance shall include public liability, passenger liability and property damage liability coverages and shall name AiResearch as an insured party therein. Buyer shall furnish evidence of such insurance in form and amounts satisfactory to AiResearch prior to the dates flights are participated in or conducted by AiResearch.

3.3 AIRESEARCH FURNISHED SERVICES, MATERIALS AND DATA:3.3.1 Labor and Materials:

AiResearch will perform all labor and furnish all material necessary for the completion of the work specified herein except as otherwise noted.

3.3.2 Drawings and Other Data:

Upon completion of the work specified herein, AiResearch will furnish with the Aircraft amended manuals, drawings and other data covering additions made by AiResearch, a corrected copy of the existing Weight and Balance report,

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3.3.2 (continued):

a list of added and deleted equipment and a new Loading Schedule.

3.3.3 F.A.A. Approval Forms:

Upon completion of the work specified herein, AiResearch will furnish with the Aircraft all necessary F.A.A. forms properly filled out and approved by the appropriate F.A.A. Inspector.

3.3.4 Flight and Ground Training:

AiResearch will, without additional cost to Buyer except as hereinafter provided, furnish to Buyer the following:

3.3.4.1 A course of pilot ground training, such training to be furnished at Los Angeles, California, and Phoenix, Arizona.

3.3.4.2 A course of flight familiarization will be furnished at Los Angeles provided that all costs of the operation of the Aircraft for the purpose of such flight training, including the cost of fuel, lubrication and maintenance, shall be paid by Buyer and that AiResearch shall not bear any risk of loss or damage to the Aircraft in connection with such operation.

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- 3.3.4.3 Ground training in the maintenance of the Aircraft and engines, which shall be furnished at Los Angeles, California, and Phoenix, Arizona.
- 3.3.4.4 Buyer shall be required to provide room, board or transportation for any employee it designates or assigns for training pursuant to this paragraph.
- 3.3.4.5 All training shall be furnished at such times as the Buyer may reasonably request, to the end that Buyer's employees may qualify to operate and maintain the Aircraft as promptly as reasonably possible following delivery.

3.3.5 Flight Crews:

AiResearch will furnish the flight crew as necessary for all flight testing of the Aircraft upon completion of the work as specified herein. AiResearch will provide a flight crew for the delivery flight of the Aircraft. Delivery and acceptance of the Aircraft will be accomplished in the manner provided in Paragraph 3.3.7. The charges for the crew, including their expenses and return transportation, will be paid for by the Buyer as an additional item. Flight tests participated in by the Buyer shall not constitute delivery of the Aircraft to the Buyer nor acceptance of the Aircraft by the Buyer.

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3.3.6 Predelivery Inspection of Aircraft:

After AiResearch has completed all work called for in the specification and the Aircraft as determined by AiResearch is ready for delivery to Buyer, AiResearch will so advise Buyer and Buyer promptly thereafter will inspect the Aircraft at AiResearch's facility for its acceptability and conformity to the specifications. Such inspection shall include appropriate in-flight demonstration of the Aircraft. Any discrepancies or malfunction found which are not the result of any action on the part of AiResearch or its employees and which the Buyer's representatives desire to have corrected, shall be corrected on a time and material basis. The inventory of loose equipment made during the incoming inspection will be checked to make certain all items are aboard the Aircraft.

3.3.7 Delivery:

When the work as specified herein has been completed and Buyer has inspected and accepted the Aircraft in accordance with Paragraph 3.3.6 above, AiResearch will deliver the Aircraft to Buyer at a location to be determined at a later date. AiResearch will use its best efforts to

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3.3.7

(continued):

comply with the delivery schedule quoted; however, AiResearch will not be in default hereunder and no liability is assumed by AiResearch for any changes in delivery schedule due to any cause not reasonably within the control of AiResearch. AiResearch will not be considered in default hereunder for delays occasioned by causes which are not reasonably within the control of AiResearch. Where events occur which would entitle Buyer to terminate this agreement for default, Buyer will first give AiResearch a thirty (30) day written notice of its intention to terminate during which time AiResearch may cure any claimed default and incur no liability therefor.

3.3.8

Modification Warranty:

3.3.8.1

As used herein, the following words and phrases have the following meanings:

- (a) "Owner" means the FAA, or its equivalent, registered owner of the Aircraft in which the Articles are installed at time of warranty claim.

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3.3.8.1 (continued):

- (b) "Articles" means new AiResearch TFE 731-3 engines, nacelles, pylon structures, other structures, system changes, parts and components described in Section II of this Exhibit A which are delivered for commercial use.
- (c) "Commercial Use" means the operation of the Aircraft as licensed by FAA or its equivalent for general civilian and commercial use excluding aerial dusting and spraying and any other type of flying requiring special authorization or dispensation by FAA or its equivalent.
- (d) "Initial Operation" means the first running of the engine after obtaining a certificate of airworthiness on the Aircraft.
- (e) "Aircraft Operation Hours" means the total number of hours of operation of the Aircraft.
- (f) "Engine Operating Hours" means the total number of flight hours.
- (g) "Failure" or "Malfunction" of the Articles means breakage or improper function.

3.3.8.2 AiResearch warrants that the Articles delivered hereunder conform to final specification, drawings, and other

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3.3.8.2 (continued):

description agreed in writing to be applicable and are free from defects in materials and workmanship. This warranty shall run to the Buyer, its successors, assigns and customers when they become the Owner.

3.3.8.3 AiResearch's responsibility under this warranty, excluding engines, shall expire

1. Five Hundred (500) Aircraft Operation Hours after delivery to Buyer; or
2. Twelve (12) months from the date of delivery of the original Article to Buyer whichever first occurs.

With respect to the engines, AiResearch's responsibility under this warranty shall expire

1. One Thousand (1,000) Engine Operating Hours after initial operation; or
2. Twenty-four (24) months from the date of delivery to the Buyer, whichever first occurs.

3.3.8.4 The responsibility of AiResearch hereunder, and the sole and exclusive remedy of Buyer, its successors, assigns or customers when they become the Owner for a breach of any warranty hereunder, is limited to repairing or replacing the Article by AiResearch (in its sole discretion)

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3.3.8.4 (continued):

at its Los Angeles, California; Houston, Texas; Springfield, Illinois; Augusta, Georgia or Long Island, New York facility, whichever is so designated to Buyer by AiResearch. In addition, where the nonconformity relates solely to engines, repair or replacement may be accomplished at the engine manufacturer in Phoenix, Arizona, or any authorized Service Center. Such repair or replacement shall be without charge, providing the Article is returned to AiResearch and is not in accordance with Paragraph 3.3.8.2 above; and provided, further, that (a) AiResearch is given written notice of a warranty claim within seven days after discovery of the defect or failure, within the warranty period, and the affected Article is returned to AiResearch within thirty (30) days after such notice, and (b) if AiResearch is unable to repair or replace the defective or nonconforming Articles within a reasonable time after receipt thereof, Buyer shall be credited for their value at the original purchase price. If AiResearch's inspection discloses that the returned Article does not require repair or replacement, Buyer shall be liable for AiResearch's usual charges for inspection, breakdown, and reassembly time and for roundtrip shipping charges.

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- 3.3.8.5 Replacement of any Articles pursuant to this warranty will not extend the aforementioned warranty period beyond the period still remaining on the original Articles.
- 3.3.8.6 Any Article which is replaced shall become the property of AiResearch.
- 3.3.8.7 AiResearch reserves the right to make changes in the Articles design and to add improvements without incurring any obligation to incorporate the same on other Articles sold by AiResearch.
- 3.3.8.8 AiResearch's obligations under this warranty are conditioned on Buyer's obligation to maintain records which will accurately reflect operating time and maintenance performed on AiResearch's equipment and establish the nature of any unsatisfactory condition of AiResearch's equipment. AiResearch, at its request, shall be given access to such records for substantiating warranty claims.
- 3.3.8.9 This warranty will not apply if the Articles or any components thereof have been subject to (a) any maintenance, overhaul, installation, storage, operation, or use, which is improper or not in accordance with AiResearch's

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3.3.8.9 (continued):

instruction; (b) any alteration, modification, or repair by anyone other than AiResearch or its authorized representative or repair facilities authorized under Paragraph 3.3.8.4 which adversely effects the normal operation and performance of the articles; (c) any accident, misuse, neglect, or negligence after delivery by AiResearch; (d) any tests other than normal production flight tests, unless AiResearch grants prior written approval; (e) ingestion of foreign material; or (f) any other cause not within the control of AiResearch. The warranty shall not apply to any Article to the extent that the malfunction or failure is attributable to any part not supplied by or approved by AiResearch.

3.3.8.10 No warranty is given with respect to any unit furnished by the Buyer or to any instrument, component, accessory, or part which is not manufactured by AiResearch; however, AiResearch shall endeavor to obtain the best possible warranties from its vendors in favor of AiResearch and/or Buyer and AiResearch shall, in the event of defect, endeavor to obtain the best adjustment possible for the benefit of the Buyer.

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- 3.3.8.11 Buyer shall bear transportation cost of both defective and replacement Articles to and from a location designated by AiResearch.
- 3.3.8.12 ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, SUCH AS WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED AND DISCLAIMED TO THE EXTENT THEY EXCEED THE WARRANTIES GRANTED HEREIN. THIS WARRANTY COMPRISES AIRESEARCH'S ENTIRE LIABILITY IN RELATION TO ANY FAILURE OR DEFECT TO THE EXCLUSION OF ALL OTHER LIABILITY. IN NO EVENT SHALL AIRESEARCH BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, LOSSES OR EXPENSES.
- 3.3.8.13 No Agreement extending this warranty shall be binding upon AiResearch unless in writing and signed by its duly authorized officer or representative.

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3.4

TITLE:

Title to all parts and materials that will be installed in the Aircraft regardless of the manner of affixation or installation therein, shall not pass to the Buyer or any other person, firm or corporation until the Buyer makes full payment and takes delivery of the Aircraft.

3.5

TAXES:

- A. Buyer indemnifies and holds AiResearch harmless from the payment or imposition of any tax imposed for any Articles sold or used hereunder, or for any work performed hereunder under the provisions of the California Sales and Use Tax Act, or any other similar tax at the place of delivery, plus any penalties or interest or attorney's fees connected with the imposition of any such sales or use tax in connection with the Articles sold or used for the work performed hereunder.
- B. The amount of all federal taxes, if any, applicable to the sale, use or transportation of the Articles sold and/or work performed hereunder and all duties, imposts, tariffs, or other similar levies, if any,

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3.5 (continued):

will be added to the price and paid by Buyer, except where Buyer shall furnish an appropriate certificate or other acceptable evidence of exemption therefrom.

3.6 Changes and Modifications:

AiResearch reserves the right to substitute equivalent equipment, accessories, materials for construction, or design, whenever it is deemed that such substitution is necessary to prevent delay in manufacture or delivery or to meet the requirements of the F.A.A. or whenever AiResearch deems that such substitution will improve the performance, stability, and control, utility, maintenance, or appearance of the Aircraft, provided that such changes or substitutions shall not adversely affect time of delivery or performance of the Aircraft nor appreciably affect its design, weight or balance. The cost of any such changes shall be borne by AiResearch. Following delivery of the Aircraft to Buyer, AiResearch shall have no obligations to incorporate or install in the Aircraft changes or substitutions of the type specified above, except for such changes or substitutions as AiResearch may be

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3.6

(continued):

required to incorporate or install pursuant to Paragraph
3.3.8 of Section III hereinbefore provided.

MINISTÈRE DES TRANSPORTS



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