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Rept
7-0400-05
ISS. 25

C-105 With J75
Production Engines

Report # 7-0400-05
ISSUE 25

WEIGHT SUMMARY & C.G. POSITION

N.A.E's Copy

April 1/56

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Report no.: QCX-AVRO-CF105- R-7-0400-05-155-25

has been ☐ downgraded to: _____

☒ de-classified

by (Name): Michel W. Drapeau

(Dept.): A/DND Coordinator, Access to Information

Date: Dec. 7, 1992

R. Auger
Signature

Classification cancelled / changed to: UNCLASSIFIED

By authority of: DRDA 7/DARET 5-8/DAS Eng 6-4-5

Date: 5 Nov 1992

Signature: B. Aubrey

Unit / Rank / Appointment: DSIS 3, Secretary CRAD HQ DRP

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Date: April 1st, 1956
Aircraft: C-105 With J75 Engines
as Interim Power Plant

Report # 7-0400-05
Sheet # 001-1 Issue 25
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 March 30th, 1956. All Weights and C.G. changes are relative to Issue 24.

GENERAL

- (a) As in Issue 24 Pratt & Whitney J75 Engines comprise the Interim Power Plant (6,175 lb each)
- (b) A package containing 4 'semi-submerged' Sparrow Missiles is currently carried. Until this date fully 'submerged' Missiles were considered, however, a substantial weight reduction is expected with the semi-submerged system.
- (c) The Hughes MX 1179 Radar System is installed, but with a Douglas Missile Control System, as in Issue 23 and 24.
- (d) As in issues subsequent to 15, the extended Outer Wing Leading Edge is recorded here.

1. STRUCTURE

WEIGHT (lb)

(a) Wings:

I/Wing Leading Edge - ribs mostly .072 were .081 Al.	- 10
I/B Skin .09 was .156 Al.	- 36
I/Wing Spars - R/Spar - redesigned - reduction in cross section area	- 18
F/Spar - redesigned some reduction in caps etc.	- 40
I/Wing Joints - Outer angles at Fin attachment now with Fin	- 21
Weight Change Decrease	- 125

Ref. 002-1

(b) Fin and Rudder:

Completely re-estimated mainly to Production Drawings.	
Addition of Outer Angles at Attach. (see above)	+ 21
Addition of Marry-Up Hardware	+ 29
Increases in Skins, Spars etc.	+ 34
Weight Change Increase	+ 84

Ref. 002-1

(c) Fuselage to Sta. 255":

Miscellaneous production drawing changes to Formers, Cockpit Floor, Navigator's Canopy etc.	+ 13
Weight Change Increase	+ 13

Ref. 002-2



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Sheet # 001-2 Issue 25
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INTRODUCTION

1. STRUCTURE (Continued)

WEIGHT (lb)

(d) Fuselage Sta. 255" - 485"

Dorsal Deflector Shield - redesigned Stainless Steel replaces
Fibreglass

+ 2

Weight Change Increase

+ 2

Ref. 002-2

(e) Fuselage Sta. 485" Aft.

Heavy Formers E.B. - Considerable increase in cap thickness

+ 19

Engine Tunnel R.F. - Addition of Steel guides for Engine
removal rails

+ 7

Nacelles, Stringer etc. R.F. - miscellaneous changes

- 1

Weight Change Increase

+ 25

Ref. 002-3

TOTAL STRUCTURE WEIGHT DECREASE

- 1

2. LANDING GEAR

Main Undercarriage - Wheel assys. Manufacturer's increase

+ 4

Allowance for Air in Tyres 260 p.s.i.

+ 4

Nose Undercarriage - Allowance for Air in Tyres 170 p.s.i.

+ 1

Main U/C Hydraulics - Brake controls now with mechanical Flying
Controls

- 11

Nose U/C Hydraulics - Mechanical controls for steering now
with Flying Controls

- 6

Ref. 002-3

TOTAL LANDING GEAR WEIGHT DECREASE

- 8

3. POWER PLANT & SERVICES

Engines: - C. G. moved Aft by .36 ins.

0

Fire Extinguishing - increase in weight of bottles and mountings

+ 6

Engine Anti-icing - complete redesign of nose bullet

- 1

Engine Mounts - Estimated to production drawings

- 1

Ref. 002-3

TOTAL POWER PLANT AND SERVICES INCREASE

+ 4

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INTRODUCTION

4. FLYING CONTROLS GROUP

WEIGHT (lb)

Mechanical Controls - these have been re-estimated almost completely to production drawings - some mechanical controls have been removed from the U/C Group and included here (+ 11 lb) but the weight increase is largely due to heavy roller bearings replacing the lighter ball bearings, it was assumed earlier would be used

+ 55

Ref. 002-4

TOTAL FLYING CONTROLS GROUP INCREASE

+ 55

5. EQUIPMENT: - FIXED AND REMOVABLE

Electrics - All circuits have been re-estimated to production schematic drawings -

Wiring now MIL-W-8777 earlier MIL-W-5086 assumed

+ 27

Redesign of De-icing boots

+ 7

Addition of Air-Conditioning Safety shut-off

+ 17

Miscellaneous equipment changes

+ 7

Windscreen De-misting - transformer increased from 2 to 4.5 K.V.A.

+ 6

Oxygen System - convertor now has transmitter, evaporator coils, relief and fill valves etc. as an integral unit also miscellaneous other changes

- 3

Air Conditioning - addition of safety shut-off system

+ 24

Ducts .012 Stainless Steel replace Fibreglass

+ 15

Miscellaneous other changes

+ 15

Emergency Provisions - The hand fire extinguisher, fire hatchet and signal pistol are no longer R.C.A.F. requirements

- 13

Radome De-icing - Fuller information available

+ 7

Missile Package Structure and Mechanisms - the 'semi-submerged'

Missiles replace the fully submerged and the

pack is expected to be considerably lighter.

On the instructions of Mr. F. Mitchell approx.

600 lb will be removed

- 599

Ref. 002-5

TOTAL EQUIPMENT DECREASE

- 490

6. OPERATIONAL LOAD

Sparrow Missiles - C. G. changed in accordance with new geometry of 'semi-submerged' state

Ref. 002-5

OPERATIONAL LOAD WEIGHT CHANGE - NIL

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INTRODUCTION

SUMMARY

Weight Change - Aircraft Weight Empty

Structure	- 1 lb.
Landing Gear	- 8 lb.
Power Plant & Services	+ 4 lb.
Flying Controls	+55 lb.
Equipment	-490 lb.
	<u>-440 lb.</u>

Weight Change - Operational Load Less Fuel

NIL

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

Issue 24

45,130

Issue 25

44,690

- 440 lb.

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WEIGHT CHANGES TO 7-0400-05 ISSUE 24

WEIGHT CHANGES

Wing:

- | | | |
|----------|---|-------------------------------|
| - 45.70 | I/Wing Leading Edge - Ribs estimated to production drawings,
mostly .072 were .081 Al.
I/B Skin .09 was .156 Al. | - 10.00
- 35.70
- 45.70 |
| - 58.00 | I/Wing Spars - R/Spar - redesign reduction in cross
sectional area
F/Spar - re-estimated to production drawings,
reduction in cap areas etc. | - 18.00
- 40.00
- 58.00 |
| - 21.00 | I/Wing Joints - Outer angle at Fin Attach. now included
with Fin - see below. | |
| <hr/> | | |
| - 124.70 | | |

Fin and Rudder:

- | | | |
|---------|--|--|
| + 83.72 | Fin - Completely re-estimated to production drawings except
the Fin Tip which is still only at scheme drawing issues.
Addition of outer angle at wing attachment
(see I/W Joints - above)
Addition of 'Marry-Up' hardware
Revised estimate of hinges
Revised estimate of Leading Edge (provisions for
pitot masts now included)
Refined estimate of skins and pivot fittings
Misc. design changes to spars (incl. systems bracketry)
Misc. structural ammendments etc. | + 21.00
+ 28.86
+ 3.50
+ 4.70
+ 13.99
+ 8.08
+ 3.59
+ 83.72 |
|---------|--|--|

+ 83.72

Front Fuselage (Fwd. Sta. 255")

- | | | |
|--------|---|----------------------------|
| + 3.36 | Cockpit Floor - some alterations to centre stiffeners and
additional details "Marry-Up" assy. | |
| + 0.83 | Nose U/C Support Structure - Stiffeners added to cross
Beam. | |
| + 5.62 | Formers - Addition of clips, stiffeners etc. to production
drawings
Addition of former stubs .081 Al. at 237.5 and
246.25, also corner gussets .051 were .04 Al. | + 2.80
+ 2.82
+ 5.62 |
| + 2.62 | Navigator's Canopy - Glass .48" thick with vinyl laminates
was .25" thick. The proposed larger window has
not yet been considered. | |

(continued)

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WEIGHT CHANGES TO 7-0400-05 Issue 24

WEIGHT CHANGES

Front Fuselage (Fwd. Sta. 255") Con't.

+ 0.29 Bulkhead Sta. 120" - addition of Miscellaneous clips etc.
to production drawings.

+ 12.72

Centre Fuselage (Sta. 255" - 485")

+ 1.81 Dorsal Deflector Shield - redesigned in .012 St. Steel
with 3 lb/cu.ft. 'Refrasil'
Insulation- previous fibreglass
shield unsatisfactory at encountered
temperatures.

+ 1.81

Aft. Fuselage (Sta. 255" Aft)

+ 0.48 Dive Brake Accommodations - gauge increases in doublers and
and angle reinforcing on Decking.
+ 18.71 Heavy Formers E.B. - Production drawing estimates of Formers
Sta. 591.65, 644.43, 697.28 - consider-
able increase in thickness of caps.
+ 1.02 Rudder Fairing R.F. - redesign fore and aft ends, skin gauges
changed, doublers removed.

- 2.91 Formers Fixed R.F. - Production drawing estimate of majority
of formers + 2.79
Reduction in gauges of O/B web and
angles Sta. 753" - 5.70
- 2.91

+ 2.81 Outer Skins Fixed R.F. - Redesign fwd. stiffeners - 0.98
Redesign aft. stiffeners - 0.78
Fwd. of Sta. 753" .04Al. was Mg. + 4.57
+ 2.81

+ 7.16 Engine Tunnel Fixed R.F. - addition of St. Steel guides for
Engine removal rails.

- 0.96 Nacelles R.F. - Gauge changes to most of formers -
Upper and Lower sections often lighter gauge
than side panels. - 1.17
Elevator fairing channel & angle .025 was
.016 titanium + 0.21
- 0.96

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WEIGHT CHANGES

Aft. Fuselage (Sta. 255" Aft.) (Cont'd.)

-	1.58	Centre Structure R.F. - chute box longer, aft end redesigned	+	2.24
		Alteration to sealing design	-	1.64
		Slitter O/B Skin .025 was .016 titanium	+	0.84
		Latches - previous allowance too low	+	3.74
		Fwd. Skins were .032 & .04 Al. now .025 Al.	-	7.17
		Struct. aft 842.25 - skins .016 & .02 were .025 also bulkhead 848.8 added etc.	+	0.41
			-	1.58

+ 24.73

Landing Gear

+	8.64	Main Undercarriage - Manufacturers increase in wheel-assys.	+	4.40
		Allowance for Air at 260 p.s.i. in tyres	+	4.24
			+	8.64
+	1.00	Nose Undercarriage - Allowance for Air at 170 p.s.i. in tyres		
-	10.73	Main U/c Hydraulics - Mechanical brake controls now included with Flying Controls.		
-	5.93	Nose U/C Hydraulics - Mechanical steering controls now included with Flying Controls.		
-	7.01			

Power Plant & Services

0	Engines - C.G. moved aft by 0.36"			
-	1.01	Engine Mounts - Production Drawing estimates of most items		
-	1.25	Engine Anti-icing - Complete redesign of Nose bullet		
+	6.25	Engine Fire Extinguishing - increase in weight of bottles	+	5.00
		increase in weight of bottle mtgs.	+	1.25
			+	6.25

+ 3.99

Flying Controls Group

+	54.51	Mechanical Controls - completely re-estimated mostly to Production Drawings. Addition of mechanical controls steering (see U/C Group)	+	5.00
		Addition of Mechanical controls brakes (see U/C Group)	+	5.59
		Aileron linkage - increase in bell-cranks etc., roller bearings replace lighter ball bearings	+	43.92

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WEIGHT CHANGES TO 7-0400-05 ISSUE 24

WEIGHT CHANGES

Flying Controls Group (Cont'd.)

Rudder Controls in Fin	+ 7.67
Generally refined estimate of controls in fuselage	+ 5.33
Generally refined estimate of controls in I/Wing	- 13.00
	+ 54.51

+ 54.51

Equipment - Fixed and Removable

All Electrical reports have been revised in accordance with the Production schematics and wiring has been removed from individual reports and incorporated into a separate wiring report - for further details see below.

- 100.00	Alternator System - deletion of wiring (see note above)	
+ 12.19	Air Conditioning Electrics - increase in Relays and circuit breakers	+ 2.20
	deletion of wiring (see note above)	- 4.21
	preliminary estimate of safety equipment	+ 14.20
		+ 12.19
- 15.87	Undercarriage Electrics - deletion of wiring (see note above)	- 14.75
	Equipment estimated to production schematic	- 1.12
		- 15.87
- 3.50	External Lights - deletion of wiring (see note above)	- 5.06
	Increase in weight of taxi and landing lights	+ 1.56
		- 3.50
- 22.43	Fuel Valve Control - deletion of wiring (see note above)	- 27.81
	Increase in Weight of 12 relays	+ 5.38
		- 22.43
- 24.52	Engine Services Electrics - deletion of wiring (see note above)	- 18.42
	Equipment estimated to production schematic	- 6.10
		- 24.52

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WEIGHT CHANGES TO 7-0400-05 ISSUE 24

WEIGHT CHANGES

Equipment - Fixed & Removable (Continued)

-	1.90	Canopy Electrics - deletion of wiring (see note above)	-	3.00
		Circuit breakers	+	0.40
		Relays etc. to production schematic	+	0.70
			-	1.90
+	2.03	Cockpit Lighting - deletion of wiring (see note above)	-	4.91
		increase in console flood lights,		
		edge lights etc.	+	6.94
			+	2.03
-	11.37	Flight Services Electrics - deletion of wiring (see note above)	-	10.26
		Equipment estimated to production		
		schematics	-	1.11
			-	11.37
-	7.18	Fuel Capacity Electrics - deletion of wiring (see note above)		
-	13.17	Fire Detection Electrics - deletion of wiring (see note above)	-	14.18
		Fire detection loops	-	4.50
		Inertia crash switch	+	1.70
		Relays - further information	+	2.50
		Control Units	+	3.00
		Circuit breakers, limiters etc.	-	1.69
			-	13.17
-	10.50	Starting & Ignition - deletion of wiring (see note above)	-	11.35
		Equipment estimated to production		
		schematic	+	0.85
			-	10.50
-	19.10	Intake De-icing - Redesign of Boots	+	6.86
		Deletion of wiring (see note above)	-	25.96
			-	19.10
+	273.73	Electrical Wiring - Incorporation of all wiring from above		
		reports. The weight has however, increased		
		due to MIL-W-8777 replacing MIL-W-5086		
		(Weight penalty + 26.64 lb)		
+	6.00	Windscreen De-misting - Transformer increased from 2.0 to 4.5		
		K.V.A.		
-	2.52	Oxygen System - revision of estimate - though drawings still		
		not issued - the convertor now in integral with		
		the transmitter, evaporator coil, relief and fill		
		valves etc.		

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WEIGHT CHANGES TO 7-0400-05 ISSUE 24

WEIGHT CHANGES

Equipment - Fixed & Removable (Cont'd.)

-	11.45	Emergency Provisions - Hand Fire Extinguisher, Axe and Signal Pistol are no longer R.C.A.F. requirements	
-	2.00	Signal Pistol Cartridges - no longer an R.C.A.F. requirement	
+	53.87	Air Conditioning System - Introduction of Safety Shut-Off system	+ 24.30
		Radar Ram Air Valve added	+ 3.18
		Actuator added on flow augmentor	+ 1.75
		Pneumatically operated doors between ram and ramp air intake added	+ 5.00
		Control of Turbine discharge temperature	+ 3.00
		Electrical press. selector replaces cockpit non-return valve.	+ 1.80
		Exhaust Ducts - .012 St. Steel replaces fibreglass	+ 14.84
			+ 53.87
+	6.66	Radome De-icing - further information available - no drawings yet 4.55 lb electrics not previously allowed for.	
-	524.10	Missile Pack Structure - "semi-submerged" missiles replace "fully sub-merged" and the pack is expected to be considerably lighter (approximately 600 lb ref. F. Mitchell). The expected reduction has been divided proportionately between structure and mechanisms.	
-	74.50	Missile Pack Mechanisms - see note above.	
-	489.63		

Operational Load

0 Sparrow Missiles - C.G. change only in accordance with 'Semi-submerged' missile geometry.

- 439.86 TOTAL WEIGHT CHANGE.

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Checked By: E. Burnett

WEIGHT AND C.G. SUMMARY

REF. No.	DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
	STRUCTURE	16,951.65	565.75	141.21
1000000	Wing	9,455.83	642.68	146.94
2000000	Fin & Rudder	995.74	754.13	209.06
3000000	Fuselage Structure Fwd. 255"	2,168.19	185.89	129.99
	255" to 485"	1,545.47	369.67	131.49
	Aft. 485"	2,786.42	641.72	111.63
4000000	UNDERCARRIAGE - Up Position	2,861.34	484.83	133.81
4010100	Main Undercarriage	1,848.24	539.88	141.00
4010200	Main U/C Doors and Fairings	287.32	539.21	136.40
4010300	Main U/C Hydraulics	284.84	548.06	135.75
4020100	Nose Wheel Undercarriage	315.47	168.80	99.81
4020200	Nose U/C Doors & Fairings	25.92	163.71	89.22
4020300	Nose U/C Hydraulics	99.55	210.03	106.57
5000000	POWER PLANT & SERVICES	13,904.88	655.33	120.46
5010000	Engines J 75	12,647.50	664.02	119.81
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	68.10	561.78	115.69
5060000	Fire Extinguishing System	70.52	701.99	127.72
5070000	Engine Mountings & Brackets	216.07	643.18	125.29
5080000	Fuel System	671.50	526.79	138.78
6000000	FLYING CONTROLS GROUP	1,766.27	653.57	140.00
6010000	Mechanical Flying Controls	839.40	682.71	145.88
6030000	Flying Controls Electronics	108.00	222.33	131.43
6000000	Flying Controls Hydraulics	818.87	680.58	135.10
	EQUIPMENT - FIXED AND REMOVABLE	6,683.93	312.01	113.12
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	43.60	226.99	140.27
7040000	Air Conditioning System	703.98	325.98	134.27
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	935.20	400.94	116.16
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	82.62	206.33	118.82
7000000	Radio & Radar Fixed, Power Supplies	937.41	220.85	110.58
7130000	Radome Anti-Icing	23.46	62.92	126.04
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	3.50	181.50	133.20	
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	900.00	375.42	96.00	
8050200	Sparrow Pack Mechanisms	325.00	353.32	100.00	
8050300	Sparrow Pack Hydraulics	505.65	409.15	98.84	
8050400	Sparrow Pack Electronics	50.00	436.15	103.20	
	AIRCRAFT WEIGHT EMPTY	42,168.07	553.26	129.36	
9000000	USEFUL LOAD	18,194.87	516.84	136.82	
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	15,673.00	539.20	142.22	
9030000	Missiles (Armament)	1,728.00	389.29	88.30	
9040000	Oxygen Charge	13.39	259.69	159.91	
	U/C Up		542.28	131.61	29.36
	Normal Combat Mission	60,362.94			
	U/C Down		543.84	129.48	29.79
	Half Combat Mission	7,836.00	540.85	139.53	
	Fuel 1,005 gal. @ 7.8 lb/gal.				
	U/C Up		542.99	129.62	29.56
	Combat Weight (Half Combat	52,525.94			
	Mission Fuel)		544.79	127.17	30.05
	U/C Down				
	Operational Weight Empty	44,689.94	543.36	127.88	29.66
	U/C Down		545.47	124.99	30.24
	Operational Weight Empty	42,961.94	549.56	129.47	31.37
	(Less Missiles)		551.76	126.48	31.97
	U/C Down				
	Maximum Internal Fuel	19,843.00	538.88	144.32	
	2,544 gal. @ 7.8 lb/gal.				
	Water (Air Conditioning System)	125.00	268.00	132.00	
	U/C Up		541.45	132.93	29.13
	A.U.W. Max. Internal Fuel	64,657.94			
	U/C Down		542.91	130.94	29.53
	Max. External Fuel 500 gal.	4,210.00	528.88	62.00	
	@ 7.8 lb/gal. and Drop Tank				
	U/C Up		540.68	128.59	28.92
	A.U.W. Maximum Internal and	68,867.94			
	External Fuel		542.05	126.72	29.30
	U/C Down				

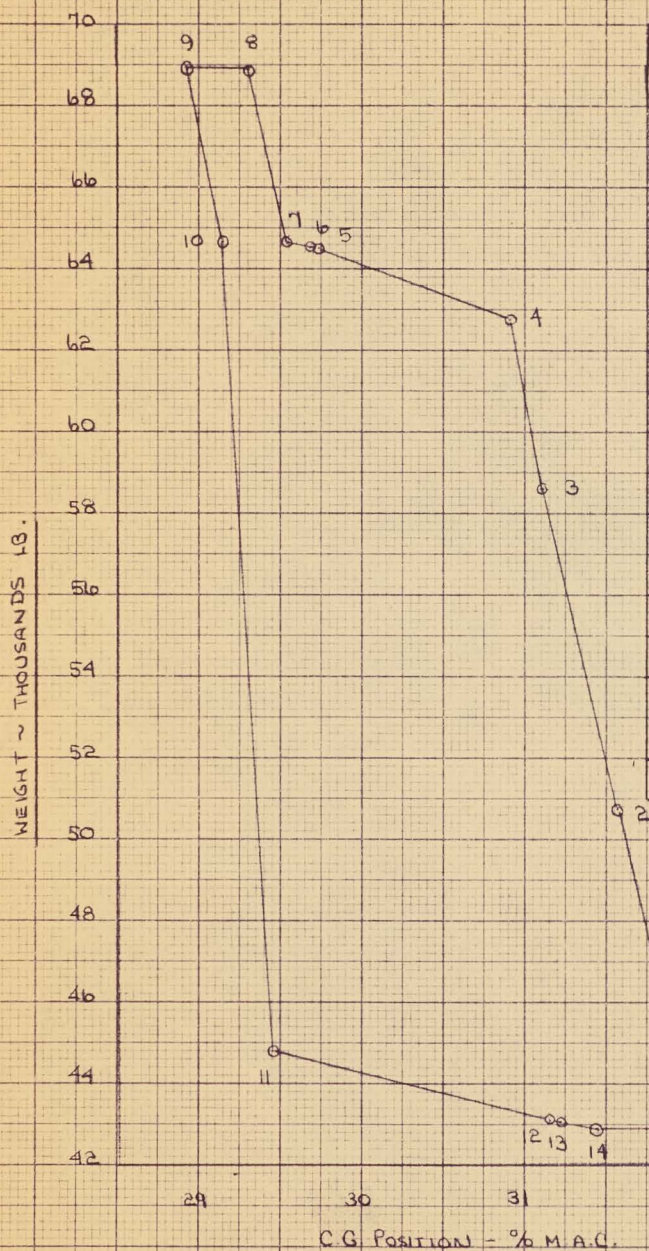
BY: Kathleen Griffin

DATE: April 1st 1955

J. Bennett

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

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No.	CONDITION COMBAT MISSION FUEL	NORMAL MISSION FUEL	MAX. INTERNAL FUEL	EXT. FUEL & TANK	MISSILES	DECING 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
12.31% M.A.C. 380LB BALLAST
MUST BE INSTALLED AT
STA 120 INS.

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RIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-05 Issue 25

April 1/56

SHEET 004-1

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	10000000						
	10100000						
	10100001	64	798.00	689.00	136.00	549822.00	108522.00
	10100002	64	125.20	698.20	137.00	87414.64	17152.40
	10100003	64	397.84	702.20	136.00	279363.25	54106.24
	10100004	64	133.34	693.40	137.40	92457.96	18320.92
	10100006	64	428.64	774.50	234.35	331981.68	100451.78
	10100007	64	116.50	644.60	138.40	75095.90	16123.60
LINKS	10100008	64	8.78	783.00	132.00	6874.74	1158.96
			2008.30			1423010.17	315841.90
	10200000						
	10200001	74	333.84	791.90	135.56	264367.90	45255.35
	10200002		8.86	782.07	130.79	6929.14	1158.80
LINKS	10200003	74	8.02	785.00	134.00	6295.70	1074.68
			350.72			277592.74	47488.83
	10300000	82	435.67	755.50	142.60	329148.69	62126.54
			435.67			329148.69	62126.54
	10400000						
	10400001	62	234.58	576.83	142.16	135312.78	33347.89
	10400002	62	140.00	450.00	144.00	63000.00	20160.00
	10400003	62	158.00	565.70	142.80	89380.60	22562.40
	10400004	62	56.26	600.00	146.00	33756.00	8213.96
	10400005	62	40.14	654.00	146.00	26251.56	5860.44
	10400006	62	72.00	702.00	145.00	50544.00	10440.00
	10400007	62	89.13	489.70	144.70	43646.96	12897.11
	10400008	62	273.99	620.64	144.83	170054.11	39683.13
	10400009	62	321.52	717.80	150.00	230787.06	48228.00
	10400010	62	422.33	725.67	143.19	306472.21	60473.43
	10400011		92.70	620.80	149.20	57548.16	13830.84
	10400012	62	98.15	964.50	114.57	633135.37	143027.48
			6150.40			3763198.54	891946.85
	10500000	63	236.60	455.57	145.00	107787.86	34307.00
			236.60			107787.86	34307.00
	10600000	65	274.14	643.30	137.60	176354.26	37721.66
			274.14			176354.26	37721.66

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RIGHT AND C. OF G BY

FUNCTIONAL GROUP COMPONENT

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SHEET 004-2

REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
201000083		87992	74634	20837	65671949	18334893
		87992			65671949	18334893
202000084		11582	81330	21431	9419641	2482138
		11582			9419641	2482138

WGT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-05 Issue 25

April 1/56

SHEET 004-3

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	30000000						
RE	30100000						
	3010000151		7819	4232	11045	330900	863409
S	3010000251		8340	9488	11451	791299	965013
	3010000351		9349	9295	11568	868990	1084492
	3010000452		6741	19280	11535	1299665	777544
	3010000554		13059	37050	14240	4838360	1859602
	3010000656		8317	53832	10373	4477207	862722
	3010000758		11639	67152	10911	7815821	1269931
	3010000852		1280	18569	11800	237683	151040
	3010000954		5173	36582	14162	1892387	732600
	3010001056		5005	50582	10015	252910	50075
	3010001152		9347	18290	12057	1709566	1126968
	3010001254		2744	137438	13295	10273362	3648281
	3010001356		14456	53895	10154	7791061	1467862
	3010001458		12804	66648	11173	8533610	1430591
	3010001558		18628	66081	11053	12309569	2058953
	3010001652		5311	18347	8622	974409	457914
B	3010001758		4197	1169	9581	298198	40144
	3010001858		7580	65009	9750	4927682	739050
	3010001958		6316	66619	13900	420366	87709
	3010002156		6875	2417	13259	360105	91089
	3010002252			5325	29515250	13406	8083
	3010002354		1425	14111	112211	5858729	1740190
	3010002456		4777	48074	10700	229313	51039
	3010002556		9366	52540	9879	4920896	925267
RON	3010002654		4053	27407	9232	1110806	374173
	3010002756		5752	51603	9152	2968205	526423
	3010002854		2310	27406	8970	633079	207207
77	3010002956		5966	53877	10389	3214302	619808
TURE	3010003056		3647	50400	9303	1838088	339280
	3010003152		1442	51912	714750	2759070	2127688
	3010003254		3351	237256	12919	12485231	4329415
	3010003356		2542	154053	11831	13740813	3007559
	3010003452		5806	21787	15992	1264953	928496
	3010003552		1598	26095	16272	416998	260027
	3010003656		3419	53647	9766	1834191	333900
TURE	3010003752		3542	21013	9130	744280	323385
	3010003852		1113	39205	2612303	2286391	1370431
	3010003954		5803	28338	13707	1644454	795417
	3010004051		1515	11356	15014	172043	227462
	3010004152		1152	41413	15014	1628456	1730213
PNLS	3010004258		4363	66740	9424	2911866	411169
	3010004358		3000	61797	9100	1853910	273000
LET	3010004454		2110	29296	16407	618146	346188
B	3010004558		4048	69530	10648	2814574	431031
	3010004658		7467	62764	8746	4686588	653064
	3010004754		6182	29400	11151	181692	68913
	3010004854		1553	33614	13118	522025	203723
	3010004954		1282	538420	11429	4927365	1465769

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WGT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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April 1/56
SHEET 004-5

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
ION	4000000						
UP	4010000						
	4010100	92	184824	53988	14100	99782781	26060184
			184824			99782781	26060184
S	4010200	92	28732	53921	113640	15492582	3919045
			28732			15492582	3919045
	4010300						
	4010301	62	28484	54806	13575	15610941	3866703
			28484			15610941	3866703
UP	4020000						
GE	4020100	91	31547	16880	9981	5325134	3148706
			31547			5325134	3148706
ING	4020200	91	2592	16371	8922	424336	231258
			2592			424336	231258
	4020300						
F	4020301	52	9115	19985	10660	1821633	971659
F	4020302	54	8403	2044	10621	269170	89216
			9955			2090803	1060875

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WRIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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April 1/56
SHEET 004-10

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	709060152		175	141.16	115.30	24703	201178
	709060254		1260	447.00	110.00	563220	138600
	709060356		296	492.35	97.20	145736	28771
	709060462		160	529.41	139.65	84706	22344
			1891			818365	209893
RICS	7090700						
	709070152		585	202.50	120.82	118463	70680
	709070254		365	449.08	110.00	163914	40150
	709070356		198	492.35	90.27	97485	17873
			1148			379862	128703
RICS	709080052		370	151.34	115.46	55996	42720
			370			55996	42720
RICS	709090052		1614	181.45	130.00	292860	209820
			1614			292860	209820
RICS	7091000						
	709100152		1715	167.08	106.14	286542	182030
	709100256		204	492.35	90.27	9847	1805
			1735			296389	183835
	709110052		346	140.05	126.47	48457	43759
			346			48457	43759
ICS	7091200						
	709120152		405	137.66	114.54	55752	46389
	709120254		750	447.00	116.00	335250	87000
	709120356		289	500.64	108.10	144685	31241
	709120458		417	648.97	120.00	270620	50040
			1861			806307	214670
ELEC F F	7091300						
	709130152		250	142.35	116.77	35588	29193
	709130254		230	447.00	110.00	102810	25300
			480			138398	54493
	7091400						
	709140152		10313	190.84	117.94	1968133	1216315
	709140254		8261	367.64	119.00	3037074	983059
	709140356		6420	529.98	120.00	3402472	770400
	709140458		403	628.66	120.00	253350	48360
	709140583		154	701.62	159.37	108049	24543
	709140662		170	856.37	139.64	967360	238505
	709140764		114	600.00	131.00	68400	14934
			27373			9804838	3296116

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