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TL-113-56/01

SECRET

Date: 1st. January, 1956
Aircraft: C-105 With J75 Engines
As Interim Power Plant

Report # 7-0400-05
Sheet # 001-1 Issue 22
Prepared By: K. Griffin
Checked By: E. Burnett

INTRODUCTION

This summary is a revised Weight & C.G. summary for the C-105 Aircraft, based on the latest weight estimates available on December 30th, 1955. All Weight and C.G. changes are relative to Issue 21.

GENERAL

- (a) As in Issue 21 Pratt & Whitney J75 Engines ~~comprise~~ the Interim Power Plant (6,175 lb each.)
- (b) The weight of Radio and Radar carried in this issue is 2,908 lb. The system is described as "Integrated Electronic System, for C-105 Aircraft, with certain deviations". The breakdown into items is given in Weight Summary Issue 14.
- (c) As in issues subsequent to 15, the extended leading edge is recorded here.

1. STRUCTURE

WEIGHT (lb)

(a) Wing:

I/W Joints - Production Drawing Estimates of strut pick-ups	+ 3
I/W M/S to R/S Structure - Gauge changes to Rib # 1.	- 29
Redesign of Engine Mtg. Brackets	- 8
I/W Elevator Control Box - no previous allowance for I/B rib	+ 4
O/W Leading Edge - complete re-estimate to latest design	+ 55
Weight Change Increase	+ 25

Ref. 002-1

(b) Fin & Rudder

No Weight Change

(c) Fuselage to Sta. 255"

Navigator's Canopy - estimated to Production Drawings	+ 7
Radome - redesign of Mg. Attach ring	- 3
Radar Nose Access Doors - redesigned	+ 21
Crew's Bulkheads and Nose U/C Structure - completely re-estimated to current design information.	+ 3
Weight Change Increase	+ 28

Ref. 002-1 & 2



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Report # 7-0400-05
Sheet # 001-2 Issue 22
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INTRODUCTION

1. STRUCTURE

WEIGHT (lb.)

(d) Fuselage Sta. 255" to 485"

Miscellaneous minor changes to beam at Sta. 292"
and Air Conditioning Mounting Tray

+ 2
+ 2

Weight Change Increase

Ref. 002-2

(e) Fuselage Sta. 485" Aft.

Access Doors D.B. - redesign; Production Drawing estimates + 10
Engine Tunnel, E.B. - complete re-estimate to current design. - 2
Rear Fuselage - due to temperature changes titanium replaces
all 'Inconel X' - refined estimates of centre
Structure, Stinger etc. - 6

Miscellaneous other changes. + 1

Weight Change Increase

+ 3

Ref. 002-2 & 3

TOTAL STRUCTURE WEIGHT INCREASE

+ 58

2. LANDING GEAR

Nose U/C Hydraulics - estimate to Production Drawings of
piping ect.

- 13

TOTAL LANDING GEAR DECREASE

- 13

Ref. 002-3

3. POWER PLANT & SERVICES

Engines - 1st scheme drawing estimate of adaptor ring + 14
Engine Mts. - complete re-estimate to current design - 17
Engine Anti-Icing - re-estimate to current scheme of Nose Bullet + 4

TOTAL POWER PLANT & SERVICES INCREASE

+ 1

Ref. 002-4

4. FLYING CONTROLS GROUP

No Weight Change.

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INTRODUCTION

5. EQUIPMENT

Instruments - generally refined estimate
Some C.G. changes to Radio & Radar items

Ref. 002-4

TOTAL EQUIPMENT INCREASE

WEIGHT (lb)

+ 4

6. OPERATIONAL LOADS

Residual Fuel - C.G. changes also 7.8 not 7.85 lb/gal.

Ref. 002-4

TOTAL OPERATIONAL LOAD DECREASE

- 1

- 1

SUMMARY

Weight Change - Aircraft Weight Empty

Structure	+	58 lb.
Landing Gear	-	13 lb.
Power Plant	+	1 lb.
Equipment	+	4 lb.
	+	50 lb.

Weight Change Operational Load Less Usable Fuel

Residual Fuel - 1 lb.

Weight Change - Operational Weight Empty (A/C less Fuel)

Issue 21

Issue 22

43,873 lb.

43,922 lb. = + 49 lb.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 21

WEIGHT CHANGES

+ 3.58	I/W Joints - Estimate to Production Drawings strut. pick-up at Sta. 538.7"	- 1.60
	Estimate to Production Drawings strut. pick-up at Sta. 697.96"	+ 2.58
	No previous allowance fitting sta. 663.0"	+ 2.00
	No previous allowance fitting sta. 714.85"	+ 0.60
		<hr/>
		+ 3.58
- 37.28	I/W M/S to R/S Structure - rib # 1 fwd. web gauge inc.	+ 6.22
	Rib # 1 centre web reduced from .15 to .10	- 25.20
	Rib # 1 aft web reduced from .15 to .085	- 10.30
	Engine Mounting Brackets - redesign	- 8.00
		<hr/>
		- 37.28
+ 3.80	I/W Elevator Control Box - no previous allowance for rib & shear fittings at I/B end.	
+ 55.26	O/W Leading Edge - re-estimated to latest design	
	Skin I/B to rib # 6 .064" to .102")	+ 40.26
	Skin rib # 6 to rib # 24 .064" to .081")	
	Intercostals added fwd. end	+ 3.00
	Ribs fwd. end inc. allowance	+ 2.00
	Doublers - redesign	+ 10.00
		<hr/>
		+ 55.26
-	Wing Fairings - C.G. changes for Aileron Link fairings.	
+ 25.36		
<u>Front Fuselage (Fwd. Sta. 255")</u>		
+ 6.08	Pilot's and Navigator's Bulkheads - completely re-estimated mostly to Production Drawings	
	Pilot's Bulkhead - changes to stiffeners etc.	+ 7.97
	Pilot's Bulkhead Top Beam - redesigned	+ 2.49
	Pilot's Lower Seat Fitting redesigned	- 1.16
	Nav. Bulkhead - addition retraction jack fitting	+ 2.80
	Navigator's Seat Fitting - redesigned	- 0.21
	Deletion of Allowance for Top Beam (part of top shear panel)	- 4.00
	Nav. Bulkhead web .051 was .072 & .091, alterations to stiffeners etc.	- 1.81
		<hr/>
		+ 6.08
- 2.21	Nose U/C Structure - Retraction jack pick-up with Nav. Bulkhead see above	- 3.21
	Estimate to Production Drawing of cross beam etc.	+ 1.00
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		+ 2.21

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continued.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 21

WEIGHT CHANGES

Front Fuselage (Fwd. Sta. 255") (Continued).

+ 16.47	Navigator's Canopy - estimated to Production Drawings	+ 6.73
	Addition of lower half hinge	+ 9.74
		<u>+ 16.47</u>
+ 9.40	Pilot's Canopy - Addition of lower half hinge on Production Drawings	
- 19.14	Top Longerons F.F. - Deletion of lower half of Pilot's and Navigator's Canopy hinges called up on Canopy Production Drawings - see above	
- 3.47	Radome - New design (scheme only) for Mg. Mounting Ring	
+ 20.71	Radar Nose Access Doors - door completely redesigned.	
	Addition of side latches (6/door)	+ 7.80
	Addition of Intercostals	+ 7.48
	Addition of Vertical Channels at Sta. 87 & 98	+ 3.53
	Deletion of I/Skin butt straps	- 2.01
	Addition of side stays (for open door)	+ 2.00
	Miscellaneous other changes	+ 1.91
		<u>+ 20.71</u>
<u>+ 27.84</u>		

Centre Fuselage (Sta. 255" to 485")

+ 0.57	Equipment Bay Structure - Production Drawing estimate of Air-Conditioning Mounting Tray.	
	Alterations to cross beams etc.	
+ 1.64	Armament Provisions - Stress Alterations to cross beam at Sta. 292".	
<u>+ 2.21</u>		

Aft Fuselage (Sta. 485" aft.)

+ 10.31	Access Doors D.B. - redesign of doors, heavy .125" Al. doublers replace .081 edge strips, skins .032 Al. were .04 Mg. etc.	
	Hydraulics Access Door Sta. 553.1 to 572.3	+ 2.54
	Electrical Access Doors Sta. 499.7 to 524.2	+ 5.51
	Air Conditioning and Hyd. Panels Sta. 524.2 to 534.0	+ 2.05
	Mounting External Supply - minor changes	- 0.09
		<u>+ 10.31</u>
+ 1.42	Dive Brake Accommodations - Production Drawings estimate of decking, stiffeners and gussets added.	

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WEIGHT CHANGES TO 7-0400-05 ISSUE 21

WEIGHT CHANGES

Aft. Fuselage (Sta. 485" aft.) (Continued)

- 1.95	Engine Tunnel E.B. - Re-estimate to current design information	
	Shroud - predicted increases did not materialize	- 10.66
	Thermal Insulation - foil .003 was .004 St. Steel	- 8.25
	Insulation - allowance for fasteners etc.	+ 11.51
	Beams - re-estimated to latest design	- 6.00
	Engine Firewall - redesigned	+ 4.60
	Airflow restrictor - redesigned	- 4.00
	Fibreglass insulation sta. 624 - 656 added	+ 10.85
		<hr/>
		- 1.95
+ 11.52	Centre Structure & Stringer R.F. - 1st detailed estimate, stinger is now titanium was 'Inconel X', 'chute box heavier, doors sealed etc.	+ 5.36
	Titanium 'Slitters' added	+ 6.16
		<hr/>
		+ 11.52
+ 0.64	Tunnel fixed R.F. - foil on insulation .003 was .004 St. Steel	- 4.21
	Addition of insulation fasteners	+ 4.50
	Revision to estimate of joint at 742"	+ 1.83
	Stiffeners .02 Al. were Titanium	- 3.69
	Addition of Butt Straps etc.	+ 2.21
		<hr/>
		+ 0.64
- 19.09	Nacelles Removable R.F. - Structure of Titanium was 'Inconel X'	
+ 0.72	Engine Access Doors Fixed R.F. - Foil on insulation .003 was .004 St. Steel	- 1.40
	Addition of insulation fasteners	+ 1.50
	Insulation edge members fibreglass were Titanium	- 0.44
	Addition of doublers at hinges	+ 1.06
		<hr/>
		+ 0.72
<hr/>		
+ 3.57		

Undercarriage:

- 13.47	Nose U/C Hydraulics - Production Drawing estimates - gauge and Dia. reductions in tubing etc.	
<hr/>		
- 13.47		

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Date: 1st. January, 1956
 Aircraft: C-107 With J75 Engines
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Report # 7-0400-05

Sheet # 003-1 Issue 22

Prepared By: J. Murphy

Checked By: E. Burnett

WEIGHT AND C. G. SUMMARY

REF. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
	STRUCTURE	17,021.13	563.36	138.52
1000000	Wing	9,647.33	641.85	142.29
2000000	Fin and Rudder	912.02	756.74	211.22
3000000	Fuselage Structure Fwd. 255"	2,220.08	181.37	129.79
	255" to 485"	1,533.67	369.22	131.63
	Aft. 485"	2,708.03	641.74	111.65
4000000	UNDERCARRIAGE - Up Position	2,868.35	483.63	133.67
4010100	Main Undercarriage	1,839.60	540.47	141.00
4010200	Main U/C Doors & Fairings	287.32	539.21	136.40
4010300	Main U/C Hydraulics	295.56	535.95	135.20
4020100	Nose Wheel Undercarriage	314.47	168.91	99.82
4020200	Nose U/C Doors & Fairings	25.92	163.71	89.22
4020300	Nose U/C Hydraulics	105.48	211.35	105.92
5000000	POWER PLANT & SERVICES	13,931.47	654.17	118.64
5010000	Engines J75	12,703.00	662.45	117.86
5020000	Gear Box & Drive	150.00	606.00	94.66
5030000	Engine Controls	25.10	356.68	119.39
5040000	Pneumatic Starting System	70.00	610.00	94.75
5050000	Engine De-icing	69.35	565.60	115.95
5060000	Fire Extinguishing System	64.27	700.07	123.00
5070000	Engine Mtgs. & Brackets	204.40	644.09	125.23
5080000	Fuel System	645.35	526.86	139.92
6000000	FLYING CONTROLS GROUP	1,723.76	646.81	139.24
6010000	Mechanical Flying Controls	784.89	671.88	145.39
6030000	Flying Controls Electronics	108.00	222.33	131.43
6000000	Flying Controls Hydraulics	830.87	678.31	134.44
	EQUIPMENT FIXED & REMOVABLE	6,540.54	306.19	114.67
7010000	Instruments	61.30	141.72	136.06
7010003	Probe	15.00	-18.00	108.00
7030000	Oxygen System	46.12	220.36	138.15
7040000	Air Conditioning System	624.95	326.22	134.63
7050000	Hydraulic Main System	215.66	591.04	117.41
7080000	Brake Parachute	69.69	784.88	131.17
7090000	Electrical System	767.74	416.24	119.43
7100000	Low Pressure Pneumatics	16.60	217.17	133.41
7110000	Oil & Hydraulic Fluid Cooling	119.80	567.91	104.22
7120000	Intake De-Icing	101.72	210.14	118.95
7000000	Radio & Radar Fixed, Power Supplies	921.10	220.87	111.00
7160000	Canopy Actuation	47.00	223.43	156.83
7170000	Cabin Consoles	20.65	177.37	125.23
7180000	Radar Door Actuation	10.00	268.00	95.00
7190000	Radome - Anti-Icing	16.80	66.35	124.40
7200000	Cabin Insulation	11.91	179.24	130.00
7210000	Cockpit Pressure Sealing	20.00	186.00	130.00

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Date: 15 January 1966
Aircraft: C-105 With J75 Engines
As Interim Power Plant

Report # 7-0400-05
Sheet # 003-2 Sheet
Prepared By: J. Murphy
Checked By: E. Burnett

WEIGHT AND C.G. SUMMARY

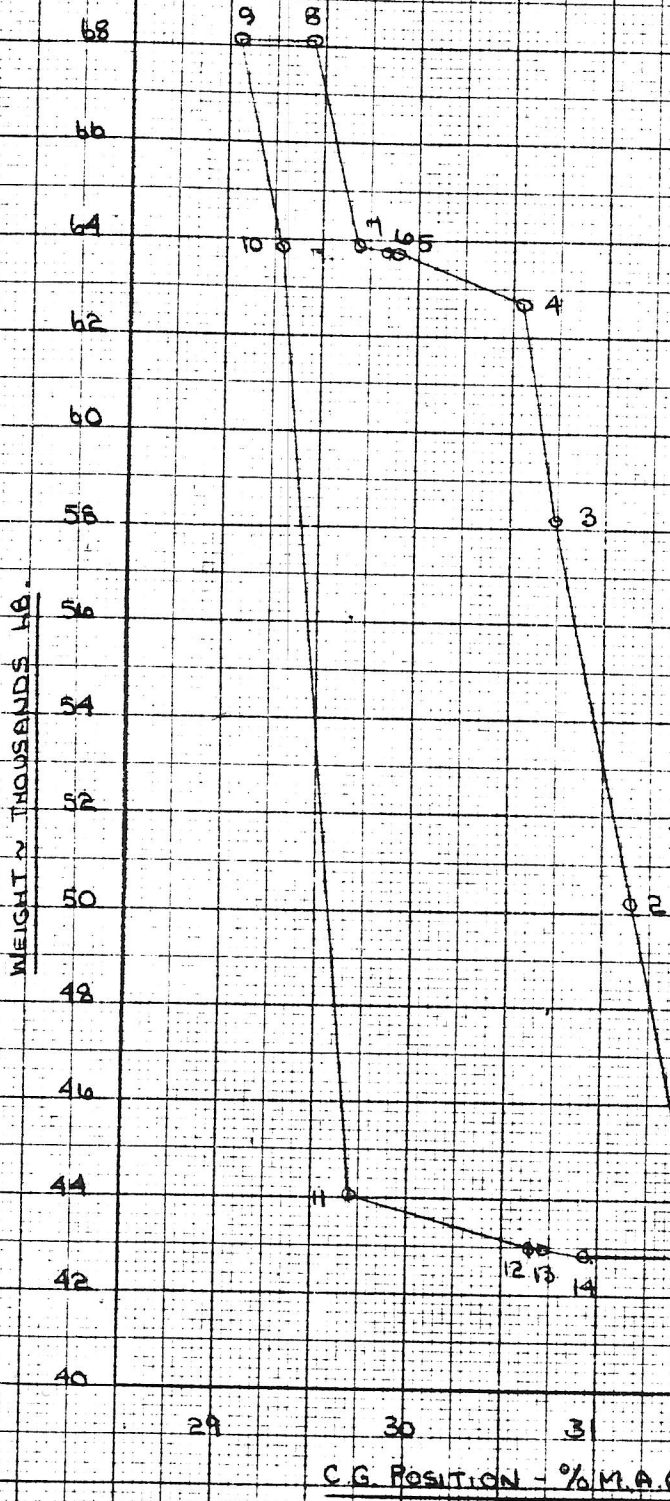
Ref. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.	C.G. POSITION % M.A.C.
	Equipment (Fixed & Remov.) Cont'd.)				
8010100	Ejector Seats	204.00	200.10	136.25	
8010200	Emergency Provisions	16.95	166.01	130.65	
8020000	Radar Removable	1,259.70	151.30	114.53	
8000000	Radio Removable & I.F.F.	276.20	285.72	123.98	
8050100	Missile Pack Structure	676.17	385.26	95.61	
8050200	Missile Pack Mechanisms	410.48	373.88	102.86	
8050300	Missile Pack Hydraulics	293.00	366.29	101.00	
8050400	Missile Pack Electronics	318.00	389.15	101.22	
	AIRCRAFT WEIGHT EMPTY	42,085.25	551.44	127.93	
9000000	USEFUL LOAD	17,172.27	522.14	138.95	
9010000	Crew	430.00	194.00	136.50	
9020000	Oil	85.08	611.71	135.00	
9050000	Alcohol for Radome De-Icing	22.00	93.00	138.00	
9060000	Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
9070000	Residual Fuel	218.40	554.44	134.04	
9090000	Fuel for Combat Mission	15,336.00	539.25	142.06	
9030000	Missiles (Armament)	1,042.40	399.12	95.60	
9040000	Oxygen Charge	13.39	259.69	159.91	
	Normal Combat Mission U/C Up	59,257.52	542.95	131.13	29.54
	U/C Down		544.53	128.98	29.98
	Half Combat Mission Fuel 983 gals. @ 7.8 lb/gal.	7,668.00	540.92	139.53	
	Combat Weight (Half Combat Mission Fuel) U/C Up	51,589.52	543.75	129.13	29.76
	U/C Down		545.57	126.66	30.27
	Operational Weight Empty U/C Up	43,921.52	544.24	127.31	29.90
	U/C Down		546.38	124.41	30.49
	Operational Weight Empty (Less Missiles) U/C Up	42,879.12	547.77	128.08	30.87
	U/C Down		549.96	125.11	31.48
	Maximum Internal Fuel 2,544 gals. @ 7.8 lb/gal. Water (Air-Conditioning System)	19,843.00 125.00	538.88 268.00	144.32 95.00	
	A.U.W. Max. Internal Fuel U/C Up	63,889.52	542.03	132.53	29.29
	U/C Down		543.51	130.54	29.70
	Max. External Fuel, 500 gals. @ 7.8 lb./gal. and Drop Tank	4,210.00	528.88	62.00	
	A.U.W. Max. Internal & External Fuel U/C Up	68,099.52	541.22	128.17	29.07
	U/C Down		542.61	126.50	

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 REPORT NO. 64-10088-1
 BY: [Signature]
 DATE: Dec 30th 1955

C105 A/C C.G. ENVELOPE
FOR A/C FLIGHT CONDITIONS
WITH J75 A25 ENGINES

WEIGHT IN THOUSANDS LB.



CONDITION	COMBAT MISSION FUEL	NORMAL MISSION FUEL	MAX INTERNAL FUEL	EXT FUEL & TANK	MISSILES	DEICING FLUID	WATER	1/2 UP	1/2 DOWN
1									*
2	*								*
3		*							*
4			*						*
5			*		*				*
6			*		*	*			*
7			*		*	*	*		*
8			*	*	*	*	*		*
9			*	*	*	*	*	*	*
10			*	*	*	*	*	*	*
11				*	*	*	*	*	*
12					*	*	*	*	*
13						*	*	*	*
14							*	*	*

N.B. IN ORDER TO BRING POINT 1
 TO THE AFT LIMIT OF 31.5% MAC
 196 LB BALLAST MUST BE
 INSTALLED AT STA 120 IN 5

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