QCX
Avro
CF105
R-7-0400-44
Iss-9

FILE IN VAULT

C-105 MK 1 Report # 7-0400-44
1st A/C Iss. 9

WEIGHT SUMMARY & C.G. POSITION

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C.E.P.E. Sept. 1/57

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DATE
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Report no.: QCX - AVRO - CF105 - R-7-0400-44-Iss-9

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

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Report # 7-0400-44 Iss. 9

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

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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 & C.G.'s.

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

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

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

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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 and C.G. changes are relative to Issue 8 of August 1st, 1957.

Note: - This Summary does not apply for the 2nd and subsequent MK 1 Aircraft 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 Instrumentation is installed, this also varies, the package for Aircraft No. 1 to 3 differing from those for Aircraft No. 4 & 5 (which are to be used for Astra I Trial Installations). A relatively detailed estimate of other Flight Test Installations throughout the Aircraft has been made. Twin shielded wire at 27 lb/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 Aircraft are allowed for in this summary. There is no provision to jettison any or all of the Instrument Package in an emergency.

d) An Interim Radio & Rador System is installed.

e) It should be noted that due to material substitutions 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 flight 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 and Gear Boxes) shows a consistant increase averaging about 11% over manufacturer's 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	69.52%
Undercarriage	67.21%
Power Plant	92.40%
Flying Controls	26.66%
Equipment	19.40%

i.e. 64.68% 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.
However, C.G. Envelopes showing fuel sequencing have currently been omitted until a fully approved sequencing is established.
(N.B. Indications are that for first flights, desirable C.G's are from 28% - 29% M.A.C., this may be achieved by further ballasting or by fuel sequencing with restrictions on the usage of certain tanks imposed.)

1. STRUCTURE	WEIGHT (lb)
a) Wing:	
O/W Aileron Control Box - Actual Weight obtained.	- 3.90
WEIGHT DECREASE WING	- 3.90
b) Fin & Rudder	
No Weight Change.	
c) Fuselage Fwd. Sta. 255"	
Radar Nose Structure - re-inforcing plates added on Shear Panel, Miscellaneous brackets added etc.	+ 2.29
Radar Nose Doors - packing added.	+ 0.06
WEIGHT INCREASE FRONT FUSELAGE	+ 2.35
d) Centre Fuselage Sta. 255"-485"	
No. Weight Change.	

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INTRODUCTION & WEIGHT CHANGES

	WEIGHT (lb)
1. STRUCTURE (cont'd)	
e) Duct Bay Sta. 485"-591.65"	
Floating Duct - minor changes to gill doors. The duct weight was checked by weighing, estimate & actual weight tallied	+ 1.29
WEIGHT INCREASE DUCT BAY	+ 1.29
f) Engine Bay Sta. 591.65" - 742.5"	
Heavy Formers - Actual weights of machinings, increases probably due to tolerances	+ 3.01
Intermediate Formers - 65% Actual weights obtained	- 0.11
Engine Tunnel - Actual weights of sub-contracted insulation blankets, foil tolerances appear to account for increases.	+ 8.08
WEIGHT INCREASE ENGINE BAY	+ 10.98
g) Rear Fuselage Sta. 742.5" Aft.	
A Rear Fuselage from Sta. 742.5" - 803" was weighed, less insulation blankets, and the actual weight checked satisfactorily with that estimated.	
Engine Doors - Actual weights of Insulation blankets, foil tolerances appear to account for increases	+ 2.15
Tunnel Fixed R.F. - Actual weights of Insulation blankets	+ 6.14
Stinger & Parachute Box - Actual weights of Insulation blankets	+ 0.93
Trial installation of aft ramp-parachute box	+ 2.02
Tailcones - general production drawing revisions and alterations	+ 4.87
WEIGHT INCREASE REAR FUSELAGE	+ 16.11
TOTAL STRUCTURAL INCREASE	+ 26.83
2. LANDING GEAR	
No Weight Change	
3. POWER PLANT & SERVICES	
Engine Mounts - Actual weights, increases probably due to machinings tolerances	+ 2.57
Fire Extinguishing System - Actual weights of bottles	- 5.00
Fuel System - addition of filters to minimize risk of Engine contamination	+ 15.45
Fuel no-air valves actual weight = 3.50 lb was quoted at 3.0 lb 22 Off 1 Aircraft	+ 11.00
Error in estimate of bag spacers in fuselage	+ 2.18
Misc. other fuel system changes	+ 3.09
TOTAL POWER PLANT & SERVICES INCREASE	+ 29.29

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INTRODUCTION & WEIGHT CHANGES

4. FLYING CONTROLS GROUP — WEIGHT (lb)

No Weight Change.

5. EQUIPMENT GROUP

Emergency Ram Air Turbine	- previous allowance considered insufficient	+ 15.00
Utility Hydraulics D.B.	- a production pressure control valve 7-1958-14 failed under test, so on the 1st A/C the heavy original test valve will be installed.	+ 6.07
TOTAL EQUIPMENT GROUP INCREASE		+ 21.07

SUMMARY

Weight Change - Aircraft Basic Weight

Structure	+ 26.83 lb.
Power Plant	+ 29.29 lb.
Equipment	+ 21.07 lb.
	+ 77.19 lb.

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

Issue 8	Issue 9	
47,596.32 lb.	47,673.51 lb.	= 77.19 lb.

N. B. If Aircraft Ballasted such that the C.G. in any flight envelope (not including some possible fuel sequencing) does not exceed 31% M.A.C. a further 945 lb. of ballast are necessary.

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1st A/C

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb.	H. ARM ins.	V. ARM ins.
STRUCTURE	18,520.20	562.05	137.55
Wings	9,959.46	642.86	142.25
Fin & Rudder	1,025.85	754.34	209.31
Fuselage: fwd. Sta. 255"	2,619.36	181.42	128.14
Sta. 255"-485"	1,650.12	379.76	130.80
Sta. 485"-591.65"	998.59	534.01	104.59
Sta. 591.65"-742.5"	1,429.16	661.00	107.32
Sta. 742.5" Aft.	785.08	800.55	129.04
"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	14,351.71	653.10	120.35
Engines & Accessories J75 P3	12,562.29	664.92	119.78
Gear Box Installation on Fuselage	275.54	601.39	102.98
Gear Box & Starters 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	65.46	700.45	134.21
Engine Mountings	206.21	635.04	127.71
Fuel System	879.12	536.86	136.38
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	9,364.47	401.44	110.28
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	140.20
Hydraulics Main System	629.22	503.61	117.70
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 De-icing Boots	51.84	197.02	118.00
Canopy Actuation	64.92	221.99	154.35
Cabin Consoles	17.45	174.76	124.34
MH 64 Damping System	139.13	449.26	135.57
Interim Radio & Radar	642.98	301.79	120.28
Radome Anti-icing	8.88	51.49	125.00
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation 1st A/C	3,036.00	395.45	95.00

continued

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Date: September 1st, 1957
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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.)				
Flight Test Installations	1,322.87	499.20	112.01	
Additional Fire Protection 1st. A/C	154.17	425.05	102.89	
Emergency Landing Gear Lowering	12.91	458.83	128.60	
Emergency Ram Air Turbine	75.00	265.00	100.00	
AIRCRAFT BASIC WEIGHT	46,690.49	558.62	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 Extinguishing 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	945.00	86.48	116.50	
U/C Up		545.30	126.63	30.19
Operational Weight Empty	48,618.51			
U/C Down		547.31	123.30	30.75
Maximum Internal Fuel (2,544 gal. @ 7.8 lb/gal.)	19,843.00	538.88	144.32	
U/C Up		543.44	131.76	29.68
A.U.W Maximum Internal Fuel	68,461.51			
U/C Down		544.87	129.39	30.07

N.B. 1) A/C 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. Envelope does not exceed 31% M.A.C. i.e. 303 lb on former Sta. 68.5" and 642 lb on the Shear Panel.

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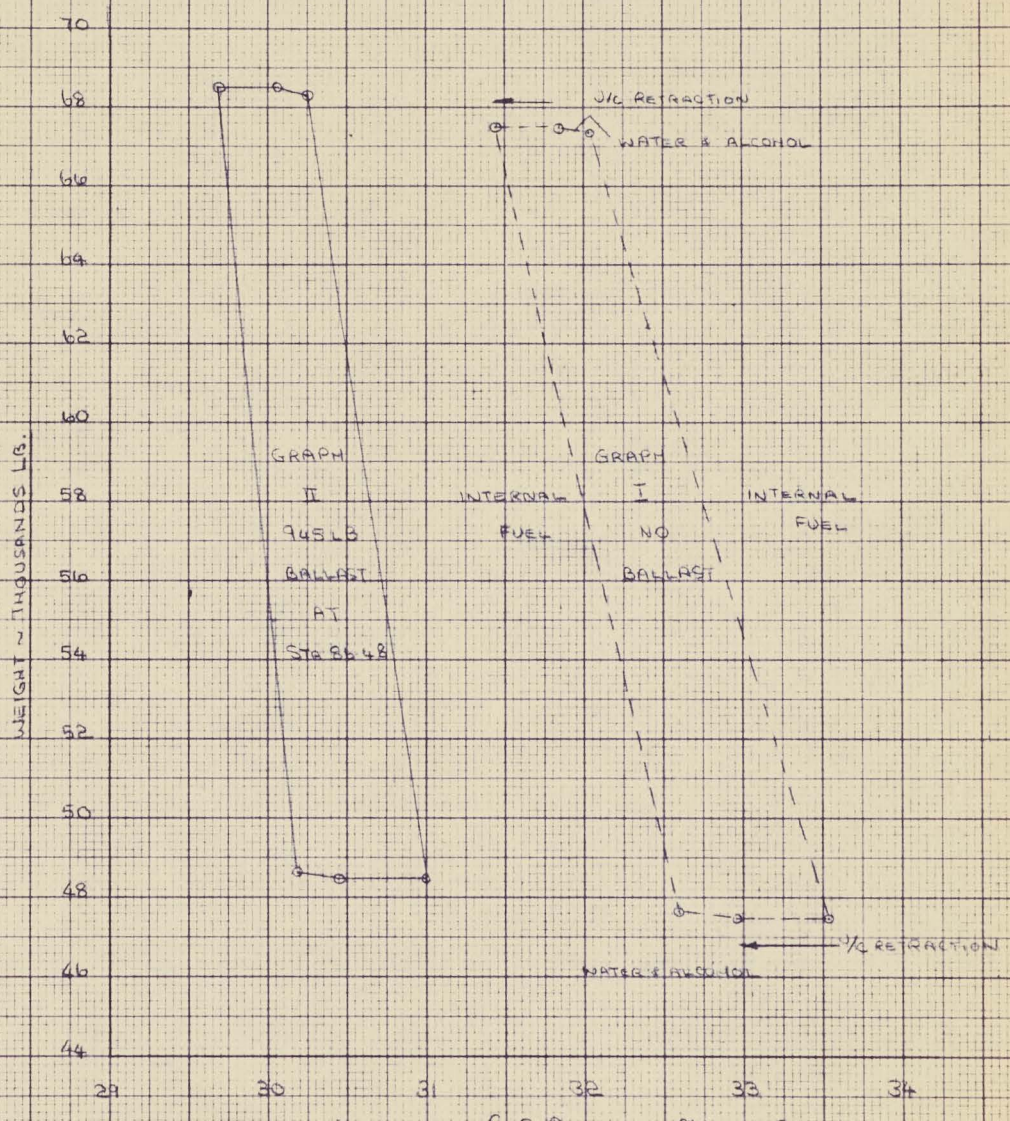
REPORT NO. 7-9600-44-9
BY: Katherine Griffiths
DATE: Sept 1st 1951
SHEET: 3

HORIZONTAL C.G. ENVELOPES
C105 MKII A/C FLIGHT CONDITIONS
WITH J75 P3 ENGINES (2ND & SUBS. A/C J75 P5)
a) INTERIM RADIO & RADAR
b) INSTRUMENT PACE & FLIGHT TEST INSTALLATIONS
c) FUEL SYSTEM PROPORTIONERS



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PROJECT C-105 MK 1

WEIGHT AND C. OF G BY FUNCTIONAL G COMPONEN

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. A
	TOTAL WING GROUP	1000000			
	OUTER WING	1010000			
100	OUTER WING SKINS	1010001	64	92910	706
100	POSTS AND INTERCOSTALS	1010002	64	2436	732
100	OUTER WING SPARS	1010003	64	3925	8701
100	OUTER WING RIBS	1010004	64	1345	695
98	AILERON CONTROL BOX	1010006	64	3753	774
100	RIB 12	1010007	64	762	648
100	O W AILERON JACK FITTING	1010009	64	104	727
	AILERON JOINTS AND FAIRING	1010010		329	787
	BUZZ DAMP STRUC PROV O W	1010011	64	80	758
				19835	
	AILERON	1020000			
100	AILERON STRUCTURE	1020001	74	3360	0792
				3360	
97	ELEVATOR	1030000	82	4490	0755
97	ELEVATOR MARRY UP	1030000		159	7738
				4649	
	INNER WING	1040000			
96	MAIN U C STRUCTURE	1040001	62	3307	1577
100	FRONT SPAR I W	1040002	62	1111	0484
100	MAIN SPAR I W	1040003	62	1510	6565
100	FWD CENTRE SPAR I W	1040004	62	536	4600
100	AFT CENTRE SPAR I W	1040005	62	366	6654
100	REAR SPAR I W	1040006	62	76	6707
94	I W STRUCTURE F S TO M S	1040007	62	10591	8499
100	STRUCTURE MS TO R S	1040008	62	1497	9609
100	STRUCTURE AFT OF REAR SPAR	1040009	62	3221	2718
40	ELEVATOR CONTROL BOX	1040010	62	4283	8724
25	TRANSP JOINT MARRY UP	1040011		706	5636
100	INNER WING JOINTS	1040012	62	6347	1662
100	SKINS M S TO R S	1040013	62	21903	8624
100	STRUT PICK UP FITTINGS	1040014	62	539	1567
100	RIBS 1 TO 9 INNER WING	1040016	62	5120	4615
	DORSAL FAIRINGS I W	1040017	62	95	482
100	RIB 10	1040018	62	1080	0636
77	FUSELAGE HINGE JOINT	1040019	62	126	2861
65	TRANSPORT JOINT O W TO I W	1040020	62	1294	2636
49	FUSELAGE HINGE JOINT	1040021		374	0527
	BUZZ DAMP STRUC PROV I W	1040022	62	552	7474
	DORSAL FAIRINGS	1040023		562	9577
				66486	

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COMPONEN

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
100 FIN	2010000	83	851707	74
BUZZ DAMP STRUC PROV FIN	2010001	83	185	80
12 FIN TO WING MARRY UP	2010002		4830	68
			90185	
95 RUDDER	2020000	84	124008	1
			12400	

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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	3010001	51	17728	3
	RADAR NOSE ACCESS DOORS	3010002	51	8008	9
	RADAR NOSE STRUCTURE	3010003	51	12454	9
	SKIN F F	3010004	52	10949	18
88	SKIN C F	3010005	54	21182	37
	SKIN D B	3010006	56	5880	53
3	SKINS E B	3010007	58	17573	66
4	FORMERS F F	3010011	52	10531	18
100	FORMERS C F	3010012	54	27824	37
	FORMER D B	3010013	56	7457	53
	LIGHT FORMERS E B	3010014	58	13501	66
64	HEAVY FORMERS E B	3010015	58	21582	66
	LOWER LONGERONS F F	3010016	52	6846	18
	LONGITUDINAL MEMBERS E B	3010017	58	1106	70
	LONGERON E B	3010018	58	6905	65
	TOP LONGERONS E B	3010019	58	638	66
	LOWER SHEAR PANEL	3010020	52	2988	23
	TOP WING LONGERONS D B	3010021	56	498	53
	LONGERONS C F	3010022	52	53	25
	LONGERONS C F	3010023	54	13813	41
43	LONGERONS F D B	3010024	54	1258	48
43	LONGERONS A D B	3010025	56	865	52
	ELECTRONICS BAY STRUCTURE	3010026	54	3570	27
59	LONGITUDINAL BEAMS D B	3010027	56	6570	52
	RADAR ACCESS DOOR C F	3010028	54	2108	27
72	MAIN FRAME AT STN 538 77	3010029	56	5980	53
	DIVE BRAKE ACCOM STRUCTURE	3010030	56	363	50
30	TOP LONGERONS F F	3010031	52	1864	19
100	DUCT C F	3010032	54	3328	37
97	DUCT D B	3010033	56	3163	54
	CANOPY ARCHES	3010034	52	853	22
4	ACCESS PANEL STIFFNERS	3010036	56	386	53
66	NOSE U C SUPPORT STRUCTURE	3010037	52	3343	21
3	CREW BULKHEADS	3010038	52	1227	20
51	EQUIPMENT BAY STRUCTURE	3010039	54	615	28
86	WINDSCREEN	3010041	52	1300	13
33	SERVICE ACCESS DOORS	3010042	58	670	66
	TORSION BOX E B	3010043	58	604	61
	DORSAL FAIRING AIR OUTLET	3010044	54	206	29
66	INTERMEDIATE FORMERS	3010045	58	515	69
	ENGINE ACCESS DOORS	3010046	58	146	62
	SEALING MISSILE BAY	3010047	54	97	32
100	MISCELLANEOUS ITEM C F	3010048	54	39	37
98	ARMAMENT BAY ROOF	3010049	54	1321	38
	BULKHEAD AT STA 120	3010050	52	306	12
	BULKHEAD AT STA 255	3010051	52	1042	25
100	BULKHEAD AT STA 485	3010052	54	1124	48
13	ENGINE TUNNEL	3010054	58	4757	66

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	INTEGRAL FUS FUEL TANK	30100555	54	20359	39
	COCKPIT FLOOR	30100566	52	5743	17
	CENTRE BEAM 697 28 717 36	30100595	8	557	71
	DORSAL OVER FUEL TANK	30100615	4	5097	41
	SHIELD EXHAUST DEFLECTOR	30100625	4	1965	31
	SHEAR PANEL BELOW NAV ARCH	30100635	2	2074	25
34	PACK MTG STRUCTURE	30100645	4	2047	29
88	ENG ACCESS DOORS R F	30100655	9	8457	77
99	TUNNEL FIXED R F	30100665	9	10403	77
100	SKIN AND STIFFENERS R F	30100675	9	5122	77
100	FAIRING UNDER RUDDER R F	30100685	9	2616	78
100	FORMERS FIXED R F	30100695	9	9001	77
100	LONGERONS C BEAM FIXED R F	30100705	9	2799	77
	NACELLES REMOVABLE R F	30100715	9	28476	82
8	CNTR STRUC STING REMOV R F	30100725	9	11634	81
	MISCELLANEOUS ITEMS E B	30100735	8	923	66
	MTG BRKTS SIDE PANEL D B	30100755	6	213	52
	FORMERS LOWER PANEL D B	30100765	6	7006	54
	LOWER PANEL D B	30100775	6	5054	55
	JOINT F F TO C F	30100785		855	25
	JOINT AIR INTAKES TO F F	30100795		952	22
	JOINT C F TO D B	30100805		500	40
	JOINT D B TO E B	30100815		2508	58
	FUS JOINT AT STA 742 50	30100825		443	74
	MISC STRUCTURE F F	30100855	2	552	16
				627214	
96	DIVE BRAKES	30200007	2	11150	56
96	DIVE BRAKES C A	30200015		406	45
				11556	
	AIR INTAKES	3030000			
18	AIR INTAKES	30301005	5	76248	2
				76248	
	PILOTS AND NAVIG CANOPIES	3040000			
76	PILOTS CANOPY	30401005	3	24154	1
				24154	
48	NAVIGATORS CANOPY	30402005	3	14317	2
				14317	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
23 FUEL SYSTEM C F	5080001	54	13474	40
28 FUEL SYSTEM D B	5080002	56	16311	53
17 FUEL SYSTEM E B	5080003	58	3592	6
39 FUEL SYSTEM I W	5080004	62	53155	55
FUEL SYSTEM ENG	5080005		626	65
FUEL SYSTEM C A	5080006		754	61
			87912	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT
	FLYING CONTROLS GROUP	6000000		
	MECHANICAL CONTROLS	6010000		
	MECHANICAL CONTROLS F F	6010001	52	87591
	MECHANICAL CONTROLS C F	6010002	54	8853
	MECHANICAL CONTROLS D B	6010003	56	3504
	MECHANICAL CONTROLS FIN	6010005	83	12688
11	MECHANICAL CONTROLS I W	6010006	62	40884
	MECHANICAL CONTROLS O W	6010007	64	30436
	MECHANICAL CONTROLS C A	6010008		467
				94648
	FLYING CONTROLS HYDRAULICS	6020000		
	FLYING CONT HYDRAULICS D B	6020001	56	23915
43	FLYING CONT HYDRAULICS E B	6020002	58	43629
	FLYING CONT HYDRAULICS R F	6020003	59	487
60	HYDRAULICS FLYING CONT I W	6020004	62	25287
58	HYDRAULICS FLYING CONT O W	6020005	64	12560
59	RUDDER HYDRAULICS	6020006	83	5527
				89778

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WEIGHT AND C. OF G BY FUNCTIONAL G COMPONEN

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	FIXED EQUIPMENT GROUP	7000000			
	INSTRUMENTS	7010000			
	INSTRUMENTS F F	701000152		44071	6
	NAVIG TABLE AND STOWAGE	701000452		2002	2
				4607	
	COCKPIT PRESSURE SEALING	702000052		5001	8
				500	
	OXYGEN SYSTEM	7030000			
	OXYGEN SYSTEM	703000152		2359	25
				2359	
	AIR CONDITIONING SYSTEM	7040000			
48	AIRCONDITIONING F F	704000152		3549	17
48	AIRCONDITIONING C F	704000254		46907	29
48	AIRCONDITIONING D B	704000356		1148	51
48	AIRCONDITIONING C A	7040005		27488	40
48	AIRCONDITIONING ENG	7040006		1556	64
48	AIRCONDITIONING I W	704000762		80	51
				8072	8
	HYDRAULICS MAIN SYSTEM	7050000			
14	UTILITY HYDRAULICS F F	705000152		8415	20
5	UTILITY HYDRAULICS C F	705000254		4162	43
12	UTILITY HYDRAULICS	705000356		26489	55
21	UTILITY HYDRAULICS E B	705000458		7240	60
23	UTILITY HYDRAULICS I W	705000562		13311	55
14	UTILITY HYDR NOSE U C	705000691		325	19
23	UTILITY HYDR MAIN U C	705000792		2980	54
28	EMERGENCY LOWERING M U C	705000862		853	58
35	EMERGENCY LOWERING N U C	705000952		438	21
				6421	3
	RAM AIR TURB EMERG POWER	706000054		7500	26
				7500	
	CABIN INSULATION	707000052		1431	18
				1431	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
93 ELECTRICS D R	709210056		271325	1
			27132	
WINDSCREEN DEMISTING	709220052		29291	9
			2929	
ELECTRICS R F	709230059		1368	0
			136	
L P PNEUMATICS	7100000			
12 L P PNEUMATICS F F	710000152		19221	9
12 L P PNEUMATICS C F	710000254		7783	2
12 L P PNEUMATICS D B	710000356		4185	5
12 L P PNEUMATICS E B	710000458		1557	6 5
12 L P PNEUMATICS FIN	710000583		5047	4
12 L P PNEUMATICS R N	710000651		136	6
			5315	
INTAKE DEICING	712000055		5184	1 9
			5184	
RADOME ANTI ICING	713000051		888	1
			888	
5 RADIO RADAR INT SYST R N	715000151		19791	1
5 RADIO RADAR INT SYST F F	715000252		99081	1
5 RADIO RADAR INT SYST C F	715000354		331412	1
5 RADIO RADAR INT SYST I W	715000562		43975	
5 RADIO RADAR INT SYST O W	715000664		807	7
5 RADIO RADAR INT SYST FIN	715000783		32017	
5 RADIO RADAR INT SYST C A	71500008		115792	1
5 RADIO RADAR INT SYST D B	715000959		137	7
			64298	
29 CANOPY ACTUATION	716000052		64922	2
			6492	
CABIN CONSOLES	717000052		17451	1
			1745	

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	7092100	56	27132	51861	10254	14070927	2782115
			27132			14070927	2782115
	7092200	52	2929	19898	9980	582812	292314
			2929			582812	292314
	7092300	59	136	80200	11360	10907	15450
			136			10907	15450
	7100000						
	7100001	52	1922	19739	12561	379384	241422
	7100002	54	778	32842	10747	255511	83612
	7100003	56	418	55545	11592	232178	48455
	7100004	58	1557	65644	9739	1022077	151636
	7100005	83	504	74257	24452	374255	123238
	7100006	51	136	6919	10000	9410	13600
			5315			2272815	661963
	7120000	55	5184	19702	11800	1021352	611712
			5184			1021352	611712
	7130000	51	888	5149	12500	45723	111000
			888			45723	111000
R N	7150001	51	1979	10256	8873	202966	175597
F F	7150002	52	9908	19017	12450	1884204	1233546
C F	7150003	54	33141	27635	10460	9158515	3466549
I W	7150056	2	4397	55270	15808	2430222	695078
O W	7150066	4	807	39041	13764	59123	11011
F I N	7150007	83	3201	76212	25627	2439546	820320
C A	7150008		11579	27810	11484	3220120	1329732
D B	7150009	59		13745	50158	00	9692	2054
			64298			19404388	7733887
	7160000	52	6492	22199	15435	1441159	1002040
			6492			1441159	1002040
	7170000	52	1745	17476	12434	304956	216973
			1745			304956	216973

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SHEET 4-13

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	719000152		363187441	22200		68041	44286
	719000253		642021815	9900		12940	10176
	719000354		1400371971	24555		520758	174370
S	719000455		408227981	20020		93016	49042
	719000556		377538281	12200		202932	42224
	719000658		443667011	12200		295485	49616
	719000759		648803621	31775		520746	85374
	719000862		3151601441	44400		1895137	453744
	719000964		1067706501	35590		753836	145005
EDGE	719001065		31963948	35526		203994	43148
N	719001174		35379190	35556		279541	47853
OR	719001282		56675523	42660		427460	80712
	719001383		63974663	20837		477097	133148
	719001484		20281279	21431		164184	43291
			10000			5915167	1401989
ION	7200000		1322874992	0112	01	66037670	14817467
			132287			66037670	14817467

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SHEET 4-14

	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	32421	3432	233363	49564
	803010462		5800	52121	16000	3023018	928000
	803010564		95	74855	14000	71112	13300
	803010651		520	80001	0200	41600	53040
	8030107		4314	48168	12000	2077968	517680
			13913			6250498	1886121
	805080054		686	80385	81 9468	26497431	6502622
			68680			26497431	6502622
	805090054		3036	00395	45 9500	120058620	28842000
			303600			120058620	28842000
C CF	805100054		1402	94095	6 9982	5745717	1400375
C DB	805100156		806	54940	12883	442816	103837
C EB	805100258		582	62634	14095	364530	82033
			15417			6553063	1586245

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	9000000						
	9010000	52	43000	19400	13650	8342000	5869500
			43000			8342000	5869500
	9020000						
	9020001		88166	12461	21186	5399447	1074318
G	9020002		17736	26761	16440	1111245	206377
8	9020003	56	19255	8084	9555	1118117	183934
8	9020004	58	909	5992	8 9704	544746	88209
			13423			8173555	1552838
	9040000						
	9040001	52	7	2049	3 13200	14755	9504
	9040002	54	1267	2628	0 16150	332968	204621
			1339			347723	214125
ICING	9050000	51	2200	9300	13800	204600	303600
			2200			204600	303600
	9060000		2500	7300	0 12900	1825000	322500
			2500			1825000	322500
	9070000						
	9070001	54	468	3942	4 12300	1845043	575640
	9070002	62	17160	5975	5 13705	10253958	2351778
			21840			12099001	2927418
ONING	9100000	54	12500	2680	0 13200	3350000	1650000
RCOND	9100001	54	1500	2670	0 12700	400500	190500
			14000			3750500	1840500