QCX
Avro
CF105
R-7-0400-44
Iss-8

FILE IN VAULT

C-105 MK I Report # 7-0400-44
Issue 8

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WEIGHT SUMMARY & C.G. POSITION

R.C.A.F. Aug. 1/57

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Report no.: QCX - AVRO - CF105 - R-7-0400-44 - Iss-8

has been [ ] downgraded to : _____

[XX] de-classified

by (Name): Michel W. Drapeau

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

Date: Dec. 7, 1992

R. Auger
Signature

Date: August 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st Aircraft.

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Report # 7-0400-44 Issue 8

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Classification cancelled / changed to: UNCLASSSIFIED
By authority of: DRDA 7/DARFT 5-8/DAS Eng 6-4-5
Date: 5 Nov 1992
Signature: B. Aubrey
Unit / Rank / Appointment: DSIS 3, Secretary CRAD HQ DRP

INDEX

Sheet #	Content
1-1 to 1-4	Introductory notes and explanations of weight changes.
2-1 to 2-2	Weight & C.G. Summaries
3-1	Horizontal C.G. Envelopes for Flight conditions with fuel proportioners used.
4-1 to 4-15	I. B. M. detail sheets of weights and C.G.'s.

N. B. The C.G. envelope for the 1st Aircraft with fuel sequencing has been omitted until a fully approved sequencing is established.

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Date: August 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st Aircraft

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Report # 7-04,00-44 Iss. 8
Sheet # 1-1

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INTRODUCTION & WEIGHT CHANGES

The following is a Weight & C.G. Summary for the 1st C-105 Aircraft, with J75 P3 Engines, based on latest information currently available. All Weight & C.G. changes are relative to Issue 7 of July 1st, 1957.

Note:- This Summary does not apply for the 2nd and subsequent MK 1 A/C - see context below.

GENERAL

a) Pratt & Whitney J75 P3 Engines comprise the Power Plant for the 1st Aircraft. J75 P5 Engines, which are partially redesigned versions of the P3 Engines, are to be installed on the 2nd and subsequent MK 1 Aircraft.
(J75 P3 Engines = 6,175 lb each; J75 P5 Engines = 5,950 lb each)

b) An Instrument Package carrying Flight Test Instrumentation is installed, this also varies between Aircraft No 1 to 3 and the installation for the 4th & 5th Aircraft (which are to be used for Astra 1 trial Installations.)
A relatively detailed estimate of other Flight Test Installations throughout the Aircraft has been made. Twin shielded wire at 27lb/1000 ft is used, there being approximately 250 monitored points. These installations amount to 1,323 lb (figure partially confirmed by actual weights of cable assys.).

c) Emergency lowering for the Undercarriages and additional fire protection, to be installed on the 1st A/C, are allowed for in this summary. There is, as yet, no provision to jettison any or all of the Instrument package in an emergency.

d) An Interim Radio & Radar System is installed.

e) It should be noted that due to material subsitutions and concessions introduced by Planning & Production Departments there is a weight penalty, to date, to the structure of 203 lb. This is all recorded in the Structural Weight breakdown. No account has been taken of variations on machinings etc. nor of shop repair schemes, since it is impossible to assess these, except where actual weights have been obtained.

f) Pending Flight Test requirements a "Buzz Damping" System may be installed on the first Aircraft. Provisions for this installation are already included in the structural group as modifications to the Control Boxes. For the first flights the Control Surfaces will be unmodified, however, if the need for Dampers is proven a modified set of Control Surfaces will be made available. The following weight penalties ensue:-

Ailerons	+ 11.68 lb/A/C.
Elevators	+ 11.07 lb/A/C.
Rudder	+ 8.78 lb
Equipment & Installation	+123.97 lb
	+155.50 lb

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INTRODUCTION & WEIGHT CHANGES

GENERAL (Cont'd)

g) A considerable number of Actual Weights have now been obtained. Structural weights are checking within 0.5% of estimates on sub-assemblies etc. However, Equipment (excluding Engines) shows a consistant increase averaging about 11% over manufacturers quotations or initial specification weights.
Preceeding the report titles on the I.B.M. Tabulation Sheets, will be found a number varying from 0 to 100, this is the percentage actual weight recorded within the report.

A summary of Actual Weights obtained so far is as follows:

Structure	63.58% Actual Weight
Undercarriage	67.21% Actual Weight
Power Plant	91.59% Actual Weight
Flying Controls	26.66% Actual Weight
Equipment	19.35% Actual Weight

i.e. 62.06% of the Basic Weight of the Aircraft.

h) The Aircraft is ballasted such that the C.G. on a flight envelope does not travel Aft of 31% M.A.C.

1. STRUCTURE

a) Wing:

	WEIGHT (lb)
I/W Centre Trailing Edge	- 1.74
N.B. A complete Inner Wing less elevator control boxes, U/C doors & fairings and some minor shortages was weighed. The Actual Weight obtained, using Electronic Weighing Cells was approximately 25 lb lighter than estimated. i.e. within 0.4%. Since the accuracy of the weighing cells is not guaranteed beyond these limits - the estimated weight will be left unchanged but assumed 100% Actual Weight.	
WEIGHT DECREASE WING	- 1.74

b) Fin & Rudder

A complete Fin was weighed, but there was no apparent weight change.

c) Fuselage Fwd. Sta. 255"

No Weight Change.

d) Centre Fuselage Sta. 255"-485"

No Weight Change.

Date: August 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st Aircraft

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INTRODUCTION & WEIGHT CHANGES

	WEIGHT (lb)
1. STRUCTURE (cont'd)	
e) Duct Bay Sta. 485"-591.65"	
No Weight Change	
f) Engine Bay Sta. 591.65" - 742.5"	
No Weight Change	
g) Rear Fuselage Sta. 742-5" Aft.	
Engine Doors - actual weight obtained	- 0.42
Rear Fuselage Decrease	- 0.42
TOTAL STRUCTURAL DECREASE	- 2.16
2. LANDING GEAR	
Main U/C Doors etc. - Addition of Micro Switch mounting on leg.	+ 0.96
TOTAL LANDING GEAR INCREASE	+ 0.96
3. POWER PLANT & SERVICES	
Engines - A Pratt & Whitney J75 P3 Engine was weighed and after allowing for shortages, inhibiting fluid etc. the obtained weight was in agreement with Pratt & Whitney's quotation. Some accessories, packing etc. also weighed	+ 2.07
TOTAL POWER PLANT & SERVICES INCREASE	+ 2.07
4. FLYING CONTROLS GROUP	
Flying Control Hydraulics - Actual Weights of pumps (4 Off)	+ 18.00
Alterations to Engine Bay Piping	+ 1.79
Heat Exchangers - Manufacturers quotation	- 2.60
TOTAL FLYING CONTROLS INCREASE	+ 17.19
5. EQUIPMENT	
Windscreen Demisting - Airesearch Control Units replace Westinghouse	- 6.40
Structural changes and re-estimates	- 1.82
Hydraulics D.B. - Two 110 cu. in. accumulators replace one 200 cu. in.	+ 10.00
Some piping now Steel was Al.	+ 2.87
Pressure relief valve added etc.	+ 1.19
Air Condn. Actual Weight of Check Valve	+ 0.53
Actual Weight of some ducting assys.	+ 2.74
Actual Weight of Turbine, was Mnfg. quote	+ 9.19

Date: August 1st, 1957
Aircraft: C-105 MK 1 with
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1st Aircraft

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INTRODUCTION & WEIGHT CHANGES

5. EQUIPMENT GROUP (cont'd.)		WEIGHT (lb)
Electrics D.B. - Actual Weight of Transformer rectifier Unit	+	1.43
Canopy Actuation - Alterations to plumbing and emergency release mechanism	+	2.87
Ram Air Emergency Turbine - introduced for emergency electrical and hydraulic power in the event of double engine flame-out.	+	60.00
Probe - Redesigned, shorter boom, estimates to stress approved schemes	-	3.50
Damping System - manufacturers quotations on units now available and preliminary estimates of wiring. Previously 60 lb was allowed with Interim Radar (thus increase per Aircraft = +79.13 lb)	+	139.13
Interim Radio & Radar - Damping System allowance deleted (see above)	-	60.00
Doppler replaces ARN 21 (Tacan)	+	12.00
TOTAL EQUIPMENT INCREASE	+	170.23

SUMMARY

Weight Change - Aircraft Weight Empty

Structure	-	2.16 lb.
Landing Gear	+	0.96 lb.
Power Plant	+	2.07 lb.
Flying Controls	+	17.19 lb.
Equipment	+	170.23 lb.
	+	188.29 lb.

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

Issue 7	Issue 8	
47,408.03 lb	47,596.32 lb	= + 188.29 lb

N. B. If Aircraft Ballasted such that the C.G. in any flight envelope does not exceed 31% M.A.C. a further 936 lb of ballast are necessary.

Date: August 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st Aircraft:

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
STRUCTURE	18,493.37	561.88	137.59
Wings	9,963.36	642.91	142.25
Fin & Rudder	1,025.85	754.34	209.31
Fuselage fwd. Sta. 255"	2,617.01	181.50	128.15
Sta. 255" - 485"	1,650.12	379.76	130.80
Sta. 485" - 591.65"	997.30	533.97	104.59
Sta. 591.65 - 742.5"	1,418.18	660.80	107.30
Sta. 742.5" Aft.	768.97	800.62	129.13
"Marry-Up"	52.58	468.91	103.89
UNDERCARRIAGE - Retracted	2,609.85	488.48	134.94
Main Undercarriages	1,959.62	539.48	141.00
Main U/C Doors & Fairings	291.88	536.80	138.48
Nose Undercarriage	333.81	170.81	99.70
Nose U/C Door & Fairing	24.54	162.24	88.23
POWER PLANT & SERVICES	14,322.42	653.01	120.25
Engines & Accessories J75 P3	12,562.29	664.92	119.78
Gear Box Installation on Fuselage	275.54	601.39	102.98
Gear Box and Starter on Engines	259.65	591.55	104.52
Engine Controls	32.43	375.76	118.62
Engine Nose Bullets	71.01	562.74	115.07
Fire Extinguishing System	70.46	702.44	134.83
Engine Mountings	203.64	609.88	123.63
Fuel System	847.40	536.57	136.16
FLYING CONTROLS GROUP	1,844.26	686.29	139.65
Mechanical Flying Controls	946.48	687.84	148.61
Hydraulic Flying Controls	897.78	684.66	130.21
EQUIPMENT FIXED & REMOVABLE	9,343.40	401.54	110.30
Instruments	46.07	163.68	138.70
Probe	15.00	-38.14	108.00
Cockpit Pressure Sealing	5.00	186.00	130.00
Ejector Seats	284.42	202.80	136.25
Oxygen System	23.59	253.72	156.43
Air Conditioning System	807.28	335.60	134.45
Surface Finish	100.00	591.52	140.30
Hydraulics Main System	623.15	502.78	117.75
Cabin Insulation	14.31	187.48	132.00
Brake Parachute	62.38	769.41	143.24
Electrical System	1,111.10	418.87	112.78
Low Pressure Pneumatics	53.15	427.62	124.55
Intake Deicing Boots	51.84	197.02	118.00
Canopy Actuation	64.92	221.99	154.35
Cabin Consoles	17.45	174.76	124.34
M.H. 64 Damping System	139.13	449.26	135.57
Interim Radio & Radar	642.98	301.79	120.28
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation 1st A/C	3,036.00	395.45	95.00
Flight Test Installations	1,322.87	499.05	112.01
Additional Fire Protection 1st A/C	154.17	425.05	102.89
Radome Anti-Icing	8.88	51.49	125.00

continued.

Date: August 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st Aircraft

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.	% M.A.C.
EQUIPMENT FIXED & REMOVABLE (cont'd.)				
Emergency Landing Gear Lowering	12.91	458.83	128.60	
Emergency Ram Air Turbine	60.00	265.00	100.00	
AIRCRAFT BASIC WEIGHT	46,613.30	558.55	126.73	
USEFUL LOAD (less fuel)	983.02	353.44	132.63	
Crew	430.00	194.00	136.50	
Alcohol - radome de-icing	22.00	93.00	138.00	
Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
Residual Fuel	218.40	553.98	134.04	
Oxygen Charge	13.39	259.69	159.91	
Water for Air Conditioning	140.00	268.00	132.00	
Oil	134.23	608.92	115.68	
BALLAST	936.00	86.39	116.50	
U/C Up		545.29	126.62	30.19
Operational Weight Empty	48,532.32			
U/C Down		547.31	123.37	30.75
Maximum Internal Fuel (2,544 gals. @ 7.8 lb/gal.)	19,843.00	538.88	144.32	
U/C Up		543.43	131.76	29.68
A.U.W. Maximum Internal Fuel	68,375.32			
U/C Down		544.86	129.38	30.07

N.B. 1) Aircraft Datum is considered to be 120" above an arbitrarily chosen ground line.

2) The above figures are for the Aircraft in the Ballasted Condition such that the Aft. C.G. on the horizontal C.G. Flight Envelope does not exceed 31% M.A.C. i.e. 303 lb on Former Sta. 68.5 and 633 lb on the Shear Panel.

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REPORT No: Y-0400-44-8

BY: Kathleen Ryffel

DATE: Aug 1st 1957

SHEET: 3-1

HORIZONTAL C.G. ENVELOPE

C105 MK.I A/C FLIGHT CONDITIONS

WITH J75 P3 ENGINES (200 & SUBS. A/C J75 P5)

a) INTERIM RADIO & RADAR

b) INSTRUMENT RACK & FLIGHT TEST INSTALLATIONS

c) FUEL SYSTEM PROPORTIONERS

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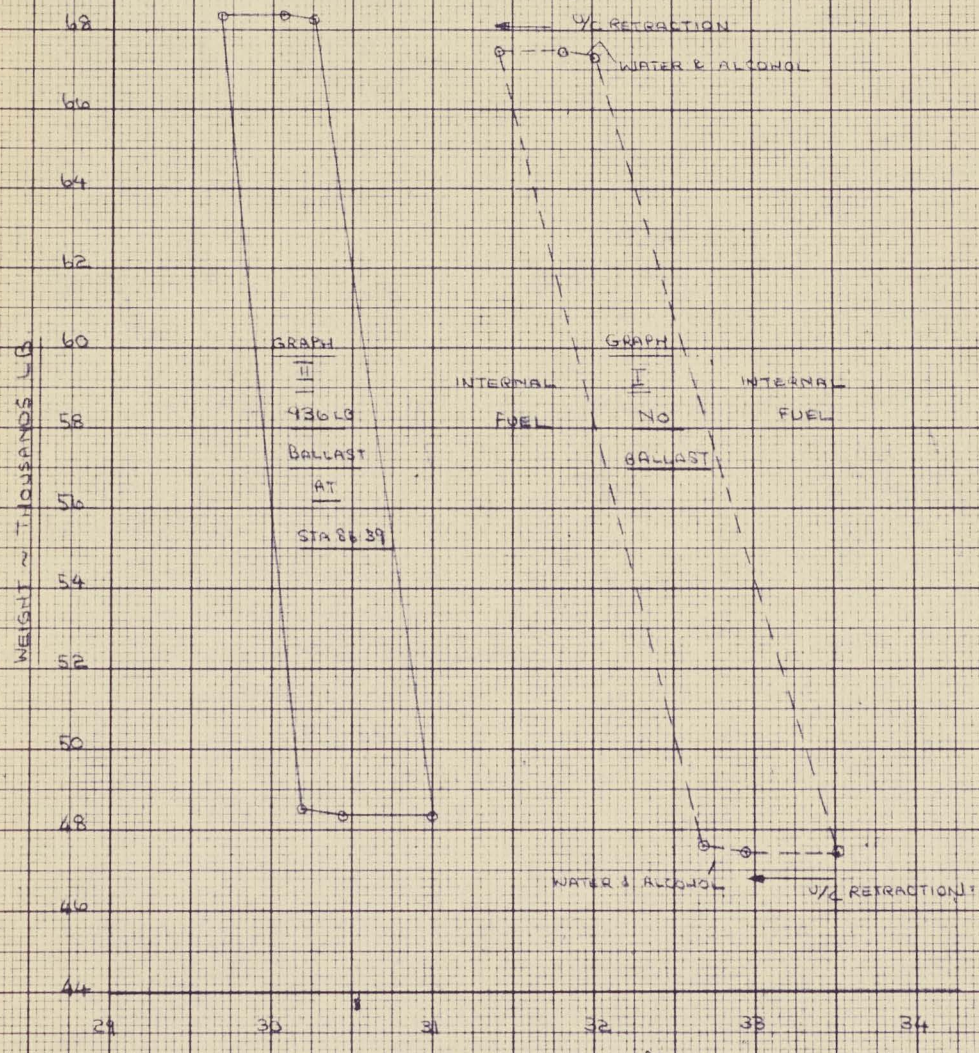

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PROJECT C-105 MK 1

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

	DESCRIPTION	REFERENCE NO.	COMP NO.	WEIGHT	H
	TOTAL WING GROUP	1000000			
	OUTER WING	1010000			
100	OUTER WING SKINS	101000164		929107	0
100	POSTS AND INTERCOSTALS	101000264		24367	3
100	OUTER WING SPARS	101000364		392587	0
100	OUTER WING RIBS	101000464		134566	9
18	AILERON CONTROL BOX	101000664		37920	7
100	RIB 12	101000764		76266	4
100	O W AILERON JACK FITTING	101000964		10467	2
	AILERON JOINTS AND FAIRING	101001000		32937	8
	BUZZ DAMP STRUC PROV O W	101001164		800	7
				198745	
	AILERON	1020000			
100	AILERON STRUCTURE	102000174		336007	9
				33600	
97	ELEVATOR	103000082		449007	5
97	ELEVATOR MARRY UP	103000000		15977	3
				46497	
	INNER WING	1040000			
96	MAIN U C STRUCTURE	104000162		3307157	
100	FRONT SPAR I W	104000262		1111048	
100	MAIN SPAR I W	104000362		1510656	
100	FWD CENTRE SPAR I W	104000462		536460	
100	AFT CENTRE SPAR I W	104000562		366665	
100	REAR SPAR I W	104000662		766770	
94	I W STRUCTURE F S TO M S	104000762		1059184	9
100	STRUCTURE MS TO R S	104000862		149796	0
100	STRUCTURE AFT OF REAR SPAR	104000962		322127	1
40	ELEVATOR CONTROL BOX	104001062		428387	2
25	TRANSP JOINT MARRY UP	104001100		70653	
100	INNER WING JOINTS	104001262		634716	6
100	SKINS M S TO R S	104001362		2190386	2
100	STRUT PICK UP FITTINGS	104001462		53915	6
100	RIBS 1 TO 9 INNER WING	104001662		512046	1
	DORSAL FAIRINGS I W	104001762		954	8
100	RIB 10	104001862		108006	3
77	FUSELAGE HINGE JOINT	104001962		126286	1
65	TRANSPORT JOINT O W TO I W	104002062		129426	3
49	FUSELAGE HINGE JOINT	104002100		37405	8
	BUZZ DAMP STRUC PROV I W	104002262		5527	4
	DORSAL FAIRINGS	104002300		5689	5
				664486	

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	1000000						
	1010000						
	101000164		929107	06461	3597	65637199	12632973
LS	101000264		24367	32071	3410	1783323	326668
	101000364		392587	01181	3636	27526924	5353221
	101000464		134566	95061	3650	9352727	1836744
	101000664		379207	74091	3508	29353493	5122234
	101000764		76266	48731	3832	4947215	1054828
TING	101000964		10467	27291	3670	761394	142988
AIRING	101001000		32937	87226	3224	2592447	435466
O W	101001164		800	75828	3680	606624	109440
			198745			142561346	27014562
	1020000						
	102000174		336007	92131	3556	26615568	4554816
			33600			26615568	4554816
	103000082		449007	55231	4260	33909827	6402740
	103000000		15977	38101	4260	1178746	227732
			46497			35088573	6630472
	1040000						
	104000162		330715	77571	3983	19100817	4624318
	104000262		111104	84281	4260	5380351	1584286
	104000362		151065	65701	4280	8545464	2157137
	104000462		53646	00981	4415	3223657	773221
	104000562		36666	54921	4450	2400937	529737
	104000662		76677	03741	4420	5395575	1105581
M S	104000762		1059186	49929	4405	52883798	15257488
	104000862		149799	60964	4572	9131798	2182740
R SPAR	104000962		322127	18291	5020	23137557	4838242
	104001062		428387	24701	4328	31044699	6137829
P	104001100		70656	36211	3876	4494824	980339
	104001262		634716	62221	5046	42031766	9549847
	104001362		2190386	24461	4464	136780469	31681656
S	104001462		53915	67661	4330	3060255	772530
NG	104001662		512046	12871	4499	31381395	7424068
	104001762		954	82801	6150	45866	15343
	104001862		108006	36831	3835	6877764	1494180
	104001962		126286	16811	3811	7789077	1744053
TO I W	104002062		129426	30711	3710	8162649	1774348
	104002100		37405	27961	4309	1974570	535157
I W	104002262		5527	41501	4200	409308	78384
	104002300		56295	72491	6026	3222546	902104
			664486			406475142	96142588

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
105000062		22138	46841	14423	10369661	3192964
		22138			10369661	3192964
106000065		30870	63013	13561	19452113	4186281
		30870			19452113	4186281

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EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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SHEET 4-3

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	201000083		851707	749572	11170	63840877	18030489
FIN	201000183		185600	300	22342	148555	41333
	201000200		4830	685381	15355	3310385	741647
			90185			67299817	18813469
	202000084		12400	813252	1438	10084300	2658312
			12400			10084300	2658312

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WEIGHT AND C. OF G BY FUNCTIONAL G COMPONEN

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	TOTAL FUSELAGE GROUP	3000000			
	FUSELAGE BASIC STRUCTURE	3010000			
	RADOME	301000151		17728	3
	RADAR NOSE ACCESS DOORS	301000251		8002	9
	RADAR NOSE STRUCTURE	301000351		12225	9
	SKIN F F	301000452		10949	18
88	SKIN C F	301000554		21182	37
	SKIN D B	301000656		5880	53
3	SKINS E B	301000758		17573	66
4	FORMERS F F	301001152		10531	18
100	FORMERS C F	301001254		27824	37
	FORMER D B	301001356		7457	53
	LIGHT FORMERS E B	301001458		13501	66
13	HEAVY FORMERS F B	301001558		21281	66
	LOWER LONGERONS F F	301001652		6846	18
	LONGITUDINAL MEMBERS E B	301001758		11067	70
	LONGERON E B	301001858		6905	65
	TOP LONGERONS E B	301001958		638	66
	LOWER SHEAR PANEL	301002052		2988	23
	TOP WING LONGERONS D B	301002156		498	53
	LONGERONS C F	301002252		53	25
	LONGERONS C F	301002354		13613	41
43	LONGERONS F D B	301002454		1258	48
43	LONGERONS A D B	301002556		8655	52
	ELECTRONICS BAY STRUCTURE	301002654		3570	27
59	LONGITUDINAL BEAMS D B	301002756		6570	52
	RADAR ACCESS DOOR C F	301002854		2108	27
72	MAIN FRAME AT STN 538 77	301002956		5980	53
	DIVE BRAKE ACCOM STRUCTURE	301003056		3634	50
30	TOP LONGERONS F F	301003152		18649	19
100	DUCT C F	301003254		33286	37
	DUCT D B	301003356		31504	54
	CANOPY ARCHES	301003452		8535	22
4	ACCESS PANEL STIFFNERS	301003656		3865	53
66	NOSE U C SUPPORT STRUCTURE	301003752		3343	21
3	CREW BULKHEADS	301003852		12272	20
51	EQUIPMENT BAY STRUCTURE	301003954		6150	28
86	WINDSCREEN	301004152		13003	13
33	SERVICE ACCESS DOORS	301004258		6704	66
	TORSION BOX E B	301004358		6042	61
	DORSAL FAIRING AIR OUTLET	301004454		2061	29
	INTERMEDIATE FORMERS	301004558		5165	69
	ENGINE ACCESS DOORS	301004658		14659	62
	SEALING MISSILE BAY	301004754		697	32
100	MISCELLANEOUS ITEM C F	301004854		392	37
98	ARMAMENT BAY ROOF	301004954		13216	38
	BULKHEAD AT STA 120	301005052		3060	12
	BULKHEAD AT STA 255	301005152		10429	25
100	BULKHEAD AT STA 485	301005254		11245	48
	ENGINE TUNNEL E B	301005458		46764	66

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	INTEGRAL FUS FUEL TANK	301005554		20359	39
	COCKPIT FLOOR	301005652		57431	17
	CENTRE BEAM 697 28 717 36	301005958		5577	71
	DORSAL OVER FUEL TANK	301006154		50974	41
	SHIELD EXHAUST DEFLECTOR	301006254		19653	32
	SHEAR PANEL BELOW NAV ARCH	301006352		20742	25
34	PACK MTG STRUCTURE	301006454		20472	29
79	ENG ACCESS DOORS R F	301006559		82427	77
	TUNNEL FIXED R F	301006659		97897	77
	SKIN AND STIFFENERS R F	301006759		51227	77
47	FAIRING UNDER RUDDER	301006859		26167	78
	FORMERS FIXED R F	301006959		90017	77
	LONGERONS C BEAM FIXED R F	301007059		27997	77
	NACELLES REMOVABLE R F	301007159		27989	82
	CNTR STRUC STING REMOV R F	301007259		11339	83
	MISCELLANEOUS ITEMS E B	301007358		923	66
	MTG BRKTS SIDE PANEL D B	301007556		213	52
	FORMERS LOWER PANEL D B	301007656		7606	54
	LOWER PANEL D B	301007756		5054	55
	JOINT F F TO C F	301007800		855	25
	JOINT AIR INTAKES TO F F	301007900		952	22
	JOINT C F TO D B	301008000		500	48
	JOINT D B TO E B	301008100		2508	50
	FUS JOINT AT STA 742 50	301008200		443	74
	MISC STRUCTURE F F	301008552		552	18
				624141	
96	DIVE BRAKES	302000072		11150	50
96	DIVE BRAKES C A	302000100		406	48
				11556	
	AIR INTAKES	3030000			
16	AIR INTAKES	303010055		76248	21
				76248	
	PILOTS AND NAVIG CANOPIES	3040000			
76	PILOTS CANOPY	304010053		24154	17
				24154	
48	NAVIGATORS CANOPY	304020053		14317	21
				14317	

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	UNDERCARRIAGE UP POSITION	4000000			
	MAIN UNDERCARRIAGE GROUP	4010000			
69	MAIN UNDERCARRIAGE	401010092		195962	53
				195962	
24	MAIN U C DOORS FAIRINGS	401020062		29188	53
				29188	
	NOSE UNDERCARRIAGE GROUP	4020000			
100	NOSE UNDERCARRIAGE	402010091		33381	17
				33381	
	NOSE U C DOOR AND FAIRING	402020052		2454	16
				2454	

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
ITION	4000000						
ROUP	4010000						
	401010092		195962	53948	14100	105717580	27630642
			195962			105717580	27630642
INGS	401020062		29188	53680	13848	15668118	4041954
			29188			15668118	4041954
ROUP	4020000						
	402010091		33381	17080	9970	5701475	3328086
			33381			5701475	3328086
IRING	402020052		2454	16224	8823	398137	216516
			2454			398137	216516

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	ENGINE GROUP	5000000			
99	ENGINE J 75	5010000	0	12527	07 6
				12527	07
	J 75 ENGINE SERV ACCESS	5010100	0	3522	6
				3522	
66	ACC GEAR BOXES ON FUS D B	502000156		4524	5
68	ACC GEAR BOXES ON FUS E B	502000258		23030	6
				27554	
	ENGINE CONTROLS	5030000			
36	ENGINE CONTROLS F F	503000152		1458	1
36	ENGINE CONTROLS C F	503000254		264	3
36	ENGINE CONTROLS D B	503000356		508	4
36	ENGINE CONTROLS E B	503000458		1013	6
				3243	
91	GEARBOX AND STARTER ON ENG	5040000	0	2596	5
				25965	
6	ENGINE ANTI ICING	5050000	0	7101	5
				7101	
	FIRE EXT SYSTEM	5060000	0		
	FIRE EXT SYST ENG	5060001	0	6900	7
	FIRE EXT SYST E B	506000256		146	5
				7046	
	ENGINE MTGS AND BRACKETS	5070000			
4	ENGINE MTGS AND BRACKETS	507000100		1439	5
	ENGINE MTGS ACCESSORIES	5070002	0	520	6
	ENGINE MTGS ACCESSORIES CA	507000300		766	6
				20364	
	FUEL SYSTEM	5080000			

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PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	FLYING CONTROLS GROUP	6000000			
	MECHANICAL CONTROLS	6010000			
	MECHANICAL CONTROLS F F	601000152		87591	5
	MECHANICAL CONTROLS C F	601000254		8853	3
	MECHANICAL CONTROLS D B	601000356		3504	8
	MECHANICAL CONTROLS F I N	601000583		126887	8
11	MECHANICAL CONTROLS I W	601000662		408847	1
	MECHANICAL CONTROLS O W	601000764		304357	7
	MECHANICAL CONTROLS C A	601000800		6467	0
				94648	
	FLYING CONTROLS HYDRAULICS	6020000			
	FLYING CONT HYDRAULICS D B	602000156		23915	7
43	FLYING CONT HYDRAULICS E B	602000258		43629	6
	FLYING CONT HYDRAULICS R F	602000359		48	7
60	HYDRAULICS FLYING CONT I W	602000462		25628	7
58	HYDRAULICS FLYING CONT O W	602000564		12560	7
59	RUDDER HYDRAULICS	602000683		5227	5
				89778	

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PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	FIXED EQUIPMENT GROUP	7000000			
	INSTRUMENTS	7010000			
	INSTRUMENTS F F	701000152		440716	
	NAVIG TABLE AND STOWAGE	701000452		20022	
				4607	
	COCKPIT PRESSURE SEALING	702000052		50018	
				500	
	OXYGEN SYSTEM	7030000			
	OXYGEN SYSTEM	703000152		235925	
				2359	
	AIR CONDITIONING SYSTEM	7040000			
48	AIRCONDITIONING F F	704000152		354917	
48	AIRCONDITIONING C F	704000254		469072 9	
48	AIRCONDITIONING D B	704000356		114851	
48	AIRCONDITIONING C A	704000500		274884 0	
48	AIRCONDITIONING ENG	704000600		155664	
48	AIRCONDITIONING I W	704000762		8051	
				8072 8	
	HYDRAULICS MAIN SYSTEM	7050000			
14	UTILITY HYDRAULICS F F	705000152		841520	
5	UTILITY HYDRAULICS C F	705000254		416243	
9	UTILITY HYDRAULICS D B	705000356		258825 5	
21	UTILITY HYDRAULICS E B	705000458		724060	
23	UTILITY HYDRAULICS I W	705000562		133115 5	
14	UTILITY HYDR NOSE U C	705000691		32519	
23	UTILITY HYDR MAIN U C	705000792		298054	
28	EMERGENCY LOWERING M U C	705000862		85358	
35	EMERGENCY LOWERING N U C	705000952		43821	
				6360 6	
	RAM AIR TURB EMERG POWER	706000054		60026	
				6000	
	CABIN INSULATION	707000052		143118	
				1431	

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	BRAKE PARACHUTE	708000 00			
	BRAKE PARACHUTE F F	708000 152		455	16
	BRAKE PARACHUTE R F	708000 559		5659	82
	BRAKE PARACHUTE I W	708000 662		124	62
				6238	
	ELECTRICAL SYSTEM	709000 00			
	ELECTRICAL WIRING	709140 00			
33	ELECTRICAL WIRING R N	709140 151		129	9
33	ELECTRICAL WIRING F F	709140 252		2966	19
33	ELECTRICAL WIRING C 6	709140 354		1304	41
33	ELECTRICAL WIRING A I	709140 455		1274	21
33	ELECTRICAL WIRING D B	709140 556		6515	53
33	ELECTRICAL WIRING E B	709140 658		64	59
33	ELECTRICAL WIRING I W	709140 862		8909	54
33	ELECTRICAL WIRING FIN	709140 983		352	79
33	ELECTRICAL WIRING NUC	709141 091		330	18
33	ELECTRICAL WIRING ENG	709141 11 0		2002	58
33	ELECTRICAL WIRING C A	709141 200		13746	33
				3759	1
59	ELECTRICS F F	709150 052		1524	8 15
				1524	8
26	ELECTRICS C F	709160 054		735	9 45
				735	9
85	ELECTRICS E B	709170 058		67	0 67
85	ELECTRICS ENG	709170 1 0		1163	2 56
85	ELECTRICS C A	709170 200		71	8 61
				1302	0
	ELECTRICS FIN	709180 083		8	3 89
				8	3
	ELECTRICS I W	709190 062		233	6 62
	ELECTRICS C A	709190 100		11	2 62
	ELECTRICS M U C	709190 292		7	4 51
				25	2 2
	ELECTRICS A I	709200 055		509	0 22
				509	0

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	REMOVABLE EQUIPMENT GROUP	8000000			
	EJECTOR SEATS	8010100	52	28442	20
				28442	
	RADAR REMOV GROUP	8020000			
	DAMPING SYSTEM	8030000			
	DAMPING SYSTEM F F	8030101	52	635	16
	DAMPING SYSTEM C F	8030102	54	2180	33
	DAMPING SYSTEM E B	8030103	58	369	63
	DAMPING SYSTEM I W	8030104	62	5800	57
	DAMPING SYSTEM O W	8030105	64	95	74
	DAMPING SYSTEM R N	8030106	51	520	0
	DAMPING SYSTEM C A	8030107	00	431	40
				1391	3
98	INSTRUMENT PACK	8050800	54	6868	30
				6868	0
	INSTRUMENTATION	8050900	54	3036	00 39
				3036	00
	FIRE PREVENT FIRST A C CF	8051000	54	140	29 40
	FIRE PREVENT FIRST A C DB	8051001	56	80	65 4
	FIRE PREVENT FIRST A C EB	8051002	58	58	26 2
				154	17

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
GROUP	8000000						
	8010100	52	28442	20280	13625	5768038	3875223
			28442			5768038	3875223
	8020000						
	8030000						
	803010152		635	16959	11961	107690	75952
	803010254		2180	31915	11403	695747	248585
	803010358		369	63242	13432	233363	49564
	803010462		5800	52121	16000	3023018	928000
	803010564		95	7485	5140	71112	13300
	803010651		520	8000	10200	41600	53040
	803010700		4314	48168	12000	2077968	517680
			13913			6250498	1886121
	805080054		68680	38581	9468	26497431	6502622
			68680			26497431	6502622
	805090054		303600	39545	9500	120058620	28842000
			303600			120058620	28842000
C CF	805100054		14029	40956	9982	5745717	1400375
C DB	805100156		806	5494	0128	442816	103837
C EB	805100258		582	6263	4140	364530	82033
			15417			6553063	1586245

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WEIGHT AND C. OF G BY FUNCTIONAL G COMPONEN

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
OPERATIONAL LOAD	9000000			
CREW MEMBERS	901000052		43000	19
			43000	
ENGINE OIL	9020000			
ENGINE OIL USABLE	9020001	0	8816	61
ENGINE OIL TRAPPED ENG	9020002	0	1773	62
ENGINE OIL TRAPPED D B	902000356		1925	58
ENGINE OIL TRAPPED E B	902000458		909	59
			13423	
OXYGEN CHARGE	9040000			
OXYGEN CHARGE F F	904000152		72	20
OXYGEN CHARGE C F	904000254		1267	26
			1339	
ALCOHOL FOR RADOME DEICING	905000051		2200	9
			2200	
ENGINE FIRE EXT FLUID	9060000	0	2500	73
			2500	
RESIDUAL FUEL	9070000			
RESIDUAL FUEL C F	907000154		4680	39
RESIDUAL FUEL I W	907000262		17160	59
			21840	
WATER FOR AIR CONDITIONING	910000054		1250	26
UNUSABLE WATER FOR AIRCOND	910000154		150	26
			1400	