

UNCLASSIFIED
 NON CLASSIFIED
 Date: March 15, 1956
 Aircraft: C-105 With J75 Engines
 as Interim Power Plant



Report # 7-0400-05
 Sheet # 001-1 Issue 24
 Prepared By: K. Griffin
 Checked By: E. Burnett

INTRODUCTION

The following is a revised Weight and C. G. Summary for the C-105 Aircraft, based on the latest weight estimates available on February 29th, 1956. All Weight and C.G. changes are relative to Issue 23.

GENERAL

- (a) As in Issue 23 Pratt & Whitney J75 Engines comprise the Interim Power Plant (6,175 lb. each).
- (b) A Package containing 4 Sparrow Missiles is carried. Currently the weight recorded is for "fully submerged" missiles although a "semi-submerged" scheme is also under consideration.
- (c) The Hughes MX 1179 Radar System is installed, but with a Douglas Missile Control System, as in Issue 23.
- (d) As in issues subsequent to 15, the extended O/W Leading Edge is recorded here.

1. STRUCTURE

WEIGHT (lb)

(a) Wing:

O/W Leading Edge - skin gauge and doubler alterations	-	8
O/W Aileron Control Box - duplication of splice plates and R/Spar joint.	-	48
Weight Change Decrease	-	56

Ref. 002-1

(b) Fin & Rudder

No Weight Change.

(c) Fuselage to Sta. 255"

Intake Ramp - Skin below bottom Longeron .051 was .04 Al. etc.	+	6
Weight Change Increase	+	6

Ref. 002-1

(d) Fuselage Sta. 255" to 485"

Dorsal over Fuel Tank - increase in gauge of lower member addition of latch re-inforcing etc.	+	4
Weight Change Increase	+	4

Ref. 002-1

continued.

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Aircraft: C-105 With 445 Engines
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INTRODUCTION

1. STRUCTURE (continued)

WEIGHT (lb)

(e) Fuselage Sta. 485" Aft.

Duct Bay - majority of structure estimated to production drawings, changes to formers, longitudinal beams, duct etc.	+ 7
Engine Bay - Production Drawing estimates of light formers	+ 11
Rear Fuselage - Re-estimate of Nacelles skins, latches etc.	+ 8
Weight Change Increase	+ 26

Ref. 002-3

TOTAL STRUCTURE WEIGHT DECREASE

- 20

2. LANDING GEAR

No Weight Change

3. POWER PLANT & SERVICES

Pneumatic Starting - manufacturer's weight of Units	- 18
Engines - manufacturer's weight of constant speed drives	- 40
re-estimate of oil system	- 15
Engine Controls & Engine Mounts minor changes	+ 3

Ref. 002-3

TOTAL POWER PLANT & SERVICES DECREASE

- 70

4. FLYING CONTROLS GROUP

No Weight Change

5. EQUIPMENT

Electrical Harness - re-estimate of sub-assy. wiring, clipping connectors, panels etc.	+ 43
Alternator System - manufacturer's weight of Trans.-rect.	+ 8
E.28 now absorbed in Harness (above)	- 43
Windscreen De-misting - revision of allowance	+ 11
Oil & Hydraulic Fluid Cooling - completely re-estimated	+ 10

Ref. 002-3

TOTAL EQUIPMENT INCREASE

+ 29

6. OPERATIONAL LOAD

No Weight Change.

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INTRODUCTION

SUMMARY

Weight Change - Aircraft Weight Empty

Structure	- 20 lb.
Power Plant & Services	- 70 lb.
Equipment	+ 29 lb.
	<u>- 61 lb.</u>

Weight Change - Operational Load Less Fuel

NIL

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

Issue 23

45,191

Issue 24

45,130

- 61 lb.

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as Interim Power Plant

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WEIGHT CHANGES TO 7-0400-05 ISSUE 23

WEIGHT CHANGES

Wing:

- 7.39	O/W Leading Edge - Skin I/B end to rib 3 .091 was .102 Al	- 4.59
	Doubler deleted I/B end to rib 1	- 7.50
	Ribs 1, 2 and 3 .081 were .064	+ 1.65
	Fwd. ribs allowance increased	+ 5.80
	Intercostals reduced	- 3.00
	.02 Al Doubler ribs 9 - 12 added	+ 0.25
		- 7.39
- 48.36	O/W Aileron Control Box - Steel Splice plates and joint to R/Spar already included with Spar - thus deleted here.	

- 55.75

Front Fuselage (Fwd. Sta. 255")

+ 5.70	Intake Ramp - Production Drawing estimate of Skins & Stringers	
	Skin below bottom longeron .051 was .04 Al.	+ 3.33
	Splice at 246" wider also .04 Al. was Mg.	+ 1.11
	Miscellaneous Production Drawing changes	+ 1.26
		+ 5.70

+ 5.70

Center Fuselage (Sta. 255" - 485")

+ 3.66	Dorsal over Fuel Tank - 1st estimate to drawings	
	Latch reinforcing angles added	+ 1.94
	Lower member .036 was .025	+ 0.72
	Skin splices added	+ 0.31
	Miscellaneous minor changes	+ 0.69
		+ 3.66

+ 3.66

Aft Fuselage (Sta. 485" Aft)

- 0.53	Dive Brakes Accommodations - minor alterations to Access Doors	
+ 7.44	Longitudinal Beams D.B. - Production Drawing estimates of most beams	
	D/B Jack support - no allowance previously	+ 3.80
	D/B Jack Beam O/B flanges included	+ 4.29
	I/B Beam Outer Hinge - web .064 was .051	+ 0.32
	Misc. changes to other beams	- 0.97
		+ 7.44

Continued.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 23

WEIGHT CHANGES

Aft Fuselage (Sta. 485" Aft.) (Cont'd.)

+ 1.85	Longerons D.B. - Production Drawing estimate of Upper Longerons Cap I/B boom .16 was .12 Joint at 485" - Alterations to Titanium plates Miscellaneous changes O/B Boom etc.	+ 0.74 + 0.70 + 0.41 <hr/> + 1.85
- 22.18	Duct D.B. - Production Drawing estimates of some items Forged ring 558.7 flanges .15 were .30 Ring at 545.35 Caps reduced etc. Fwd. attachment ring Sta. 485"	- 12.04 - 8.55 - 1.59 <hr/> - 22.18
+ 4.40	Access Panels D.B. - Forward door edge members production drawings Edge Members added 533.1" to 572.3" Front Engine Mounting Door - Doublers increased; Steel were Al., panel .102 was .051, reinforcing angles added etc.	+ 0.28 + 2.00 <hr/> + 2.12 + 4.40
- 12.03	Longeron Top D.B. - Production Drawing estimate, frame fittings now in relevant former reports - see below	
+ 7.88	Former Sta. 538.77 - Addition of Wing fittings see above Estimate to Production Drawings	+ 3.12 <hr/> + 4.76 + 7.88
+ 20.75	Formers D.B. - Production Drawing estimates of majority of formers. Wing Attachment Brackets added see above Formers - Minor Changes to Production Drawings Redesign Heat Exchange Mounting Structure	+ 9.12 + 5.55 + 6.08 <hr/> + 20.75
- 25.23	Top Longerons E.B. - Production Drawing calls up attachment brackets with formers - see below	
+ 5.87	Intermediate Formers E.B. - Transfer of Wing Pick Up Fittings Production Drawing Estimate Struts at Sta. 663.65"	+ 5.31 <hr/> + 0.56 + 5.87
+ 9.52	Heavy Formers E.B. - Addition of Wing Pick-Up Fittings see above	
+ 21.41	Light Formers E.B. - Production Drawing estimates of majority of formers. Transfer to Wing Pick-Up Fittings Miscellaneous Production Drawings changes	+ 12.37 + 9.04 <hr/> + 21.41

Continued.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 23

WEIGHT CHANGES

Aft Fuselage (Cont'd.)

-	0.85	Longerons - fixed R.F. - Upper I/B Longerons .20" thick was .23"	
+	8.47	Nacells - Removable R.F. - more accurate estimate of O/Skin	- 2.51
		Inner Skins - gauge changes	+ 2.17
		Insulation fasteners added.	+ 0.88
		T/Edge reinforced plate narrower	- 0.40
		Latches - first detailed estimate to drawings - some design change	+ 8.33
			+ 8.47

+ 26.77

Power Plant & Services

-	0.88	Engine Mounts - Centre fitting R.E.M. sleeve titanium was Steel	- 3.00
		Addition of rail guides	+ 2.12
			- 0.88
-	18.00	Pneumatic Starting - Manufacturer's Weight of Unit 21.5 lb.	
		each, 30.5 lb was previously allowed.	
+	4.09	Engine Controls - Addition of tension regulator Sta. 495"	+ 4.25
		General re-estimate of System	- 0.16
			+ 4.09
-	55.50	Engines - Manufacturer's Weight of constant speed drives	- 40.00
		Re-estimate of Oil System (see also oil and Hydraulic Fluid Cooling.)	- 15.50
			- 55.50

- 70.29

Equipment - Fixed & Removable

+	43.00	Electrical Harness - re-estimate of clipping weight	+ 6.71
		re-estimate of panels	- 1.40
		re-estimate of connectors	+ 4.50
		Sub-assy. wiring re-estimate	+ 33.19
			+ 43.00
-	35.00	Alternator System - Trans.-rect. manufacturer's weight	+ 8.00
		Delete main Power Box E.28	
		now in harness report	- 43.00
			- 35.00

+	10.90	Windscreen De-misting - revised allowance, previously was 10 lb.
+	10.20	Oil & Hydraulic Fluid Cooling - completely re-estimated, fuller information now available.

+ 29.10

- 60.81 TOTAL WEIGHT CHANGES

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 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	16,953.37	564.84	141.06
1000000	Wing	9,580.53	641.21	146.93
2000000	Fin & Rudder	912.02	756.74	211.22
3000000	Fuselage Structure Fwd. 255"	2,155.47	185.81	130.06
	255" to 485"	1,543.66	369.71	131.46
	Aft. 485"	2,761.69	641.42	111.49
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 and 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	13,900.89	654.98	118.67
5010000	Engines J.75	12,647.50	663.66	117.87
5020000	Gear Box & Drive	150.00	606.00	94.66
5030000	Engine Controls	29.19	377.46	118.91
5040000	Pneumatic Starting System	52.00	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 Mountings & Brackets	217.08	642.67	124.97
5080000	Fuel System	671.50	526.79	138.78
6000000	FLYING CONTROLS GROUP	1,711.76	647.68	139.59
6010000	Mechanical Flying Controls	784.89	671.88	145.39
6030000	Flying Controls Electronics	108.00	222.33	131.43
6000000	Flying Controls Hydraulics	818.87	680.58	135.10
	EQUIPMENT - FIXED & REMOVABLE	7,173.56	317.13	111.80
7010000	Instruments	53.30	153.98	140.27
7010003	Probe	23.00	- 9.74	108.00
7020000	Cockpit Pressure Sealing	5.00	186.00	130.00
7030000	Oxygen System	46.12	220.36	138.15
7040000	Air Conditioning System	644.11	323.13	133.68
7050000	Hydraulics Main System	215.66	591.04	117.46
7060000	Fin Pitot System	12.30	596.69	198.16
7070000	Cabin Insulation	11.91	179.24	130.00
7080000	Brake Parachute	69.69	784.88	131.17
7090000	Electrical System	857.69	415.46	117.22
7100000	Low Pressure Pneumatics	16.60	217.17	133.41
7110000	Oil & Hydraulic Fluid Cooling	130.00	573.07	102.64
7120000	Intake De-Icing	101.72	210.14	118.95
7000000	Radio & Radar Fixed, Power Supplies	937.41	220.85	110.58
7130000	Radome Anti-icing	16.80	62.42	124.84
7160000	Canopy Actuation	46.80	223.54	154.60
7170000	Cabin Consoles	20.65	177.37	125.23
7180000	Radar Door Actuation	10.00	268.00	95.00

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WEIGHT AND C.G. SUMMARY

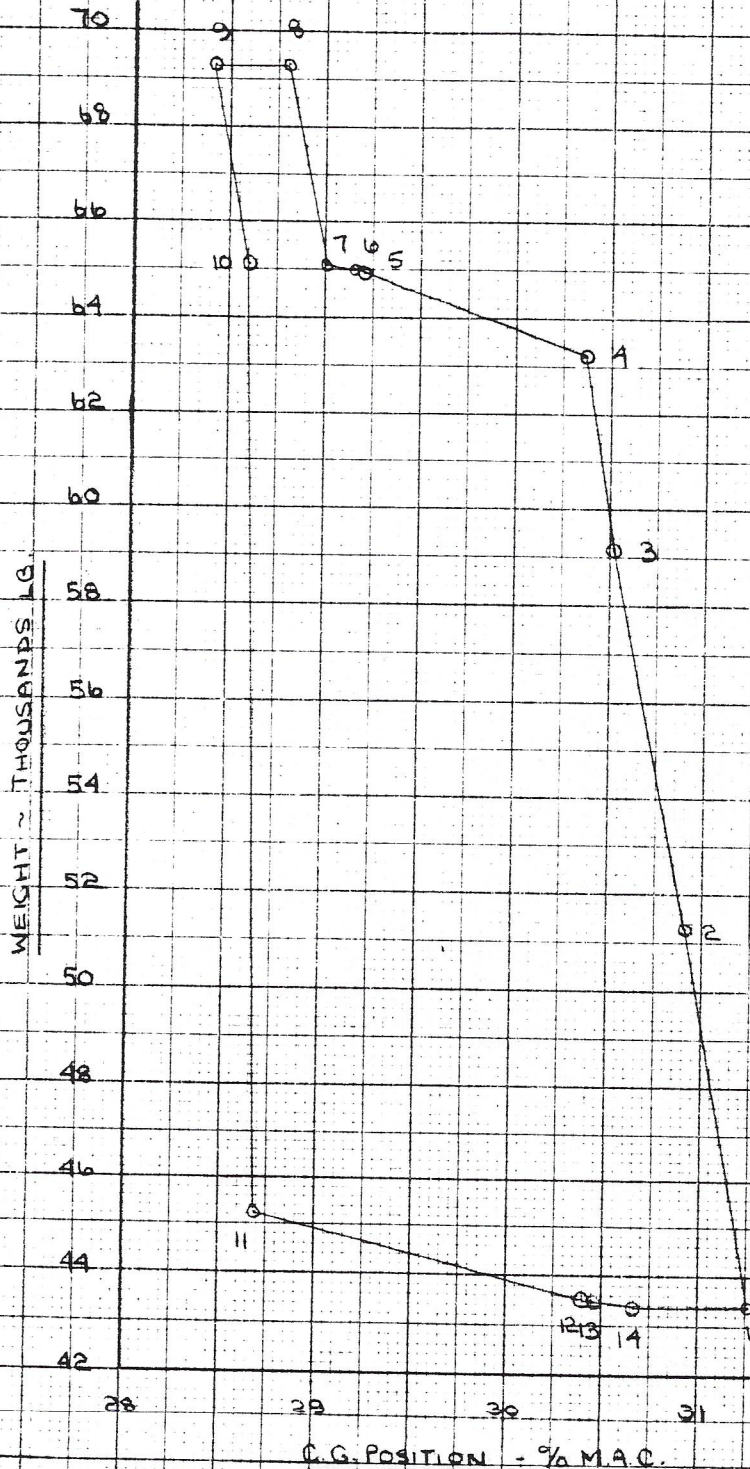
REF. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.	C.G. POSITION % M.A.C.
Equipment (Fixed & Remov.) (Cont'd.)					
8010100	Ejector Seats	186.00	201.10	136.25	
8010200	Emergency Provisions	16.95	166.01	130.65	
8020000	Radar Removable	1,124.70	140.94	113.19	
8000000	Radio Removable & I.F.F.	247.90	291.13	112.19	
8050100	Sparrow Pack Structure	1,424.10	375.42	96.81	
8050200	Sparrow Pack Mechanisms	399.50	353.32	100.22	
8050300	Sparrow Pack Hydraulics	505.65	409.15	98.84	
8050400	Sparrow Pack Electronics	50.00	436.15	103.20	
AIRCRAFT WEIGHT EMPTY		42,607.93	550.40	128.27	
9000000	USEFUL LOAD	18,321.87	516.66	137.47	
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	553.98	134.04	
9090000	Fuel For Combat Mission	15,800.00	539.20	142.28	
9030000	Missiles (Armament)	1,728.00	385.76	94.27	
9040000	Oxygen Charge	13.39	259.69	159.91	
Normal Combat Mission U/C Up		60,929.80	540.25	131.04	28.80
U/C Down			541.79	128.95	29.22
Half Combat Mission Fuel 1,013 gal. @ 8.7 lb/gal.		7,900.00	540.80	139.55	
Combat Weight (Half Combat Mission Fuel) U/C Up		53,029.80	540.64	128.96	28.91
U/C Down			542.41	126.55	29.40
Operational Weight Empty U/C Up		45,129.80	540.62	127.10	28.90
U/C Down			542.70	124.27	29.48
Operationa Weight Empty (Less Missiles) U/C Up		43,401.80	546.79	128.41	30.60
U/C Down			548.95	125.47	31.20
Maximum Internal Fuel 2,544 gal. @ 7.8 lb/gal.		19,843.00	538.88	144.32	
Water (Air Conditioning System)		125.00	268.00	132.00	
A.U.W. Max Internal Fuel U/C Up		65,097.80	539.57	132.36	28.61
U/C Down			541.01	130.40	29.01
Max. External Fuel 500 gal. @ 7.8 lb/gal. and Drop Tank		4,210.00	528.88	62.00	
A.U.W. Maximum Internal and External Fuel U/C Up		69,307.80	538.92	128.09	28.43
U/C Down			540.27	126.25	28.81

BY: Kathleen Griffin

DATE: March 1st 55

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

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CONDITION	COMBAT MISSION	FUEL	NORMAL MISSION	FUEL	MAX INTERNAL	FUEL	EXT. FUEL	TANKS	MISSILES	DEICING FLUID	WATER	W/C UP	W/C DOWN
No.													
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 I.E. 31% MAC. 96LB BALLAST MUST BE INSTALLED AT STA 120 IN.

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