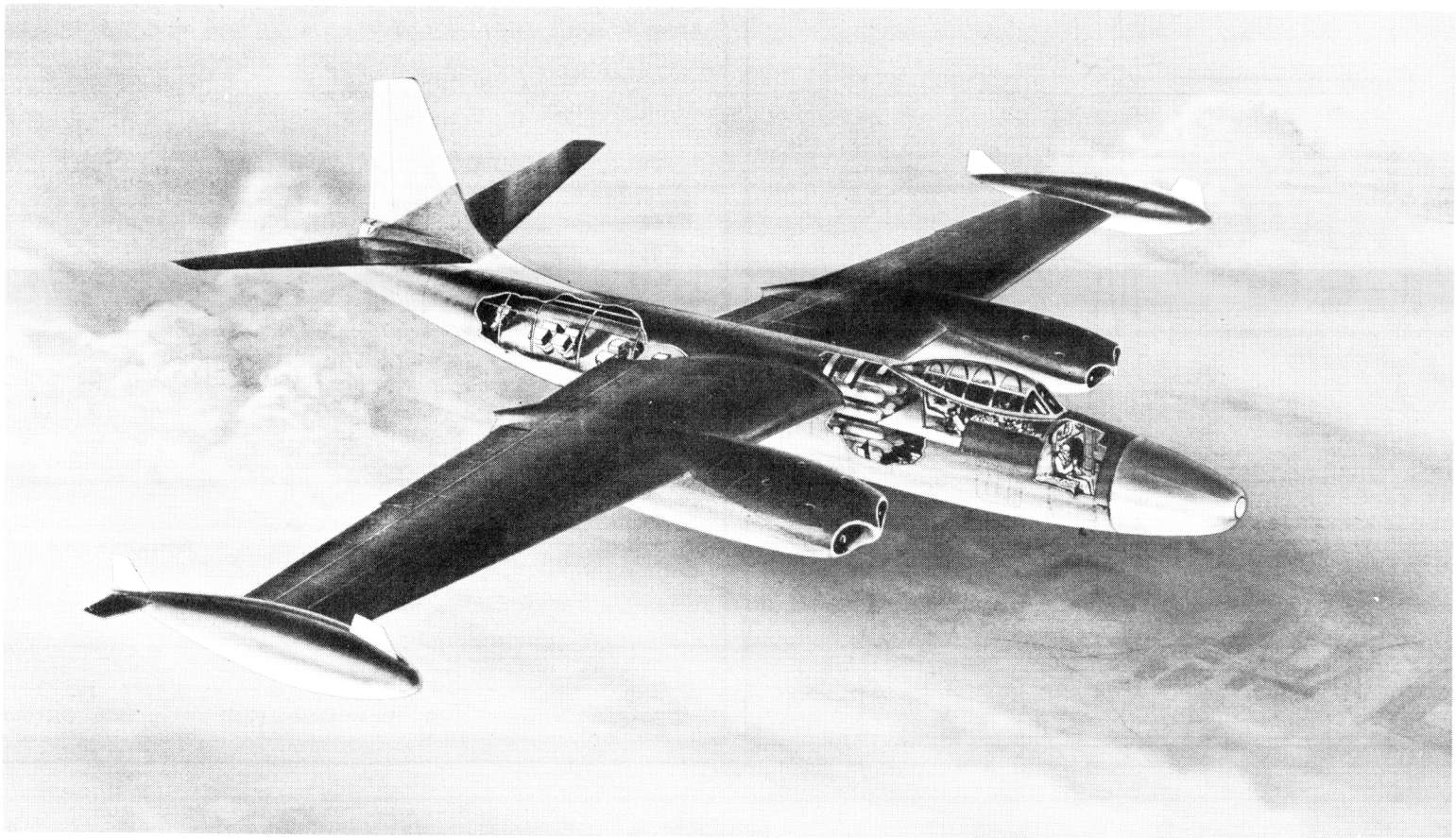
SERVICE



Standard Aircraft Characteristics

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

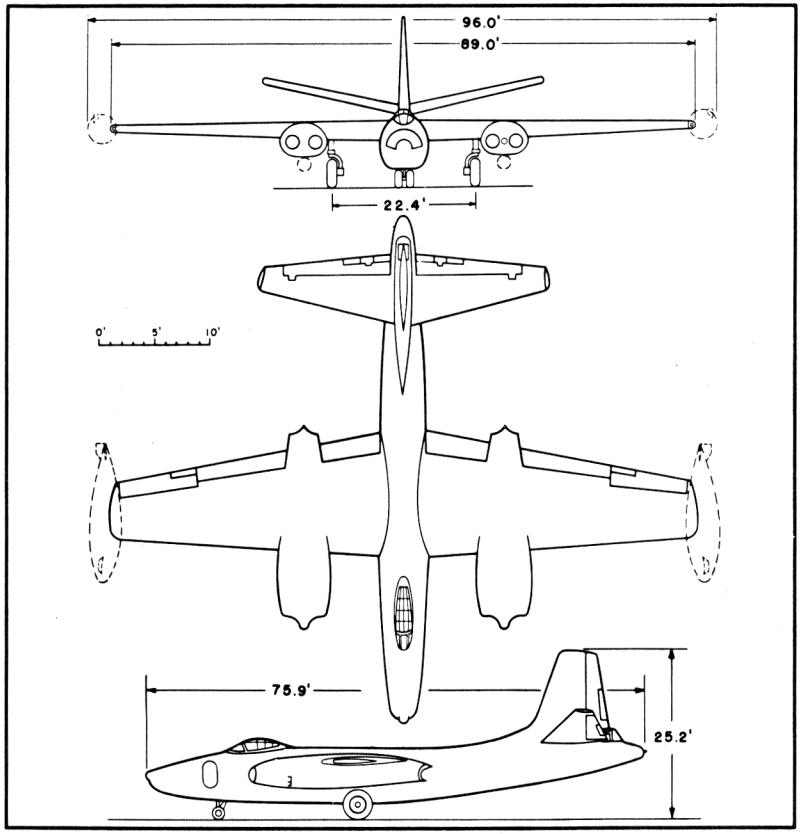
RB-45C

TORNADO

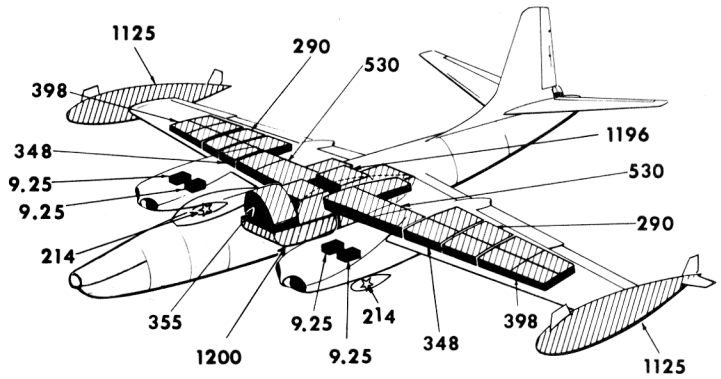
North American

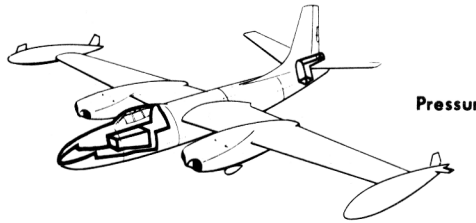
TWO J47-GE-7 OR -13
AND
TWO J47-GE-9 OR -15
GENERAL ELECTRIC

18 FEB 54



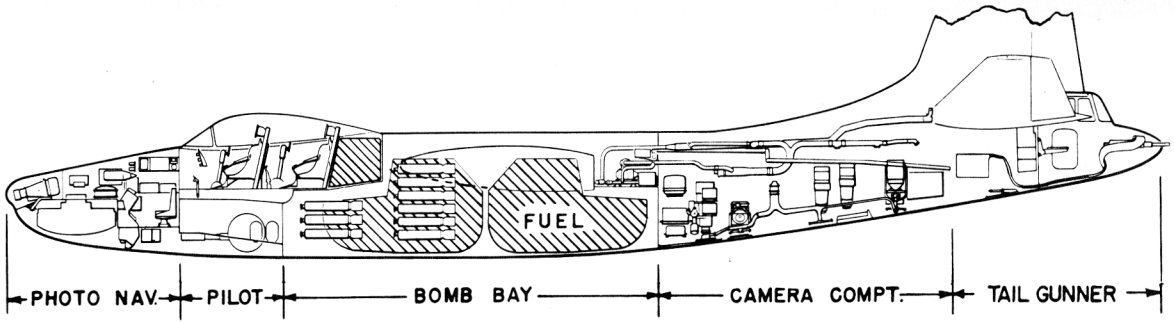
Wing Area	1175 sq ft	Wing Section:	
M.A.C.	168.18 in.	Root	N.A.C.A. 66,2-215
Aspect Ratio	6.74	Tip	N.A.C.A. 66,1-212





Pressurized Area

▨ Fuel (Gal) ☆ Water Alcohol (Gal) ■ Oil (Gal)



POWER PLANT

No. & Model: (2)J47-GE-7 or -13 and (2)J47-GE-9 or -15
Mfr. . . . . General Electric
Engine Spec No. . . E-581 & E-582
Type . . . . . Axial
Length . . . . . 144"
Diameter . . . . . 39"
Weight (dry) . . . . . 2525 lb
Tail Pipe . . . . . Fixed Area
Augmentation . . . Water/Alcohol ATO
No. & Model . . (2)30DS4000(T-34)
Mfr . . . . . Picatinny Arsenal
Engine Spec No. . . . . NA
Weight (loaded) . . . . . 1610 lb ea

ENGINE RATINGS

S. L. S.	LB	-	RPM	-	MIN
Max:(wet)	*6000	-	7950	-	5
(wet)	**5820	-	7950	-	5
Mil:	*5200	-	7950	-	30
	**5000	-	7950	-	30
Nor:	*4320	-	7370	-	Cont
	**4250	-	7370	-	Cont

* -13 and -15 engines
** -7 and -9 engines
ATO
Thrust (lb ea) 4000
Duration (sec) 30

Mission and Description

Navy Equivalent: None Mfr's Model: NA-153

The principal missions of the RB-45C are day or night photo-reconnaissance, mapping and charting.

The crew of four consists of pilot, co-pilot-radio operator, tail gunner and photo-navigator. The photo-navigator also serves as bombardier-navigator and radar operator.

Movement of personnel to the aft camera compartment is impossible while the airplane is in flight; however, access can be gained to the bomb bays in flight, but only if the bomb bays are empty, bomb bay doors are closed, and the pressurized compartments are depressurized.

Features provided for crew comfort consist of pressurization of all crew compartments, heating and cooling. Ejection seats are provided for the pilot and co-pilot and emergency escape hatches for the bombardier-navigator and tail gunner. Communication equipment, emergency flight controls and instruments are installed at the co-pilot's station.

Hot air for anti-icing and defrosting is extracted from the final stage of the engine compressors.

A water injection system is installed for increased thrust for take-off and utilizes two 214 gal droppable tanks suspended beneath the nacelles by use of ATO suspension hooks.

There are provisions for two droppable assist take-off rockets, one on the underside of each nacelle in lieu of water injection system.

A type E-4 Auto-Pilot and bombing-navigation radar are installed as standard equipment.

Air refueling provisions have been incorporated into the existing single-point refueling system.

Development

Design Initiated	Jan 49
First Flight	Apr 50
First Acceptance	Jun 50
Final Delivery	Oct 51

WEIGHTS

Loading	Lb	L. F.
Empty	49,984 (A)	
Basic	50,687 (A)	
Design	82,600	3.0
Combat	*73,200	
Max T. O.	†110,721	
Max Land	‡110,721	

(A) Actual
* For Basic Mission
† Limited by space
‡ Limited by T. O. weight

F U E L

Location	No. Tanks	Gal
Wg*	8	3132
Fus*	1	355
Bomb Bay, fwd	1	1200
Bomb Bay, aft	1	1196
Wg, drop	2	2250
	Total	8133

Grade JP-4
Specification . . MIL-F-5624A

OIL

Nacelles . . . . 4 . . . (tot) 37
Grade 1005
Specification . . . MIL-L-6081A
* Self-Sealing

WATER/ALCOHOL

Nac, ext, drop . . 2 . . . (tot) 428

DIMENSIONS

Wing
Span . . . . . 89.0'
(with tip tanks) . . . . . 96.0'
Incidence (root) . . . . . 3°
(tip) . . . . . 0°30'
Dihedral . . . . . 1°
Sweepback (LE) . . . . . 3°30'
Length . . . . . 75.9'
Height . . . . . 25.2'
Tread . . . . . 22.4'

B O M B S

No.	Class (lb)
25 . . M-122 . .	Photo Flash . . 188

G U N S

No.	Type	Size	Rds ea	Loc
2 . .	M-7 . .	50 cal . .	400 .	Tail, tur

CAMERAS

No.	Type	Lens
	Tri-Metrogon Station	
3	K-17C	6"
	Vertical Station	
1	K-38	36"
1	K-37	12"
1	T-11	6"
1	S-7A Stereo	7"
	Forward Oblique Station	
1	K-22	24" or 12"
	Split Vertical Station	
2	K-37	12"
2	K-38	24"

ELECTRONICS

VHF Command AN/ARC-3
Radio Compass AN/ARN-6
Interphone AN/AIC-2A
Localizer RC-103A
Glide Path AN/ARN-5A
Marker Beacon RC-193A
Bomb. Nav. Radar . . AN/APQ-24
Loran AN/APN-9
IFF *AN/APX-6
Radar AN/APN-68
Radar . . . . . AN/APN-2B or -12
* AF 48-34 and subsequent
Note: Plans are under consideration for the installation of AN/APS-54 & E-6 Chaff system

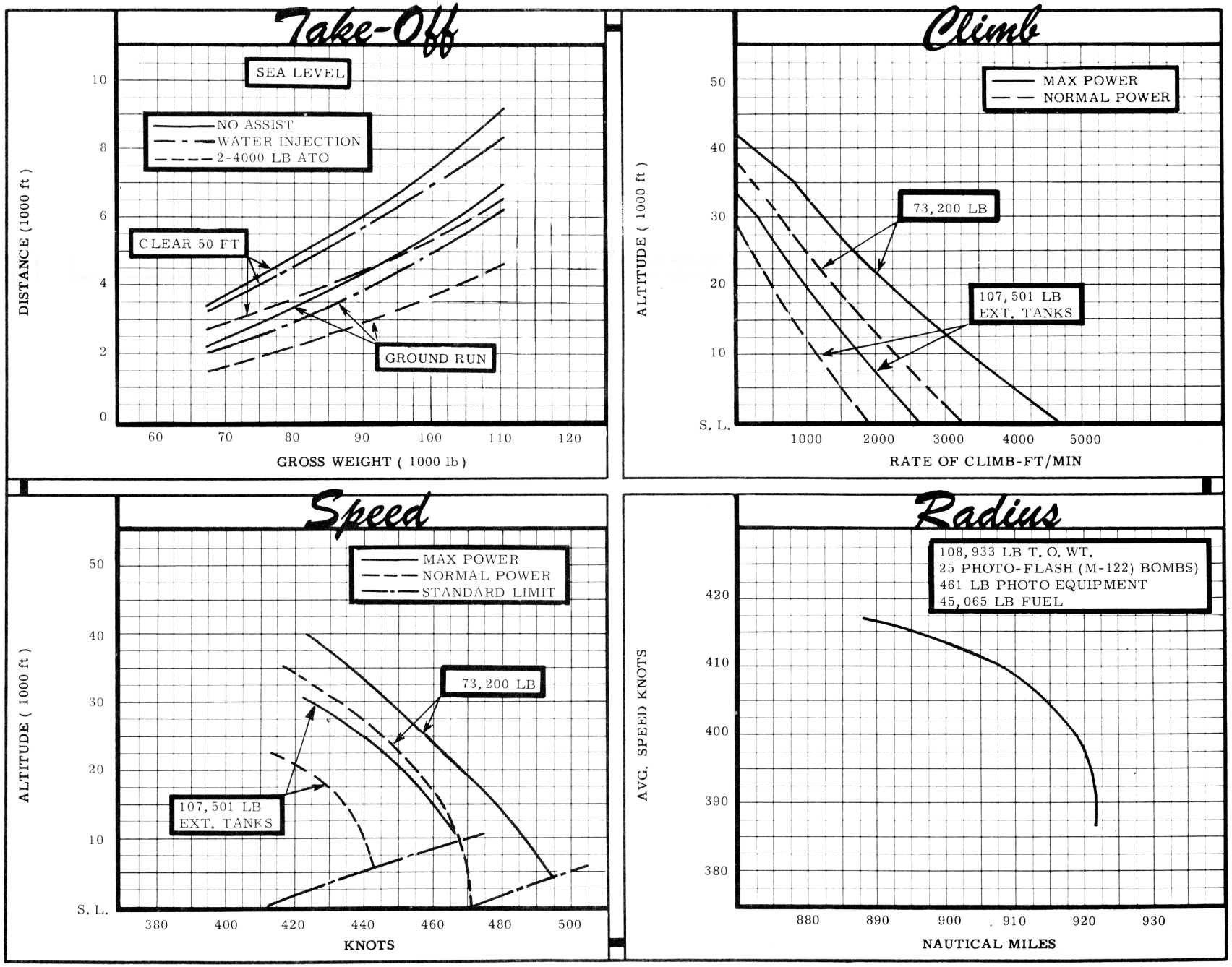
Loading and Performance—Typical Mission

CONDITIONS		BASIC MISSION	DESIGN MISSION	DAY RECONN HIGH ALT MISSION	DAY RECONN LOW ALT MISSION	FERRY RANGE (TANKS DROPPED)	FERRY RANGE (TANKS CARRIED)
TAKE-OFF WEIGHT ④	(lb)	I 107,528	II 91,243	III 110,721	IV 110,680	V 110,279	VI 110,279
Fuel at 6.5 lb/gal (grade JP-4)	(lb)	45,064	30,439	52,865	52,865	52,865	52,865
Payload (Cameras)	(lb)	461	461	442	401	None	None
Payload (Flash Bombs)	(lb)	4700	4700	None	None	None	None
Wing loading	(lb/sq ft)	92.55	78.71	95.26	95.23	94.89	94.89
Stall speed (power off) ⑥	(kn)	121	111	123	123	122	122
Take-off ground run at SL ①	(ft)	6100	4100	6570	6570	6500	6500
Take-off ground run with ATO ⑤ ①	(ft)	4300	2950	4600	4600	4550	4550
Take-off to clear 50 ft ①	(ft)	8070	5760	8580	8580	8500	8500
Take-off to clear 50 ft w/ATO ① ⑤	(ft)	6170	4580	6570	6570	6500	6510
Rate of climb at SL ① ⑥	(fpm)	2700	3690	2590	2590	2610	2610
Rate of climb at SL (one eng. out) ① ⑥	(fpm)	1625	2040	1550	1550	1570	1570
Time: SL to 20,000 ft ① ⑥	(min)	10.5	7.4	11.2	11.2	11.0	11.0
Time: SL to 30,000 ft ① ⑥	(min)	21.1	14.5	23.2	23.2	22.9	22.9
Service ceiling (100 fpm) ① ⑥	(ft)	33,500	37,200	32,300	32,300	32,500	32,500
Service ceiling (one eng. out) ①	(ft)	23,300	28,200	22,400	22,400	22,550	22,550
COMBAT RANGE ③	(n. mi)	———	———	———	———	2250	2164
COMBAT RADIUS ③	(n. mi)	916	616	1107	940	———	———
Average cruise speed	(kn)	404	407	406	401	406	386
Initial cruising altitude	(ft)	26,250	31,600	25,300	25,300	25,400	25,400
Target speed ②	(kn)	421	418	420	472 ⑦	———	———
Target altitude	(ft)	32,300	34,800	32,700	S. L.	———	———
Final cruising altitude	(ft)	39,500	39,800	39,400	40,000	39,700	39,100
Total mission time	(hr)	4.6	3.1	5.5	4.7	5.6	5.6
COMBAT WEIGHT	(lb)	73,200	67,289	77,022	77,500	58,129	58,129
Combat altitude	(ft)	32,300	34,800	32,700	S. L.	39,700	39,100
Combat speed ①	(kn)	442	438	440	472 ⑦	435	428
Combat climb ①	(fpm)	1020	1070	850	4300	840	890
Combat ceiling (500 fpm) ①	(ft)	37,800	39,750	36,600	36,400	42,900	42,800
Service ceiling (100 fpm) ①	(ft)	41,500	43,300	40,250	40,100	46,400	46,200
Service ceiling (one eng. out) ①	(ft)	33,800	35,900	32,000	31,800	38,800	39,300
Max rate of climb at SL ①	(fpm)	4600	5060	4340	4300	5970	5450
Max speed at Opt. Alt. ① ⑦	(kn/ft)	495/4000	495/4100	494/3900	494/3900	495/4200	481/1500
Basic speed at 35,000 ft ①	(kn/ft)	436	438	434	434	441	432
LANDING WEIGHT	(lb)	58,407	57,646	58,591	57,325	58,129	58,129
Ground roll at SL	(ft)	2180	2140	2190	2130	2160	2160
Total from 50 ft	(ft)	3480	3440	3490	3430	3460	3460

NOTES

① Max power
② Normal power
③ Detailed descriptions of Radius and Range missions are given on page 6
④ Includes weight of ATO (3220 lb)
⑤ With 2-4000 lb ATO units
⑥ Values quoted are for T.O. weight less ATO
⑦ Structural limit

Performance Basis:
(a) Data source: Flight test
(b) Performance is based on powers shown on page 6


Take-Off
SEA LEVEL
NO ASSIST
WATER INJECTION
2-4000 LB ATO
CLEAR 50 FT
GROUND RUN
DISTANCE (1000 ft)
GROSS WEIGHT (1000 lb)
Climb
MAX POWER
NORMAL POWER
73,200 LB
107,501 LB
EXT. TANKS
ALTITUDE (1000 ft)
RATE OF CLIMB-FT/MIN
Speed
MAX POWER
NORMAL POWER
STANDARD LIMIT
73,200 LB
107,501 LB
EXT. TANKS
ALTITUDE (1000 ft)
KNOTS
Radius
108,933 LB T. O. WT.
25 PHOTO-FLASH (M-122) BOMBS)
461 LB PHOTO EQUIPMENT
45,065 LB FUEL
AVG. SPEED KNOTS
NAUTICAL MILES

NOTES

FORMULA: RADIUS MISSIONS I & II

Take-off and climb on course to cruise ceiling at maximum power. Cruise out at long range speeds increasing altitude with decreasing airplane weight, external and bomb bay tanks (if carried) are dropped when empty, to a point 15 minutes from target. Run into target at normal power, drop flash bombs, conduct 2 minutes evasive action and 8 minutes escape from target at normal power. Climb to cruise ceiling is conducted during the evasive and escape operation. Cruise back to base at long range speeds increasing altitude with decreasing airplane weight. Range free allowances include 5 minutes normal power fuel consumption for starting engines and take-off, 2 minutes normal power fuel consumption at combat altitude for evasive action and 30 minutes of maximum endurance fuel consumption at sea level plus 5% of initial fuel load for landing reserve.

FORMULA: RADIUS MISSION III

Same as Mission I, except no flash bombs are carried for the daylight high altitude reconnaissance mission.

FORMULA: RADIUS MISSION IV

Take-off and climb on course to cruise ceiling at maximum power. Cruise out at long range speeds increasing altitude with decreasing airplane weight, external and bomb bay tanks are dropped when empty. Descend to sea level 50 nautical miles from target, run into target at maximum permissible speeds, photograph and run out from target 50 nautical miles. Climb on course at maximum power to cruise ceiling. Cruise back to base at long range speeds, increasing altitude with decreasing airplane weight. Range free allowances include 5 minutes normal power fuel consumption for starting engines and take-off and 20 minutes maximum endurance fuel consumption at sea level plus 5% fuel load for landing reserve.

FORMULA: RANGE MISSION V

Take-off and climb on course at maximum power to cruise ceiling. Cruise out at long range speeds increasing altitude with decreasing airplane weight until all usable fuel is consumed; external and bomb bay tanks dropped when empty. Range free allowances include 5 minutes normal power fuel consumption for starting engines and take-off and 30 minutes of maximum endurance fuel consumption at sea level plus 5% of initial fuel load for landing reserve.

FORMULA: RANGE MISSION VI

Same as Mission V, except all tanks are carried the entire distance.

GENERAL DATA:

(a) Engine ratings shown on page 3 are manufacturer's guaranteed ratings. Power values used for performance calculations are as follows:

(2) J47-GE-7 or -13 and (2) J47-GE-9 or -15			
S. L. Static:	LB	RPM	MIN
Max:	5000	7950	30
Nor:	4300	7370	Cont

(b) Water injection installation may be carried in lieu of 2-400 lb ATO units. Weight of this droppable water installation is 3648 lb. Sea level static rating for this wet take-off power is 5700 lb.

(c) For detailed planning refer to Technical Order AN01-60GFB-1 and other applicable technical orders.

PERFORMANCE REFERENCE:

North American Report No. NA-51-4, "Performance Calculations based on Flight Test of B-45C Airplane", dated March 1951.

REVISION BASIS: To conform with MIL-C-5011A Ground Rules.