Date: December 1st, 1956
Aircraft: C-105 With PS 13 Engines.

Report # 7-0400-34
Sheet # 1 Issue 3
Prepared By: K. Griffin
Checked By: E. Burnett

INTRODUCTION

The following is a Weight and C.G. Summary of the C-105 Aircraft with P.S. 13 Engines. Of necessity the figures quoted herein are only of a very preliminary nature.

Information herein is based on Report # 7-0400-05 Issue 27 of December 1st, 1956, Weight Summary for C-105 Aircraft with J75 P5 Engines as Interim Power Plant, with relevant changes made.

GENERAL:

(a) Orenda PS 13 Engines comprise the Power Plant (4,500 lb each).

(b) A package containing 4 "semi-submerged" Sparrow II Missiles (432 lb each) is currently carried.

(c) The R.C.A. Radar Astra I is installed - weight information being to the latest breakdown received from them, dated October 15th, 1956. (Total Weight of Astra I including Avro installed Antennae = 2,731.5 + 118.5 = 2,850 lb.)

1. STRUCTURE

With the introduction of PS 13 Engines the lines of the Rear Fuselage Aft Sta. 742.5" undergo changes, there will be alterations to the Engine Bay Structure, Intake Ramp, Intake Ducts and numerous other changes, however, until more information is available the Structure weight will temporarily be retained as in Report # 7-0400-05 Issue 27.

2. LANDING GEAR

This will remain as in Report # 7-0400-05 Issue 27

3. POWER PLANT & SERVICES

All items in this group will alter for PS 13 installation, however, until more details are available all accessories, mounts, controls, etc. will be retained weightwise as for J75 P5 Installation, the Engine Weight and Alternator Drive only being amended. The fact that the engine rails are now fixed in the Aircraft will be more than compensated for weightwise by there being no additional Fire Can. The PS 13 at 4,500 lb already includes a Fire Can.

Engines - J75 P5 were 5,950 lb each, PS 13 quoted at 4,500 each, therefore, compared to Report # 7-0400-05 Issue 27 Weight Change is	- 2,900
Engine Accessories - 40 KVA Alternators replace 30 KVA's resulting in a weight increase on Drives of	+ 23
WEIGHT CHANGE POWER PLANT GROUP	- 2,877 lb

4. FLYING CONTROLS GROUP

This will remain as in Report # 7-0400-05 Issue 27.

Date: December 1st, 1956
Aircraft: C-105 With PS 13 Engines

Report # 7-0400-34
Sheet # 2 Issue 3
Prepared By: K. Griffin
Checked By: E. Burnett

INTRODUCTION

5. EQUIPMENT GROUP

The majority of items remain as in Report # 7-0400-05 Issue 27. However, there are some changes relative to that report, as listed below:-

Air-Conditioning - Increases are anticipated here due to redesign of the system resulting from reduced engine bleed pressures and increased Air-Conditioning requirements for Astra I not already catered for in Report # 7-0400-05 Issue 27.

Preliminary figures indicate + 215 lb

Alternator System - 40 KVA Alternators will probably be installed on the aircraft with PS 13 Engines replacing 30 KVA Alternators on J75 Aircraft. + 110 lb

WEIGHT CHANGE EQUIPMENT + 325 lb

6. OPERATIONAL LOAD

All items as in Report # 7-0400-05 Issue 27 with the following exception:-

Water for Air-Conditioning - requirement for all missions Max. Weight at Mach 2 is 260 lb, with J75 Engines weight of water was 125 lb, thus increase over Report # 7-0400-05 Issue 27 + 135 lb.

SUMMARY (All changes relative to Report # 7-0400-05 Issue 27 - C-105 Aircraft With J75 Engines as Interim Power Plant)

WEIGHT CHANGE - AIRCRAFT WEIGHT EMPTY

Power Plant	- 2,877 lb
Equipment	+ 325 lb.
	- 2,552 lb.

WEIGHT CHANGE - OPERATIONAL LOAD (Less Fuel)

Water for Air-Conditioning + 135 lb.

WEIGHT CHANGE - OPERATIONAL WEIGHT EMPTY - (A/C Less Fuel)

Report # 7-0400-05 Issue 27	Report # 7-0400-34 Issue 3	
46,528	44,111	= - 2,417 lb

Date: December 1st, 1956
Aircraft: C-105 With PS 13 Engines

Report # 0400-34
Sheet # 3 Issue 3
Prepared By: K. Griffin

WEIGHT AND C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
STRUCTURE	18,087.08	565.39	137.29
Wing	9,989.07	643.60	141.93
Fin and Rudder	999.96	754.27	201.96
Fuselage Struct. Fwd. Sta. 255"	2,390.47	187.41	129.61
Sta. 255" - 485"	1,672.37	378.59	129.82
Sta. 485" Aft.	3,035.21	646.37	110.90
UNDERCARRIAGE - Up Position	2,604.33	488.72	134.65
Main Undercarriage	1,951.62	539.57	141.00
Main U/C Doors & Fairings	294.36	539.29	136.01
Nose Undercarriage	333.81	170.80	99.70
Nose U/C Doors & Fairings	24.54	162.24	88.23
POWER PLANT & SERVICES	10,841.50	672.83	120.34
Engines PS 13	9,345.00	688.33	119.74
Gear Box & Drives on Fuselage	237.06	603.73	104.00
Engine Controls	29.19	377.46	118.91
Gear Box & Starter on Engines	150.18	610.55	96.37
Engine De-icing	70.37	562.80	115.09
Fire Extinguishing System	70.52	701.99	127.72
Engine Mountings	189.19	633.40	127.82
Fuel System	749.99	542.97	135.70
FLYING CONTROLS GROUP	1,677.82	688.36	139.58
Mechanical Flying Controls	904.40	689.05	147.08
Flying Control Hydraulics	773.42	687.56	130.81
EQUIPMENT - FIXED & REMOVABLE	8,072.95	319.10	111.18
Instruments	53.30	153.98	140.27
Probe	23.00	9.74	108.00
Cockpit Pressure Sealing	5.00	186.00	130.00
Oxygen System	43.44	227.72	142.18
Air-Conditioning System	927.68	327.16	132.46
Hydraulic Main System	588.36	501.22	117.38
Cabin Insulation	11.91	179.24	130.00
Brake Parachute	69.69	784.88	131.17
Electrical System	1,068.34	418.20	116.16
Low Pressure Pneumatics	39.01	478.47	127.28
Oil & Hydraulic Fluid Cooling	22.00	579.50	92.00
Intake De-icing	85.84	206.52	118.79
Radome Anti-icing	23.46	62.92	126.04
Canopy Actuation	54.41	222.04	154.40
Cabin Consoles	20.65	117.37	125.23
Radar Door Actuation	10.00	268.00	95.00
Ejector Seats	186.00	201.10	136.25
Radio & Radar - Removable	2,001.80	178.02	103.53
Radio & Radar - Fixed	671.35	230.67	108.98
Sparrow Pack Structure	850.00	390.84	96.00
Sparrow Pack Mechanisms	625.32	376.67	99.22
Sparrow Pack Hydraulics	350.19	368.83	99.00

continued

Date: December 1st, 1956
Aircraft: C-105 With J75
PS 13 Engines

Report # 7-0400-34
Sheet # 4 Issue 3
Prepared By: K. Griffin

WEIGHT AND C.G. SUMMARY

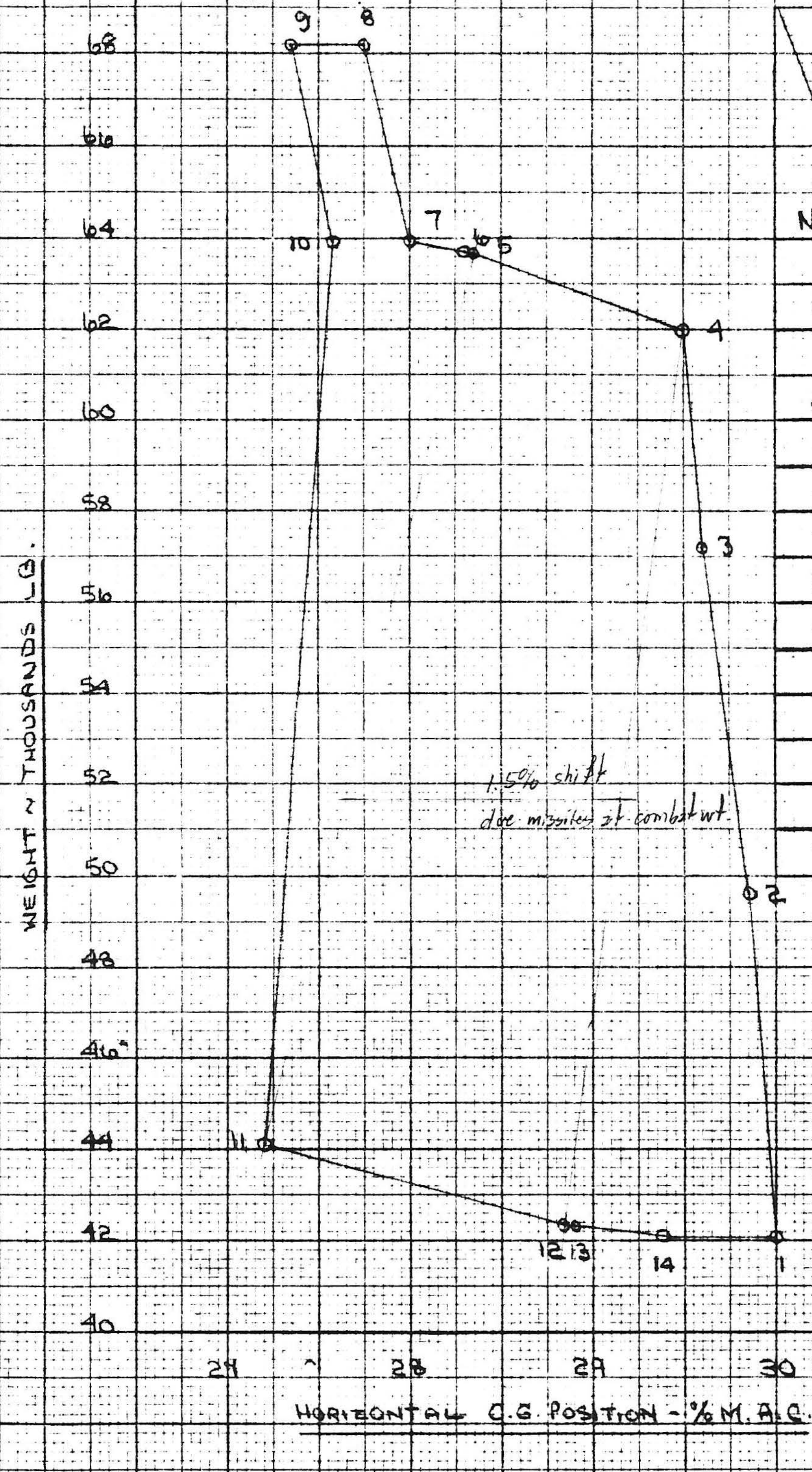
DESCRIPTION	WEIGHT lb.	H. ARM ins	V. ARM ins.	C.G. POSITION %. M.A.C.
Equipment - Fixed & Removable - Cont'd.				
Sparrow Pack Electronics ★	178.00	332.00	100.00	
Sparrow Pack Electrics	64.10	362.29	95.00	
Surface Finish	100.00	591.52	140.20	
AIRCRAFT WEIGHT EMPTY	41,283.68	545.60	127.66	
USEFUL LOAD	17,912.18	512.76	136.17	
Crew	430.00	194.00	136.50	
Oil	130.39	609.19	117.17	
Alcohol - Radome De-icing	22.00	93.00	138.00	
Engine Fire Extinguishing Fluid	25.00	730.00	129.00	
Residual Fuel	218.40	553.98	134.04	
Missiles	1,728.00	389.29	88.30	
Oxygen Charge	13.39	259.69	159.91	
Water for Air-Conditioning	260.00	268.00	132.00	
Fuel for Combat Mission	15,085.00	539.26	141.90	
Normal Combat Mission U/C Up	59,195.86	535.66	130.24	27.53
Normal Combat Mission U/C Down		537.30	127.52	27.99
Half Combat Mission Fuel 967 Gals. at 7.8 lb/gal.	7,542.00	540.98	144.27	
Combat Weight (Half Combat Mission Fuel) U/C Up	51,652.86	535.39	128.88	27.46
Combat Weight (Half Combat Mission Fuel) U/C Down		537.27	125.76	27.98
Operational Weight Empty U/C Up	44,110.86	534.43	126.25	27.19
Operational Weight Empty U/C Down		536.64	122.60	27.80
Operational Weight Empty (less Missiles) U/C Up	42,382.86	540.35	127.80	28.83
Operational Weight Empty (less Missiles) U/C Down		542.65	124.00	29.46
Max. Internal Fuel 2544 gal. @ 7.8 lb/gal.	19,843.00	538.88	144.32	
A.U.W. Max. Internal Fuel U/C Up	63,953.86	535.81	131.86	27.58
A.U.W. Max. Internal Fuel U/C Down		537.33	129.34	27.99
Max. External Fuel 500 gal. at 7.8 lb/gal. + Drop Tank	4,226.00	522.34	60.64	
A.U.W. Max. Internal and External Fuel U/C Up	68,179.86	534.98	127.44	27.35
A.U.W. Max. Internal and External Fuel U/C Down		536.41	125.08	27.74

N.B. 1) Aircraft Datum = 120" above nominal ground line

2) ★ Together make R.C.A's Weight of Astra I + 118 lb of AVRO supplied Antennae.

REPORT NO: 7-0400-34 ISSUE 3
BY: Kathleen Guffin
DATE: Dec 1st 1956

C105 A/C HORIZONTAL C.G. ENVELOPE
FOR A/C FLIGHT CONDITIONS
WITH ORENDA PS13 ENGINES
& FUEL SYSTEM PROPORTIONERS



CONDITION No.	COMBAT MISSION FUEL	NORMAL MISSION FUEL	MAX INTERNAL FUEL	EXT FUEL & TANKS	MISSILES	DEICING FLUID	WATER	U/C UP	U/C DOWN
1									*
2	*								*
3		*							*
4			*						*
5			*		*				*
6			*		*	*			*
7			*		*	*	*		*
8			*	*	*	*	*		*
9			*	*	*	*	*	*	
10			*		*	*	*	*	
11					*	*	*	*	
12						*	*	*	
13							*	*	
14								*	