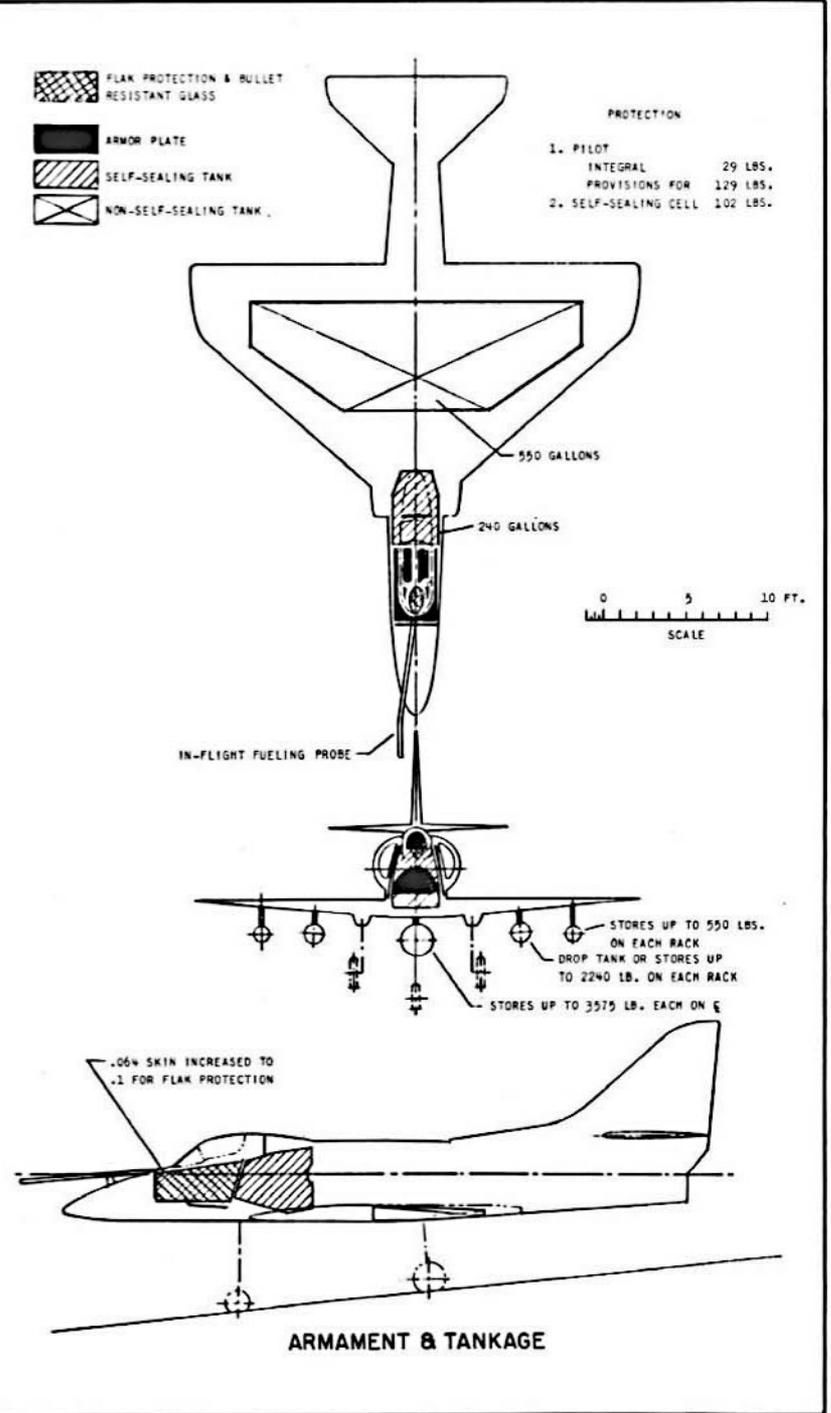
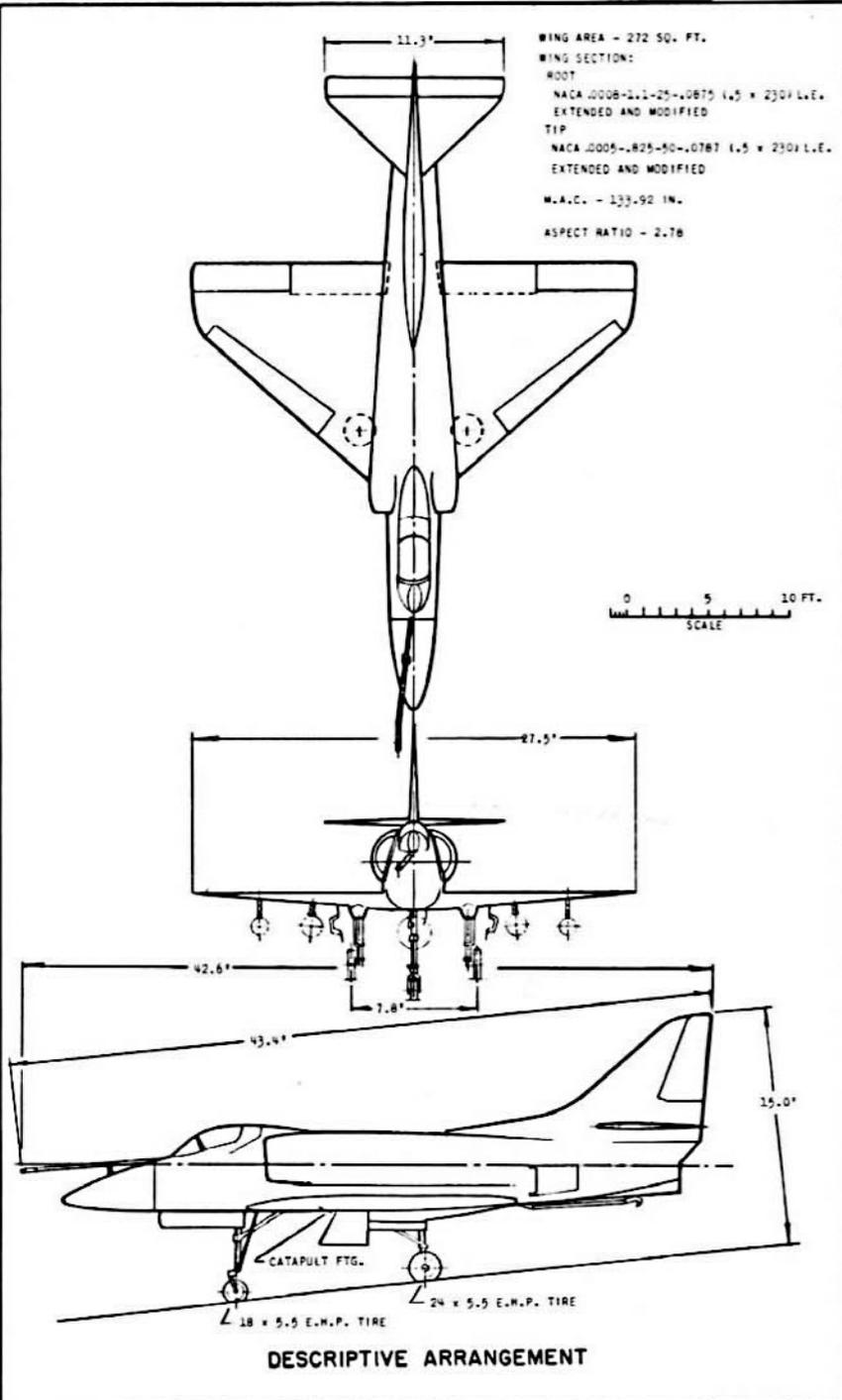


STANDARD AIRCRAFT CHARACTERISTICS MODEL 725 (A4D-3)

DOUGLAS AIRCRAFT COMPANY, INC., EL SEGUNDO DIVISION

PROPOSAL



MODEL 725

15 AUGUST 1957

POWER PLANT

No & Model..... (1) J52-P-(JT8B)
 Mfr.....Pratt & Whitney
 Eng.Spec.No.....N-1731 (7-17-57)
 Type.....Turbo-Jet
 Compr.....Two-rotor,Multi-Stage,
 Axial Flow
 Length.....127.5 in.
 Diameter.....31.5 in.
 JATO (MK. 7-Mod. 1)...(2)5KS 4500

RATINGS

Sea Level Static

Thrust
 Lbs.

Max. T.O. (Water Inject.) 9800
 Military (Non-A/B).....8500
 Normal.....7500

ORDNANCE

Bombs - Mk. 81, 82, 83, 84,
 91, 28, and smaller
 weapons.

TABLE LEG II

Firebomb - MK. 79
 Flare Dispenser-Aero 5A

Guns - POD-Two 20mm Mk. 11 Guns
 with 800 rounds.

Rockets - Expendable Package
 Launchers

Aero 6A1
 Aero 7D
 Aero 10D

Missiles - BULLPUP
 CORVUS
 SIDEWINDER

Miscellaneous

Practice Bomb Containers
 Aero 8A and Aero X9A,
 Missile Dispenser Aero 1A,
 NAPALM - Aero 1A, and
 In-Flight Fueling Store

MISSION AND DESCRIPTION

The Model 725 carrier-based attack airplane is a single-place, jet-powered design. It is basically identical to the Model A4D-3 except for a new nose section and a modified cockpit. Model 725 is capable of accomplishing the low altitude close support mission described in BuAer Type Spec. No. T.S. 149. A modified long range, low altitude attack mission can be completed at 800 N.Mi. radius without refueling and a 1000 N.Mi. radius mission is available with one refueling from another Model 725 airplane.

The aerodynamic configuration is conventional with all-metal semi-monocoque structure and a three spar low aspect ratio wing. The conventional rudder, aileron and elevator flight controls, landing gear, flaps, and speed brakes are hydraulically operated by engine-driven pumps comprising a tandem hydraulic system. A wind driven, drop-out pump furnishes emergency hydraulic power. An electrically operated, fully adjustable stabilizer is used for longitudinal trim. A wind driven, drop-out generator furnishes emergency electric power. In an emergency, the landing gear is manually unlocked and lowered by gravity.

The wing is 27.5 feet in span hence, wing fold is not required. Provisions for the fourth and fifth external wing stations are included. The fuselage aft of the wing is removable for engine access. In-flight fueling and tanker provisions are included.

The nose section is enlarged over the original APG-53 equipped A4D-3 to accommodate additional electronics equipment. Two radar units are provided for the functions of search, obstacle clearance, and track. The original A4D-3 cockpit and instrument panel are modified to accommodate the new equipment in Model 725. JATO provisions are included for use in short field operations. A drag chute is installed for use in short field landings.

Model 725 is capable of conventional and special weapons attack on fixed and moving targets under all conditions of weather and visibility.

WEIGHTS

Loadings	Lbs.	L. F.
Empty (E)	9777	
Basic	10,061	
Flight Design	12,504	7.0
Combat	15,553	5.6
Max. T.O.	22,599	3.9
Des. Landing	13,444	
Des. Catapult	22,599	

FUEL AND OIL

Gal.	No. Tanks	Location
550	1 (Int.)	Wing
240	1 (self-seal)	Fus.
400	1 (Drop)	C/L Wing
300	2 (Drop)	In'bd. Wing

Fuel GradeJP-5
 Fuel Spec.MIL-F-5624C-1

OIL

Capacity (Integral).....3.0 gal.
 Oil Spec. MIL-L-7808C-1

ELECTRONICS

CNI Pkg. (Equiv. to) AN/ASQ-19
 Communications
 Navigation
 Identification
 Radar Functions: Search
 Track
 Terrain Clearance
 Doppler

Armament Control System:
 All-weather Attack
 Navigation System for Model
 725 as described in DAC
 Summary Report No. ES 26781

DIMENSIONS

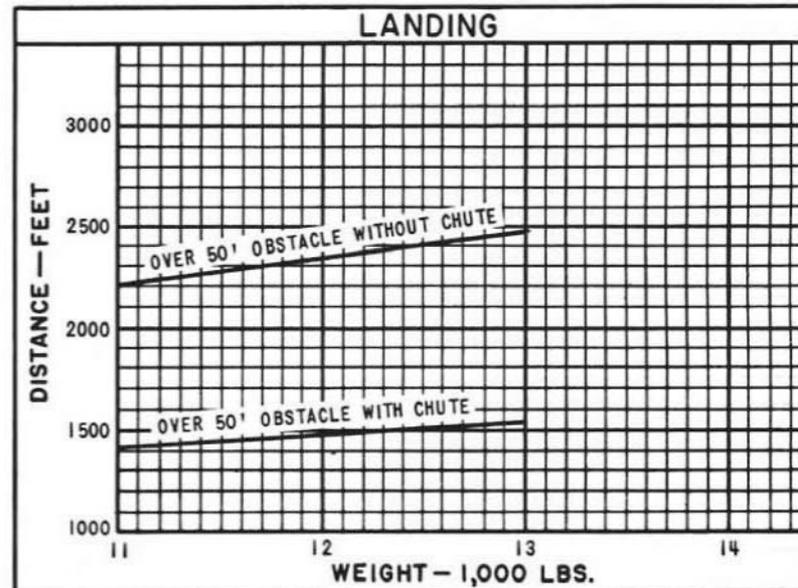
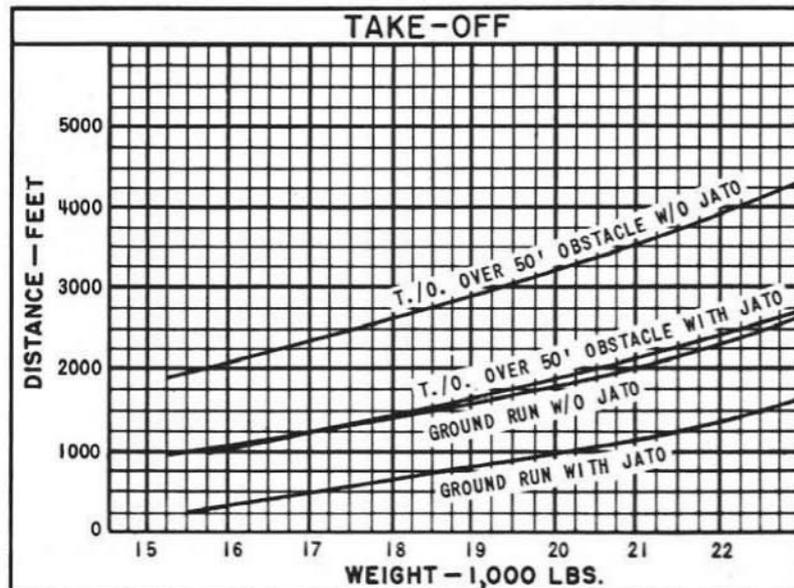
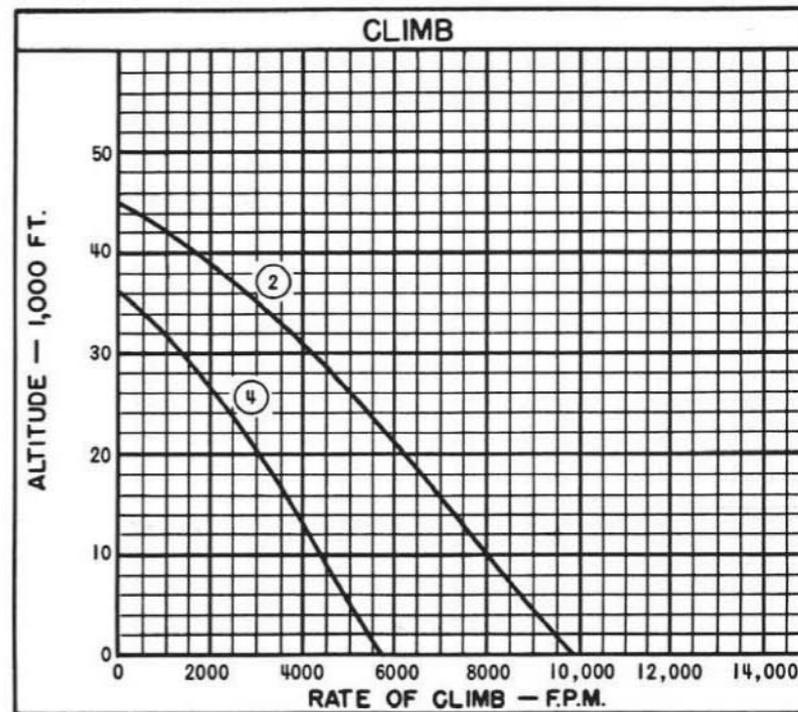
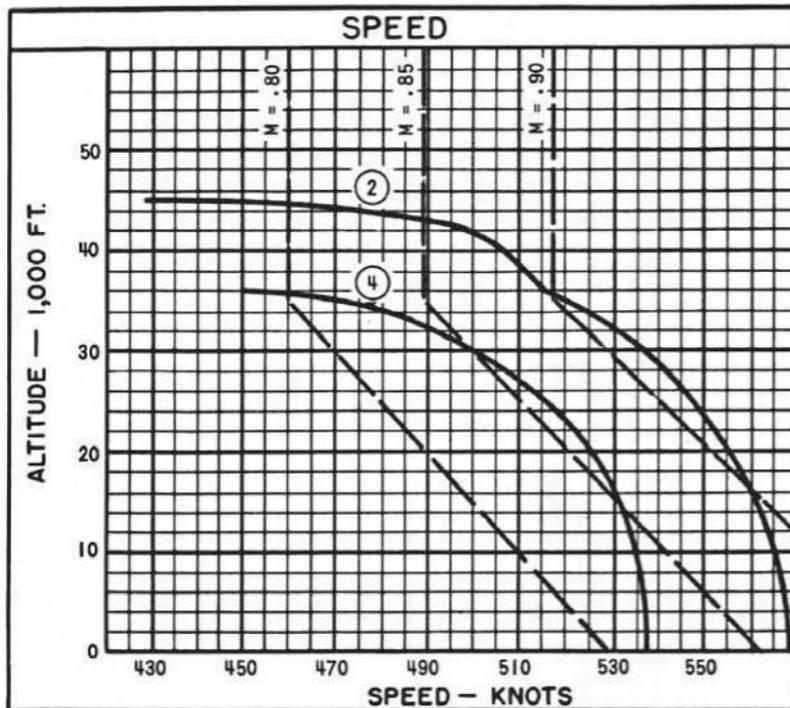
Wing:
 Area 272 sq. ft.
 Span 27.5 ft.
 M.A.C.133.9 in.
 Sweepback 33.2 Deg.
 Length41.1 ft.
 Height15.0 ft.
 Span (no wing fold).....27.5 ft.
 Tread 7.8 ft.

PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION	(1) CLOSE SUPPORT 2 1000-LB MK 83 BOMBS	(4) LONG RANGE 1 MK 28 STORE 2 300-GAL.EXT. FUEL TANKS
TAKE-OFF WEIGHT lb.	17,827	22,599
Fuel (790 Gal. JP-5 @ 6.8 Lb./Gal.) lb.	5372	9452
Payload lb.	2000	2250
Wing loading lb./sq.ft.	65.5	83.1
Stall speed - power-off kn.	116	131
Take-off run at S.L. - No JATO (A) ft.	1410	2495
Take-off run at S.L. - With JATO (A) ft.	695(B)	1660
Take-off to clear 50 ft.-No JATO (A) ft.	2600	4180
Take-off to clear 50 ft.-with JATO (A) ft.	1490 (B)	2715
Rate of climb at S.L. (C) fpm	8250	5650
Time: S.L. to 20,000 ft. (C) min.	2.8	4.6
Time: S.L. to 30,000 ft. (C) min.	5.3	8.8
Service ceiling (100 fpm) (C) ft.	41,900	36,000
Combat range n.mi.	1055	1812
Average cruising speed kn.	433	432
Cruising altitude(s) ft.	37,300-42,200	31,900-41,800
Combat radius n.mi.	300 (D)	800 (E)
Average cruising speed kn.	433	432
Mission Time/Cycle Time hr./hr.	2.4/2.7	3.9/4.3
COMBAT LOADING CONDITION	(2) COMBAT 60% FUEL 2 1000-LB. MK 83 BOMB	
COMBAT WEIGHT lb.	15,553	
Engine power	Military	
Fuel lb.	3223	
Combat speed/combat altitude kn./ft.	568/S.L.	
Rate of climb/combat altitude fpm/ft.	9750/S.L.	
Combat ceiling (500 fpm) ft.	43,600	
Rate of climb at S.L. fpm	9750	
Max. speed at S.L. kn.	568	
Max. speed/altitude kn./ft.	520/35,000	
LANDING WEIGHT (20% Fuel-No Stores) lb.	11,404	
Fuel lb.	1074	
Stall speed - power-off kn.	92.8	
Stall speed - with approach power kn.	88.5	
Landing Distance-Calm, With Chute ft.	1440	

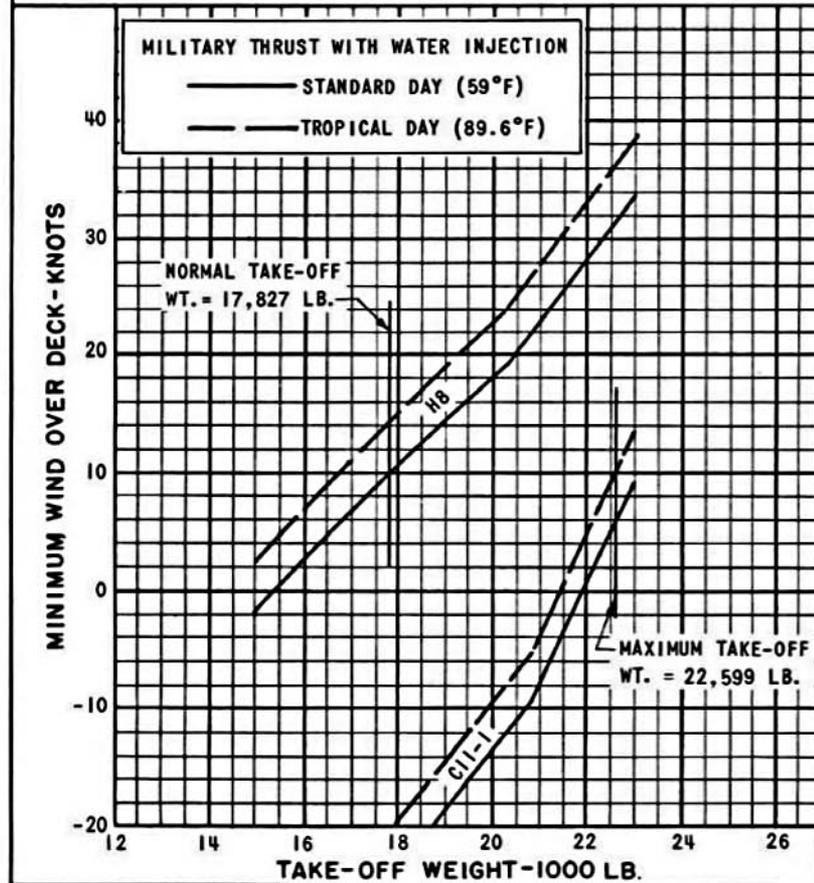
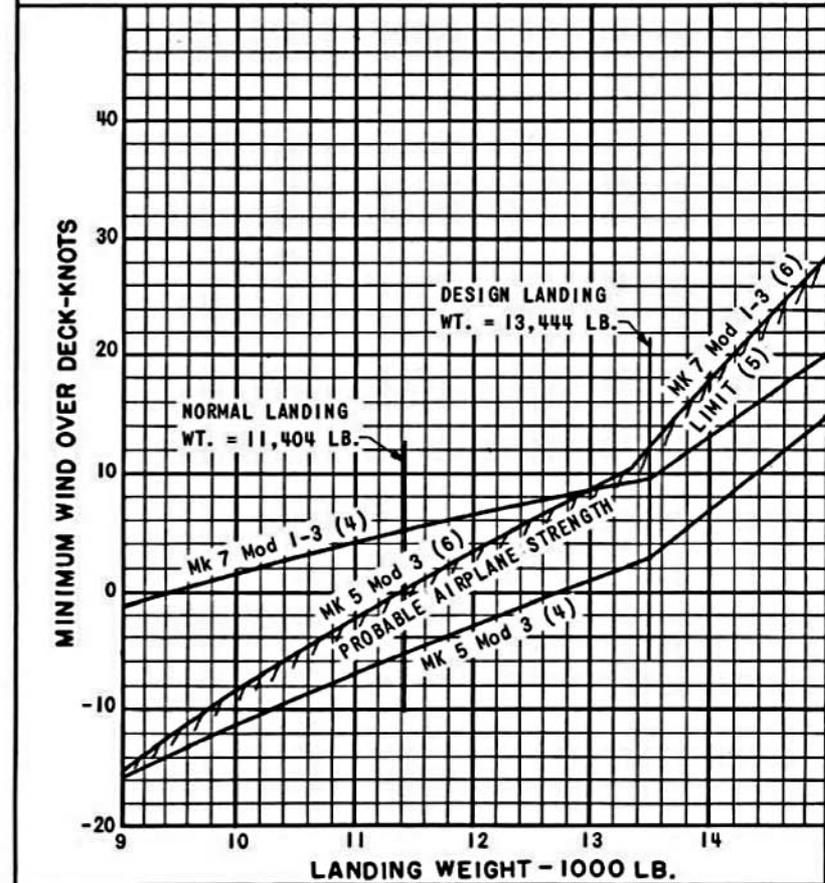
NOTES

- (A) Maximum thrust with water injection.
- (B) Take-off weight with two 5KS 4500 JATO units is 18,281 lb.; JATO dropped after take-off.
- (C) Military thrust.
- (D) Close support mission defined in BuAer type specification 149 dated 19 Feb. 1957 and shown on 1st. NOTES page.
- (E) Modified long range problem. See Notes for mission profile.
- (F) PERFORMANCE BASIS: Flight test data obtained from A4D-1 and Model A4D-3 wind tunnel tests.
- (G) Combat range and radius are based on fuel consumption data from Pratt & Whitney specification N 1731 dated 7-17-57 and increased 5%.
- (H) A total of 27 airplanes can be accommodated in a landing spot 96 ft. wide by 200 ft. long.



○ LOADING CONDITION COLUMN NUMBER

CARRIER SUITABILITY

DECK WIND REQUIRED
FOR CATAPULTINGDECK WIND REQUIRED
FOR LANDING

NOTES:

- (1) H8 catapult take-off speed is based on $.81C_{Lmax}$. C11-1 catapult take-off speed is based on NATC recommended minimum for A4D-1.
- (2) H8 catapult end speed is limited by maximum end speed at weights below 20,260 lb. and by catapult capacity above 20,260 lb. C11-1 catapult end speed is limited by load factor of 5.86 at weights below 20,750 lb. and by horizontal hook load of 117,000 lb. above 20,750 lb.
- (3) Approach speed is based on $1.3V_{SPA}$.
- (4) Engaging speed limited by load factor of 5.72 at weights below 13,444 lb. and by maximum hook load of 77,000 lb. above 13,444 lb.
- (5) Engaging speed is based on ultimate sinking speed and 6.25° angle between flight path and carrier deck.
- (6) Probable airplane strength limit, based on sinking speed, restricts minimum wind with MK. 5 Mod. 3 at all weights and with MK. 7 Mod. 1-3 at weights above 13,000 lb.

NOTES

CLOSE SUPPORT (COMBAT RADIUS MISSION)

WARM-UP, TAKE-OFF AND ACCELERATE: 5 minutes at normal rated thrust at sea level.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE OUT: At altitudes and speeds for maximum range.

DESCEND TO 5000 FT.: No fuel consumed, no credit for distance covered.

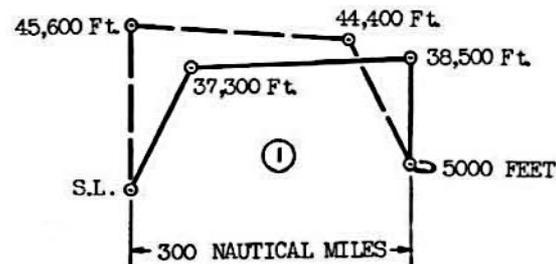
LOITER ONE HOUR: At 5000 feet at speed for maximum endurance (no credit for distance covered.)

DROP BOMBS:

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE BACK: At altitudes and speeds for maximum range.

RESERVE: 5% of initial fuel plus fuel for 20 minutes at speed for maximum endurance at sea level.



$$\text{COMBAT RADIUS} = \text{CLIMB} + \text{CRUISE-OUT} = \text{CLIMB} + \text{CRUISE-BACK}$$

$$\text{MISSION TIME} = \text{TIME REQUIRED FOR CLIMB} + \text{CRUISE OUT} + \text{LOITER} + \text{CLIMB} + \text{CRUISE BACK}$$

$$\text{CYCLE TIME} = \text{MISSION TIME} + 20 \text{ MINUTES RESERVE LOITER TIME}$$

LONG RANGE (COMBAT RADIUS MISSION)

WARM-UP, TAKE-OFF AND ACCELERATE: 5 minutes at normal rated thrust at sea level.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE OUT: At altitudes and speeds for maximum range.

DESCEND TO SEA LEVEL: When 300 N.Mi. from target (no fuel used, no credit for distance covered)

CRUISE: At maximum range at sea level. Drop external fuel tanks when empty.

RUN-IN: 3 minutes to target at military power.

DROP BOMB:

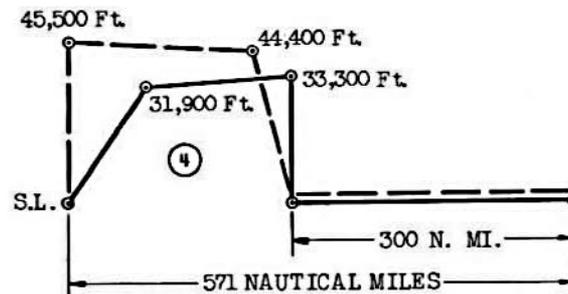
RUN-OUT: 2 minutes from target at military power at sea level.

CRUISE: At maximum range speed at sea level to a point 300 N.Mi. from target.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE BACK: At altitudes and speeds for maximum range.

RESERVE: 5% of internal fuel capacity plus fuel for 20 minutes at maximum endurance speed at S.L.



○ LOADING CONDITION COLUMN NUMBER

NOTES

MODIFIED LONG RANGE (COMBAT RADIUS MISSION)

WARM-UP, TAKE-OFF AND ACCELERATE: 5 minutes at normal rated thrust at sea level.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE-OUT: At altitude and speeds for maximum range.

DESCEND TO SEA LEVEL: When 152 N.Mi. from target (no fuel used, no credit for distance covered).

CRUISE: At maximum range at sea level. Drop external fuel tanks when empty.

RUN-IN: 3 minutes to target at military power.

DROP BOMB:

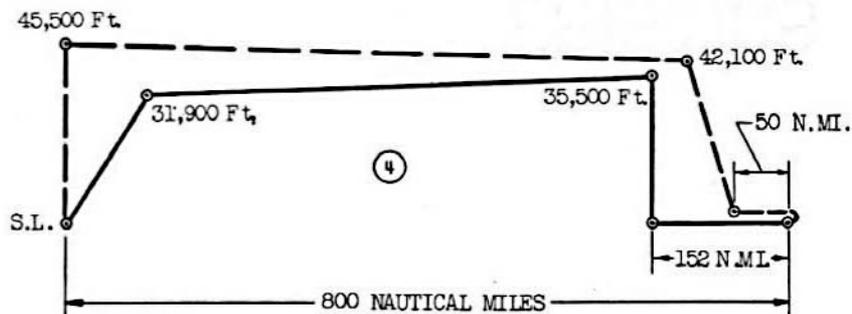
RUN-OUT: 2 minutes from target at military power at sea level.

CRUISE: At maximum range speed at sea level to a point 50 N.Mi. from target.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE BACK: At altitudes and speeds for maximum range.

RESERVE: 5% of internal fuel capacity plus fuel for 20 minutes at maximum endurance speed at S.L.

MODIFIED LONG RANGE (COMBAT RADIUS MISSION) WITH ONE IN-FLIGHT REFUELING

WARM-UP, TAKE-OFF AND ACCELERATE: 5 minutes at normal rated thrust at sea level.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE-OUT: At altitude and speeds for maximum range to 400 N.Mi.

REFUEL: From Buddy A3D, A4D, or Model 725 Tanker.

CRUISE OUT: At altitude and speeds for maximum range.

DESCEND TO SEA LEVEL: When 300 N.Mi. from target (no fuel used, no credit for distance covered)

CRUISE: At maximum range at sea level.

RUN-IN: 3 minutes to target at military power. External fuel tanks are dropped before run to target.

DROP BOMB:

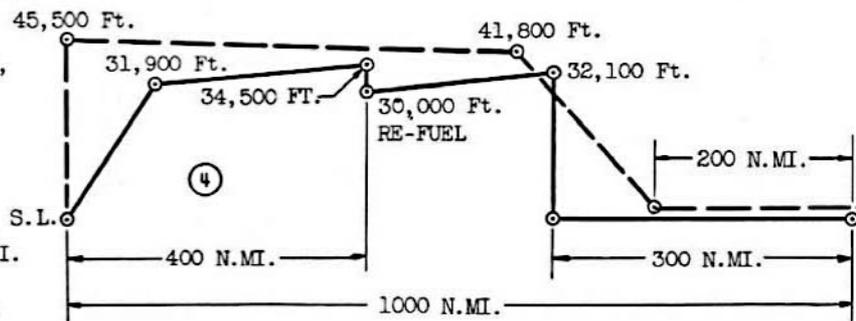
RUN-OUT: 2 minutes from target at military power at sea level.

CRUISE: At maximum range speed at sea level to a point 200 N.Mi. from target.

CLIMB: On course to optimum cruise altitude with maximum rated thrust.

CRUISE BACK: At altitudes and speeds for maximum range.

RESERVE: 5% of internal fuel capacity plus fuel for 20 minutes at maximum endurance speed at S.L.



○ LOADING CONDITION COLUMN NUMBER



DEVELOPMENT PROGRESS SUMMARY A4D-3 SKYHAWK

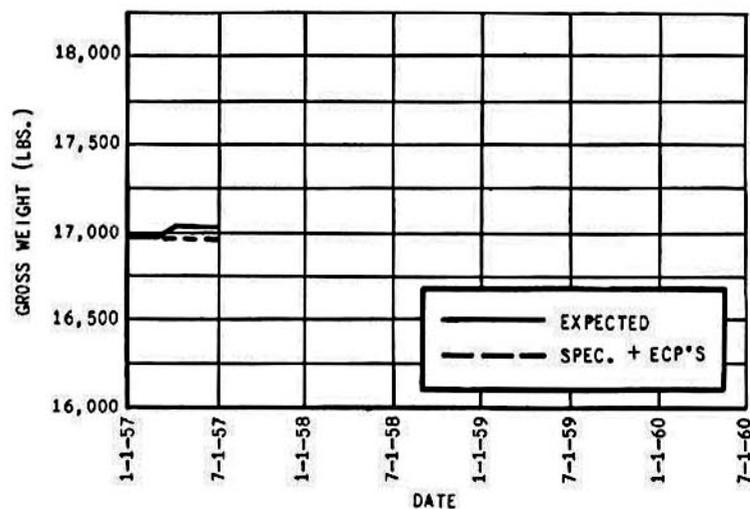
CONTRACT NO α (s) 57-183
DOUGLAS AIRCRAFT COMPANY, INC.
EL SEGUNDO DIVISION

Δ SUMMARY

Notification of termination of the A4D-3 (Contract NOa(s) 57-183c) has been received by BuAer dispatch 2118532 of June.

Δ WEIGHT STATUS

CONDITION	SPEC. WT. + ECP's	EXPECTED WEIGHT
NOa(s) 57-183 - Wt. Empty	9119 lb.	9180 lb.
ATTACK - 790 gal. fuel (JP-5), 1-2000 lb. store - Gross Wt.	16,966 lb.	17,027 lb.



Above weights include pending ECP 297 which consists of the mock-up board changes, ECP 327-relocated inflight refueling probe to nose, GFE Spec. weight adjustment +11.6 lbs.

△ PERFORMANCE STATUS (1)

J52-P-4 ENGINE
 LOADING CONFIGURATION - 1-2000 lb. store on C pylon
 In Flight Fueling Probe
 790 Gallons of JP-5 Fuel

		Original Estimate + ECP's (2)	Guarantees (3)	Expected Performance (4)
TAKE-OFF WEIGHT	lb.	16,966		17,027
Fuel	lb.	5372		5372
Stall speed - power-off	kn.	113.2	116.0	113.4
Wind required for catapult take-off with H-8 catapult	kn.	8		9
Rate of climb at S.L.	ft./min.	8000		7900
Service ceiling	ft.	42,200		43,300
Combat radius	n.mi.	505		518
Average cruise speed	kn.	442		437
Mission time	hr.	2.4		2.5
Cycle time	hr.	2.7		2.8
COMBAT WEIGHT	lb.	12,817		12,878
Engine power		MILITARY		MILITARY
Fuel	lb.	3223		3223
Rate of climb at S.L.	ft./min.	10,900		10,800
Combat ceiling	ft.	47,200	46,200	48,000
Max. speed at S.L.	kn./M	571/.86	562	573/.87
Max. speed at 35,000 ft.	kn./M	533/.93		531/.92
Max. specific range at alt. for max. specific range	n.mi./lb.	.373 @ 41,100 ft.	.346 @ 41,100ft.	.381 @ 41,900 ft.
LANDING WEIGHT	lb.	10,269		10,326
Fuel	lb.	675		671
Stall speed - power-off at S.L.	kn.	88.1		88.3
Wind required for arrested landing with Mk.5, Mod.3 arresting gear	kn.	-6		-6

(Notes on following page)

△ NOTES

Notes for Performance Status on preceding page:

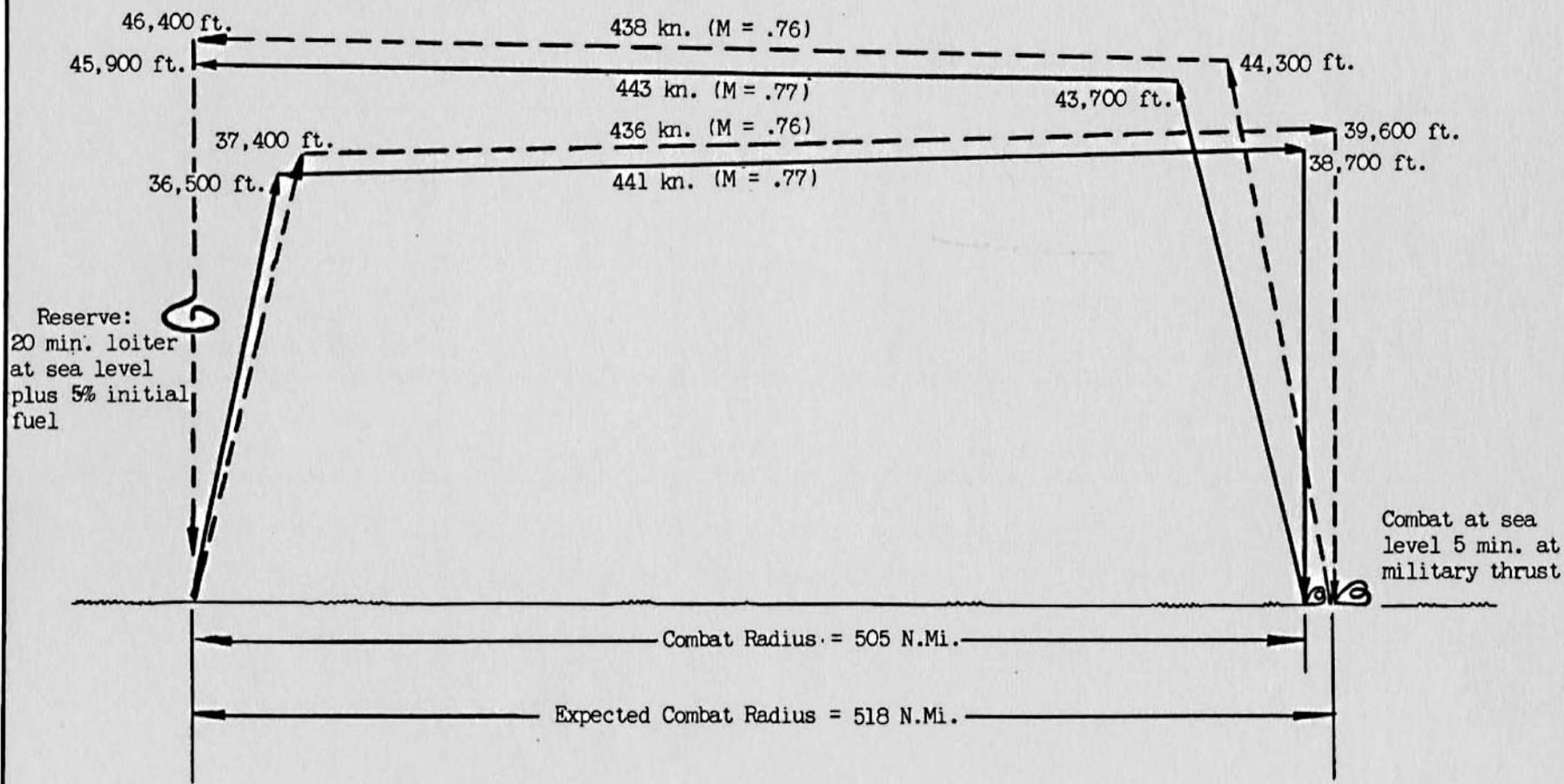
- (1) All performance data as of 26 June 1957 including ECP 297 and ECP 327.
- (2) Based on original estimate from which guarantees were derived.
- (3) Actual guarantees as of 26 June 1957, adjusted for applicable ECP's (see note 1).
- (4) Estimated and guaranteed performance are derived from A4D-3 wind tunnel tests and limited A4D-1 flight tests and are based on Pratt & Whitney Specification No. 1723 for the model J52-P-4 engine, dated 14 January 1957.
- (5) The differences between the expected and the original estimated performance are due to more recent wind tunnel results incorporated in the expected performance and an airplane overweight of 61 pounds.

Δ COMBAT RADIUS PROFILE

LOW ALTITUDE ATTACK MISSION

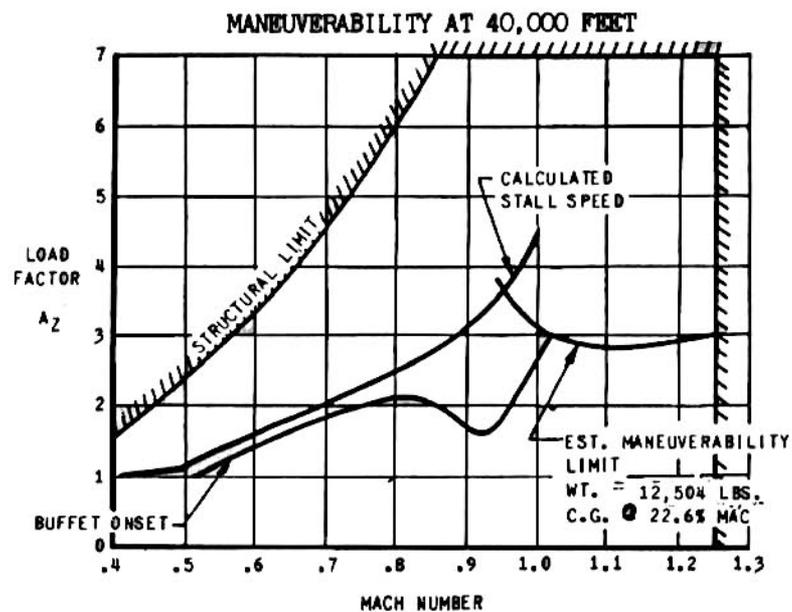
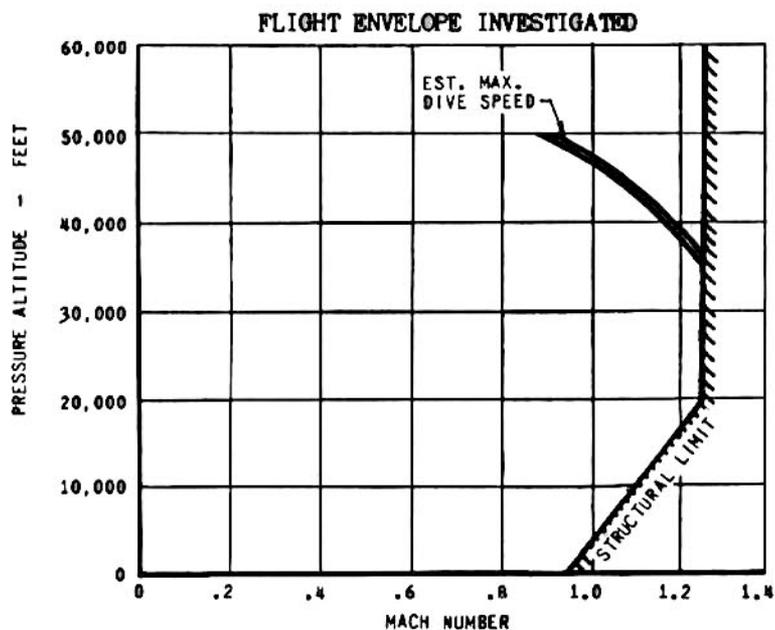
2000 lb. Store on ϕ Pylon

— Original Estimate + ECP's
 - - - Expected



AERODYNAMIC DEMONSTRATION

ESTIMATED FLIGHT LIMITS

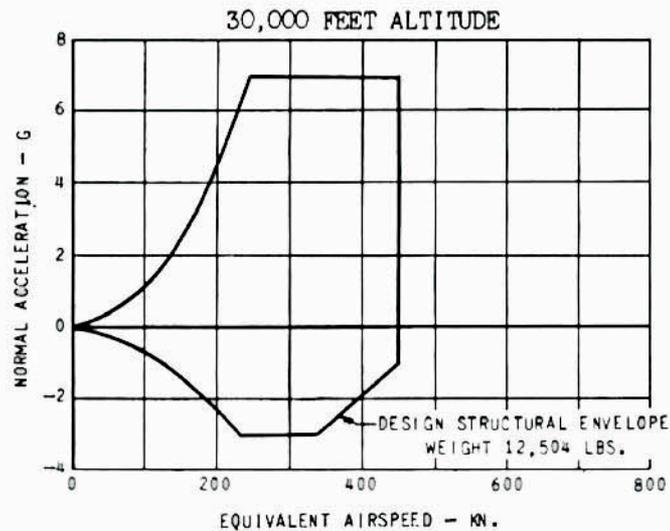
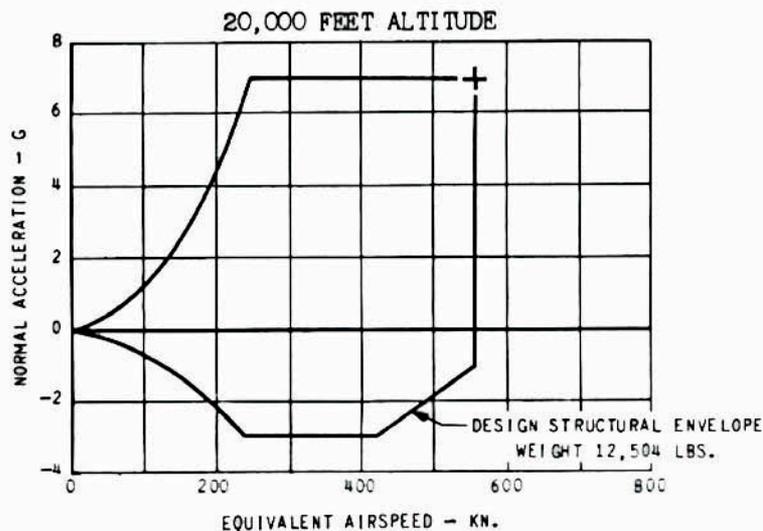
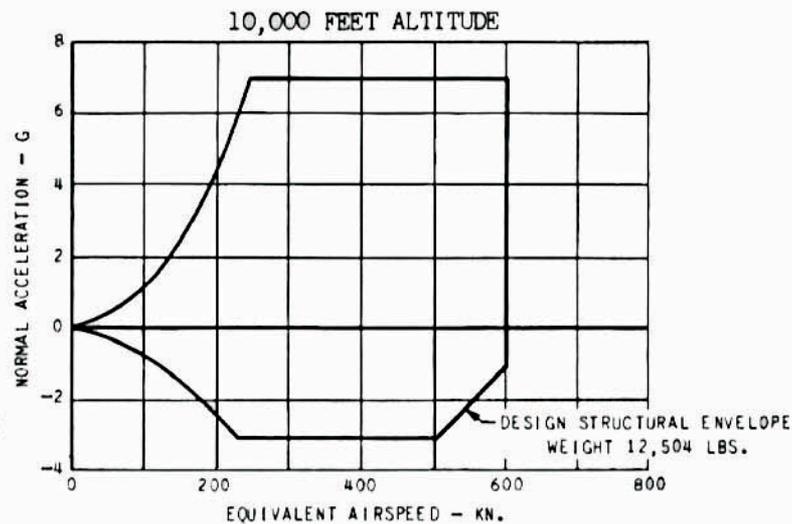
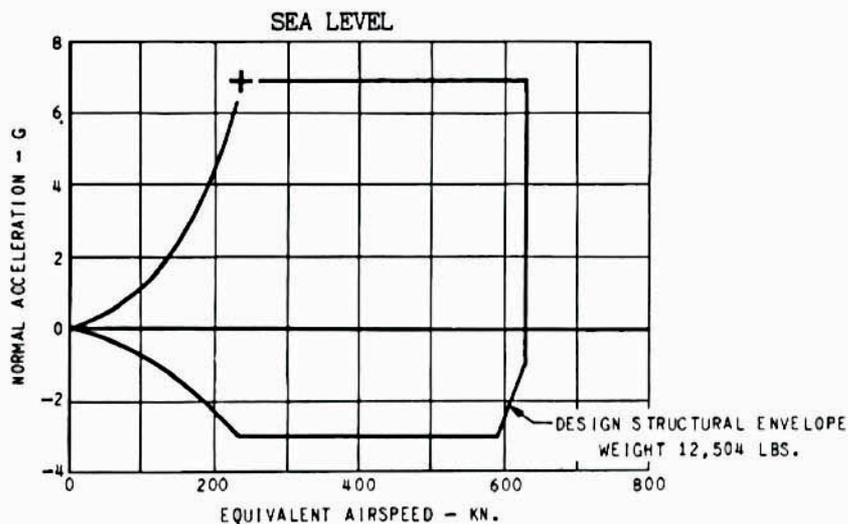


26 JUNE 1957

A4D-3

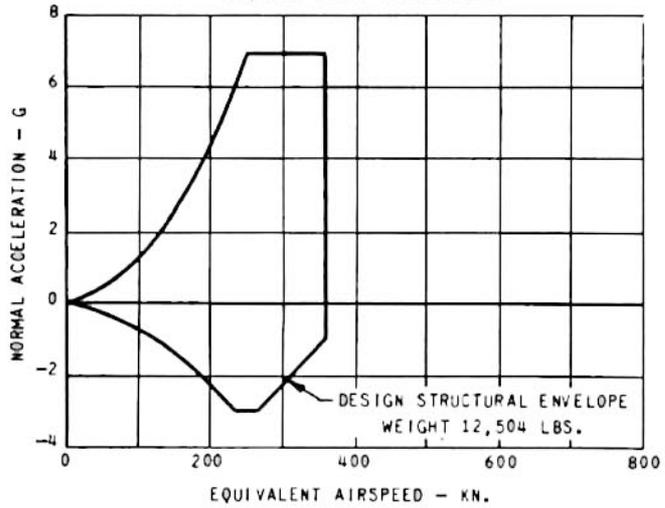
STRUCTURAL DEMONSTRATION

+	STATIC TEST POINTS REQUIRED
○	STATIC TEST POINTS COMPLETED



STRUCTURAL DEMONSTRATION

40,000 FEET ALTITUDE



50,000 FEET ALTITUDE

