QCX
Avro
CF105
R-7-040034
Iss-15

FILE IN VAULT

ARROW 2 Report # 7-0400-34
Prod. A/C Issue 15

WEIGHT & C.G. SUMMARY

RCAF Date Jan. 1/58

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has been [ ] downgraded to: _____

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by (Name): Michel W. Drapeau

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

Date: Dec. 7, 1992

R. Deuger
Signature

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AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

Ref. 5049/11/J
Date January 1st, 1958
To See Distribution
From Mr. E. F. Burnett
Subject ARROW 2 PRODUCTION A/C WEIGHT & C.G. SUMMARY - Report # 7-0400-34 Iss. 15

Attached is a copy of Weight and C.G. Summary Report # 7-0400-34 Iss. 15, dated January 1st, 1958 for your retention.

This report is revised monthly and is issued complete on the 1st of each month.

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: DSIS 3, Secretary CRAD HQ DRP

E. F. Burnett

amc.

E. F. Burnett
Weights Supervisor

cc: Messrs.

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Date: January 1st, 1958
Aircraft: ARROW 2
PRODUCTION A/C

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INDEX

Sheet #	Content
1-1 to 1-4	Introductory notes and explanation of Weight Changes.
2-1 to 2-2	Weight & C.G. Summaries
3	Horizontal C.G. plot showing basic fixed points on flight envelope. The variation of C.G. with fuel used has been omitted until such time as a fully approved fuel sequencing is established.
4-1 to 4-15	I.B.M. Detail Sheets of Weights and C.G.'s.

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INTRODUCTION & WEIGHT CHANGES

The following is a Weight & C.G. Summary of the Arrow 2 Production Aircraft, based on the latest weight estimates available.

All Weight & C.G. changes are relative to Issue 14 of December 1st, 1957.

The early Arrow 2 Aircraft # 25206 etc. will not be as this summary designates, but will be flight test aircraft with Instrumentation, "Astra Minus" Radar, Missile Pack Trial Installations, various equipment T.I.'s (e.g. Ram Air Turbine in Aircraft # 25206 and 25211) etc. Weight statements for these aircraft will be issued at a later date.

GENERAL:

a) Orenda PS 13 Engines comprise the Power Plant (4,500 lb each, brochure weight, excluding Nose Bullet and Input Frame).

b) A package containing 4 "semi-submerged" Sparrow II Missiles (432 lb each) forms the current armament.

c) The R.C.A. Astra I Radar System is installed, Weight & C.G. breakdown being to the latest information received from R.C.A. dated 4th October 1957. No Sparrow III Auxiliaries are carried in the production aircraft. Some Avro installed antennae have been added. The Infra-red Tracker System is allowed for in its proposed location at the Fin. (Total Weight = 2,881.8 lb)

In addition to the above the Minneapolis-Honeywell MH 64 Damping System is installed.

Arrow 2 Aircraft # 25206 to 25208 will have the "Astra Minus" System (Navigational & Communication equipment only).

d) A considerable number of Arrow 1 parts, assemblies and equipment have now been weighed. Where these weights apply to the Arrow 2 Aircraft, they have been recorded in the Arrow 2 records.

On the I.B.M. Sheets in this report, immediately preceeding the item title, will be found a number varying from 0 to 100. This is the percentage actual weight recorded in that report.

1. STRUCTURE

		WEIGHT (lb)
a) Wing:		
Ribs # 1 to # 9 I/Wing - redesign of Arrow 2 fabricated ribs, reductions in caps & Webs, also minor redesign in machined ribs	-	25.86
Spars I/Wing - production drawing estimates of C/Spar Aft	-	0.37
F/Spar to M/Spar Struct I/W - redesign 2 point refueling door and gate valve operating mechanism	+	3.27

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S E C R E T
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INTRODUCTION & WEIGHT CHANGES

1. STRUCTURE

		WEIGHT (lb)
a) Wing: (Cont'd.)		
Strut Pick-up Fittings	I/W - production drawing estimates of Engine Mountings redesign Front Centre Mounting fitting	+ 9.22
Elevator Control Box	- Actual Weights of some applicable Arrow 1 parts	+ 1.21
	Weight Decrease Wing	- 12.53
b) Fin & Rudder:		
	No Weight Change	
c) Front Fuselage Fwd. Sta. 255"		
Cockpit Formers	- Production drawing estimates now made	- 2.70
Crew's Bulkheads	- first Arrow 2 production drawing estimates	- 0.32
Cockpit Floor	- addition channel supports at U/C Uplocks	+ 0.55
Pilot's Canopy	- addition of insulation batting	+ 0.54
Radar Nose Structure	- Production drawing re-issues	+ 1.22
	Front Fuselage Weight Decrease	- 0.71
d) Centre Fuselage Sta. 255"-485"		
Equipment Bay Structure	- revision of estimate of Mounting tray	+ 0.17
Electronics Bay Structure	- initial Arrow 2 scheme drawing estimates	+ 5.25
	Centre Fuselage Weight Increase	+ 5.42
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.		
Longerons Fixed R.F.	- production drawing estimates	- 1.71
Removable Tailcones	- previously estimated in Aug./57 to verbal information re gauges etc. now stress approved schemes and production drawings available. Outer skins and gauges increased from .025 to .032 and from .018 to .025 etc. also longeron cap strips changes from titanium to N155 etc. etc.	+ 39.34

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INTRODUCTION & Weight CHANGES

1. STRUCTURE		WEIGHT (lb)
g) Rear Fuselage Sta. 742.5" Aft. (Cont'd.)		
Removable Tailcones - Cont'd		
Inner Skins - some gauge changes e.g. .025 to .028 for Aft Skins etc.	+	11.08
Latches - addition of 7 shear latches/ tailcone withassociated structure.	+	12.20
Aft Ring - an extruded ring has now been added at the aft end.	+	29.42
Former Sta. 808.25 was .02 N155 channel section now .04 with .051 capping and doubler added.	+	23.12
Former Sta. 814 now .04 was .02, doubler added	+	6.70
changes to other formers, diaphragms, kink members, intercostals etc. too many to enumerate.	+	7.24
Total Weight change to Tailcones	+	129.10
Rear Fuselage Increase	+	127.39
h) Fuselage "Marry-Up"		
No Weight Change.		
TOTAL STRUCTURAL INCREASE	+	119.57

2. LANDING GEAR

No Weight Change

3. POWER PLANT & SERVICES

No Weight Change

4. FLYING CONTROLS GROUP

Flying Control Hydraulics I/Wing - addition of surge dapmers to Elevator jacks (mod. to jack)	+	1.50
Flying Controls Hydraulics O/W - addition of surge dampers to Aileron jacks.	+	1.50
Flying Controls Hydraulics Fin - addition of surge damper to Rudder jack	+	0.75
FLYING CONTROLS GROUP INCREASE	+	3.75

5. EQUIPMENT GROUP

Electrics Air Intakes - Arrow 2 Production Drawing estimates	-	1.90
Electrics D.B. - Westinghouse proposal for Transformer-rectifier unit greater than previously recorded Lucas Rotax Unit	+	9.00

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INTRODUCTION & WEIGHT CHANGES

5. EQUIPMENT GROUP	WEIGHT (lb)
Electrics E.B. - Westinghouse proposal for Alternator Wt. = 87 lb, Lucas Rotax was 82 lb	+ 10.00
Utility Hydraulics I/Wing - Dowty increase in weight of Main U/C Door jacks	+ 2.00
Radio & Radar Fixed Equipment - latest R.C.A. estimate	+ 54.00
Radio & Radar Removable Equipment - latest R.C.A. estimate, increase due primarily, so they state, to the fwd. nose estimate now backed by 85% Actual Weight.	+ 103.80
Missile Auxiliaries in Pack - latest R.C.A. estimate	- 12.50
Electrics & Electronics fixed in Pack - first complete estimate made for production pack, partially based on test pack information. (additional to R.C.A. equipment.)	
Actuation System	+ 4.20
Firing System - not previously included	+ 85.20
Missile Pack Mechanisms - addition of nylon liners in telescopic links	+ 2.77
Modifications to door actuation levers	+ 0.51
First detailed estimate of all installation details	+ 19.65
Production drawing estimates of launchers (approximately 61.5 lb each, previously 75 lb was allowed.)	- 54.38
EQUIPMENT GROUP INCREASE	+ 222.35

SUMMARY

Weight Change - Aircraft Basic Weight

Structure	+ 119.57 lb
Flying Controls	+ 3.75 lb
Equipment	+ 222.35 lb
	+ 345.67 lb

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

Issue 14	Issue 15	
45,263.82 lb	45,609.49 lb	+ 345.67 lb

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb	H. ARM ins.	V. ARM ins.
STRUCTURE	19,044.15	566.37	137.35
Wings	10,012.03	642.54	142.22
Fin & Rudder	1,024.00	754.25	209.28
Fuselage - fwd. Sta. 255"	2,572.87	183.01	128.43
Sta. 255"-485"	1,691.83	375.38	130.60
Sta. 485"-591.65"	1,119.04	538.28	105.41
Sta. 591.65"-742.5"	1,550.20	661.04	110.51
Sta. 742.5 Aft.	1,021.85	805.37	128.62
"Marry-Up"	52.33	467.60	103.84
LANDING GEAR - RETRACTED	2,542.31	487.09	134.78
Main Landing Gear	1,901.62	539.31	141.00
Main Gear Doors & Fairings	282.34	537.60	138.37
Nose Landing Gear	333.81	170.80	99.70
Nose Gear Door & Fairing	24.54	162.24	88.23
POWER PLANT & SERVICES	10,800.67	671.41	121.32
Engines & Accessories PS 13	9,186.78	687.95	121.16
Gear Box & Drives on Fuselage	281.84	601.70	102.49
Engine Controls	32.43	375.76	118.61
Gear Box, Starter & drives on Engine	315.45	615.98	105.24
Engine Nose Bullet (Orenda Supplied)	70.00	587.17	116.00
Fire Extinguishing System	65.46	700.45	134.21
Engine Mountings	132.38	666.82	136.52
Fuel System	716.33	530.91	134.48
FLYING CONTROLS GROUP	1,792.80	683.95	140.43
Mechanical Flying Controls	944.53	684.69	148.25
Hydraulic Flying Controls	848.27	683.13	131.72
EQUIPMENT FIXED & REMOVABLE	8,640.80	335.93	115.30
Instruments	46.07	163.68	138.70
Probe	15.00	-38.14	108.00
Cockpit Pressure Sealing	5.00	186.00	130.00
Oxygen System	26.07	240.54	156.70
Ejector Seats	339.06	204.43	134.10
Air Conditioning System	856.00	333.49	134.98
Hydraulics Main System	640.81	504.22	117.77
Cockpit Insulation	14.31	187.48	132.00
Drag Chute	91.07	786.68	143.19
Electrical System	1,276.26	434.44	112.66
Low Pressure Pneumatics	56.94	421.96	128.47
Surface Finish	100.00	591.52	140.20
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	64.92	221.99	154.35
Cabin Consoles	17.38	174.63	124.32
Radar Door Actuation	10.00	268.00	95.00
MH64 Damping System	180.15	471.27	135.69
Radio & Radar Removable	2,011.30	213.06	114.24
Radio & Radar Fixed	685.00	236.96	118.63
Sparrow Pack Structure	890.19	381.67	97.60
Sparrow Pack Mechanisms	551.12	374.40	99.12
Sparrow Pack Hydraulics	331.94	373.52	99.00
Sparrow Pack Electronics Removable	185.50	331.91	100.00
Sparrow Pack Electrics & Electronics fixed	153.50	340.74	95.00
Sparrow Pack Air Conditioning	5.21	305.50	102.50

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb	H. ARM ins.	V. ARM ins.	M.A.C. %
AIRCRAFT BASIC WEIGHT U/C Up	42,820.73	546.58	128.83	
AIRCRAFT BASIC WEIGHT U/C Down		548.81	125.13	
USEFUL LOAD (less fuel)	2,788.76	377.69	104.73	
Crew	390.00	194.00	136.50	
Oil	138.97	636.92	110.57	
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	259.68	159.91	
Water for Air Conditioning	275.00	268.00	131.75	
Operational Weight Empty U/C Up	45,609.49	536.25	127.36	27.70
Operational Weight Empty U/C Down		538.35	123.89	28.28
Operational Weighing Empty Less Missiles U/C Up	43,881.49	542.04	128.89	29.29
Operational Weighing Empty Less Missiles U/C Down		544.22	125.28	29.89
Normal Combat Mission Fuel * (2,227 gal. @ 7.8 lb/gal.)	17,370.00	-	-	-
Normal Combat Weight	62,979.49	-	-	-
Half Combat Mission Fuel * (1,113 gal. @ 7.8 lb/gal.)	8,685.00	-	-	-
Combat Weight * (half Mission Fuel)	54,294.49	-	-	-
Maximum Internal Fuel (2,492 gal. @ 7.8 lb/gal.)	19,438.00	541.85	144.16	
A.U.W. Maximum Internal Fuel U/C Up	65,047.49	537.92	132.38	28.16
A.U.W. Maximum Internal Fuel U/C Down		539.39	129.95	28.56
Maximum External Fuel (500 gal. @ 7.8 lb/gal + Drop Tank)	4,248.00	521.84	60.67	
A.U.W. Maximum Internal and External Fuel U/C Up	69,295.49	536.93	127.98	27.88
A.U.W. Maximum Internal and External Fuel U/C Down		538.31	125.70	28.26

N.B. 1) Aircraft Datum = 120" above an arbitrarily chosen ground line.

2) * Fuel weights in accordance with latest data issued by Aerodynamics November 19th, 1957. Centres of Gravity have temporarily been omitted until a fuel sequencing system is finally established.

3) With the increase of 344.40 lb in Operational Weight Empty the Normal Combat Mission Fuel has increased by 90 lb.

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REPORT: 7-0400-34-15

BY: Kathleen Griffin

DATE: JAN 1ST 1958

HORIZONTAL C.G PLOT OF FIXED POINTS ON ARROW 2 FLIGHT ENVELOPE

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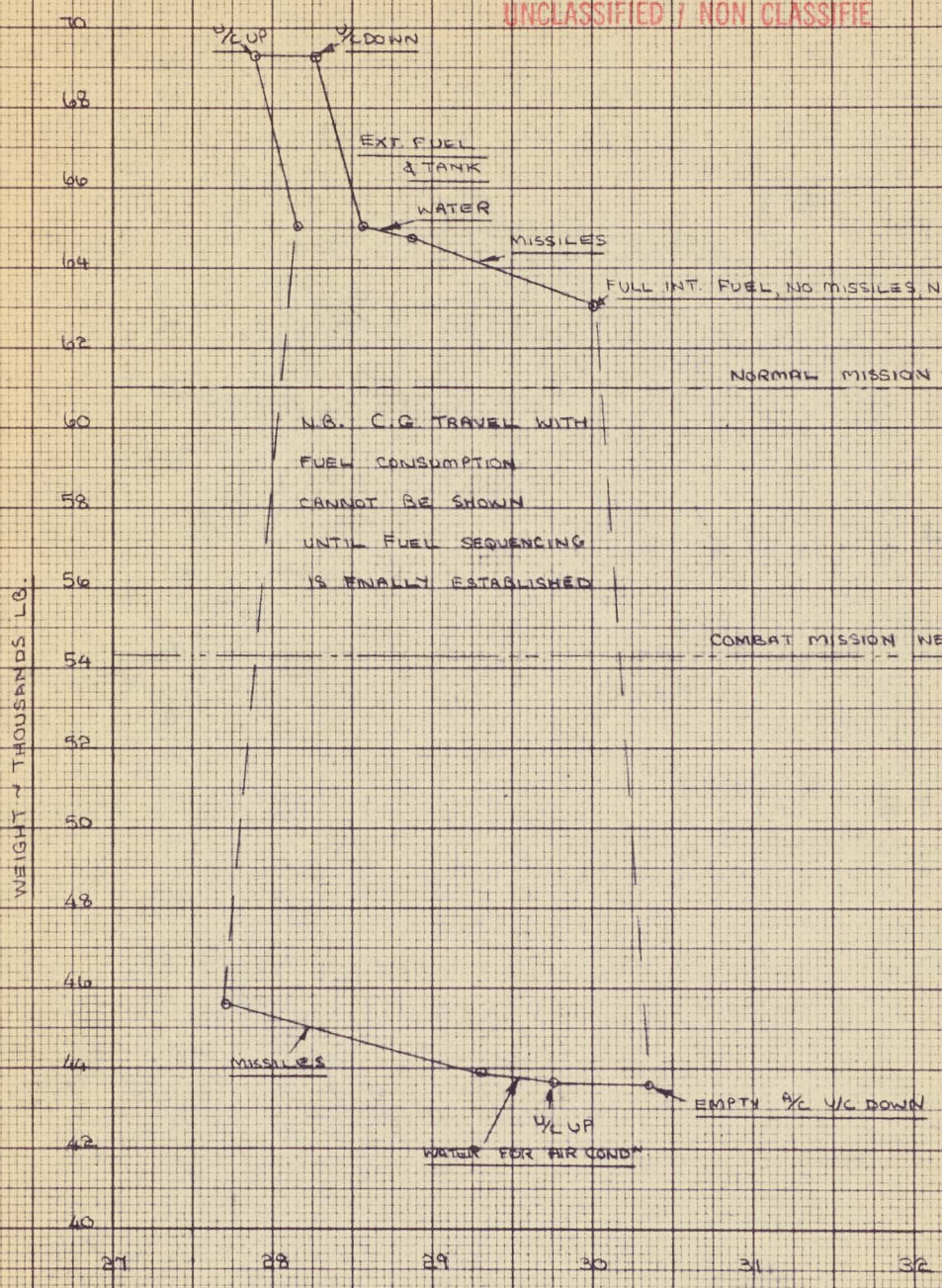

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT ARROW 2 Prod. A/C

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	TOTAL WING GROUP	1000000			
	OUTER WING	1010000			
100	OUTER WING SKINS	10100001	64	9291070	
100	POSTS AND INTERCOSTALS	10100002	64	243673	
100	OUTER WING SPARS	10100003	64	3925870	
100	OUTER WING RIBS	10100004	64	1345669	
18	AILERON CONTROL BOX	10100006	64	3792077	
100	RIB 12	10100007	64	762664	
100	O W AILERON JACK FITTING	10100009	64	104672	
	AILERON JOINTS AND FAIRING	1010010		329378	
				197945	
	AILERON	1020000			
100	AILERON STRUCTURE	10200001	74	3360079	
				33600	
97	ELEVATOR MARRY UP	1030000		159773	
97	ELEVATOR	10300008	2	4490075	
				46497	
	INNER WING	1040000			
79	MAIN U C STRUCTURE	10400001	62	3307157	
16	INNER WING SPARS	10400002	62	4101058	
	I W STRUCTURE F S TO M S	10400007	62	10749849	
	I W STRUCTURE M S TO R S	10400008	62	1497960	
	STRUCT AFT OF REAR SPAR	10400009	62	3163972	
40	ELEVATOR CONTROL BOX I W	10400010	62	4283872	
25	TRANSP JOINT MARRY UP	10400011		706563	
36	CENTRE LINE JOINTS	10400012	62	5906966	
	INNER WING SKINS	10400013	62	22420462	
17	STRUT PICK UP FITTINGS	10400014	62	1274061	
8	RIBS 1 TO 9 INNER WING	10400016	62	4861861	
74	DORSAL FAIRINGS I W	10400017	62	9548	
100	RIB 10	10400018	62	1080063	
	FUSELAGE HINGE JOINT I W	10400019	62	1381262	
25	TRANSP JOINT	10400020	62	1294263	
	FUSELAGE HINGE JOINT	1040021		374052	
74	DORSAL FAIRINGS C A	1040023		603357	
				670153	
	LEADING EDGE INNER WING	10500000	62	2213846	
				22138	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
LEADING EDGE O W	106000065		308.70	63
			308.70	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
12 FIN	201000083		851707	4
12 FIN TO WING MARRY UP	2010002		48306	8
			90000	
95 RUDDER	202000084		124008	1
			12400	

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WEIGHT AND C. OF G BY FUNCTIONAL C COMPONEI

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. A
	TOTAL FUSELAGE GROUP	3000000			
	FUSELAGE BASIC STRUCTURE	3010000			
	RADOME	3010001	51	17815	3
	RADAR NOSE STRUCTURE C A	3010002		263	12
	RADAR NOSE STRUCTURE R N	3010003	51	16957	9
	SKIN F F	3010004	52	8264	19
	SKIN C F	3010005	54	22043	36
	SKIN D B	3010006	56	6135	53
	SKIN E B	3010007	58	16489	66
	FORMERS C F	3010012	54	28749	37
6	FORMERS D B	3010013	56	7331	53
8	LIGHT FORMERS E B	3010014	58	11041	66
8	HEAVY FORMERS E B	3010015	58	19858	66
	LOWER LONGERONS F F	3010016	52	6772	18
	INNER LONGERON E B	3010017	58	7184	65
	BOTTOM LONGERONS E B	3010018	58	6919	65
	TOP LONGERONS E B	3010019	58	638	66
	LOWER SHEAR PANEL	3010020	52	3154	23
	TOP WING LONGERONS D B	3010021	56	498	53
	LONGERONS C F	3010022	52	53	25
	LONGERONS C F	3010023	54	13813	41
	LONGERONS F D B	3010024	54	1258	48
	LONGERONS A D B	3010025	56	859	52
	ELECTRONICS BAY STRUCTURE	3010026	54	504	27
32	LONGITUDINAL BEAMS D B	3010027	56	661	52
	RADAR ACCESS DOOR C F	3010028	54	210	27
72	MAIN FRAME AT STN 538 77	3010029	56	598	53
	DIVE BRAKE ACCOMMODATIONS	3010030	56	366	50
37	TOP LONGERONG F F	3010031	52	1864	19
	DUCT C F	3010032	54	3155	35
	FLOATING DUCT D B	3010033	56	4321	55
23	CANOPY ARCHES	3010034	52	815	22
	ACCESS PANELS	3010036	56	325	53
66	NOSE U C SUPPORT STRUCTURE	3010037	52	334	21
	CREW BULKHEADS	3010038	52	122	40
	EQUIPMENT BAY STRUCTURE	3010039	54	600	28
59	WINDSCREEN	3010041	52	1293	13
	SERV ACCESS DOORS AND PNLS	3010042	58	592	66
	DORSAL FAIRING FWD	3010044	54	294	28
	INTERMEDIATE FORMERS	3010045	58	460	72
	ENGINE ACCESS DOORS E B	3010046	58	1073	64
	SEALING MISSILE BAY	3010047	54	559	29
	MISCELLANEOUS ITEMS C F	3010048	54	374	37
	ARMAMENT BAY ROOF	3010049	54	1241	38
	BULKHEAD AT STA 120	3010050	52	298	12
	BULKHEAD AT STA 255	3010051	52	1074	25
8	BULKHEAD STA 485	3010052	54	1262	48
	ENGINE TUNNEL E B	3010054	58	6131	65
	FUSELAGE FUEL TANK	3010055	54	2229	39
	COCKPIT FLOOR	3010056	52	579	17

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	DORSAL OVER FUEL TANK	301006154		4138	41
	DEFLECTOR SHIELD	301006254		2045	33
	SHEAR PANEL BELOW NAV ARCH	301006352		2074	25
	PACK MOUNTING STRUCTURE	301006454		2470	29
	ENG ACCESS DOORS FIXED R F	301006559		9326	77
	TUNNEL FIXED R F	301006659		13054	77
	SKIN AND INTERCOSTAL R F	301006759		5256	77
	FAIRING UNDER RUDDER R F	301006859		2767	78
	FORMERS FIXED R F	301006959		10744	78
	LONGERONS C BEAM FIXED R F	301007059		2519	77
	REMOVABLE NACELLES R F	301007159		47725	82
	CNTR STRUC STING REMOV R F	301007259		10794	83
	MISC ITEMS STRUCTURE E B	301007358		912	66
	MTG BRKTS SIDE PANEL D B	301007556		190	51
	FORMERS LOWER PANEL D B	301007656		7416	54
	LOWER PANEL D B	301007756		5054	55
	JOINT F F TO C F	3010078		855	25
	JOINT AIR INTAKES TO F F	3010079		952	22
	JOINT C F TO D B	3010080		500	48
	JOINT D B TO E B	3010081		2508	58
	FUS JOINT AT STA 742 50	3010082		418	74
	DROP TANK MTG STRUCT D B	301008356		1133	58
	STRUCT AT ENG ACCESS DOORS	301008558		6537	64
	MISC STRUCTURE F F	301008652		552	18
	ENG RAILS ATTACHM TO FORM	301008758		2854	68
	COCKPIT FORMERS	301009252		10261	18
				672969	
96	DIVE BRAKES	302000072		11150	50
96	DIVE BRAKES C A	3020001		406	48
				11556	
	AIR INTAKES	3030000			
	AIR INTAKES	303010055		75502	21
				75502	
	PILOTS AND NAVIG CANOPIES	3040000			
76	PILOTS CANOPY	304010053		24208	17
				24208	
	NAVIGATORS CANOPY	304020053		16650	23
				16650	

IGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

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SHEET

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	30100061	54	4138	41310	14206	1709408	587844
	30100062	54	2045	33739	16400	689963	335380
ARCH	30100063	52	2074	25702	15350	533059	318359
RE	30100064	54	2470	29234	10308	722080	254608
) R F	30100065	59	9326	77366	9867	7215153	920196
	30100066	59	13054	77180	13177	10075077	1720126
R F	30100067	59	5256	77231	13643	4059261	717076
R F	30100068	59	2767	78223	15590	2164430	431375
	30100069	59	10744	78037	13647	8384295	1466234
) R F	30100070	59	2519	77159	12810	1943635	322684
F	30100071	59	47725	82663	12764	39450917	6091619
/ R F	30100072	59	10794	83412	13644	9003491	1472733
E B	30100073	58	912	66401	10278	605577	93735
) B	30100075	56	190	51866	13066	98545	24825
B	30100076	56	7416	54432	9015	4036677	668552
	30100077	56	5054	55457	8790	2802797	444247
	30100078		855	25500	12000	218025	102600
F	30100079		952	22000	12000	209440	114240
	30100080		500	48500	9800	242500	49000
	30100081		2508	58478	9150	1466628	229482
50	30100082		418	74250	11500	310365	48070
) B	30100083	56	1133	58576	8848	663666	100248
DOORS	30100085	58	6537	64089	9261	4189498	605392
	30100086	52	552	18750	11500	103500	63480
FORM	30100087	58	2854	68741	11362	1961868	324271
	30100092	52	10261	18329	12076	1880739	1239118
			672969			328135321	81233731
	30200000	72	11150	50846	9062	5669329	1010413
	30200001		406	48794	9374	198104	38058
			11556			5867433	1048471
	3030000						
	30301000	55	75502	21076	11828	15912802	8930377
			75502			15912802	8930377
PIES	3040000						
	30401000	53	24208	17686	15915	4281427	3852703
			24208			4281427	3852703
	30402000	53	16650	23200	16200	3862800	2697300
			16650			3862800	2697300

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	UNDERCARRIAGE UP POSITION	4000000			
	MAIN UNDERCARRIAGE GROUP	4010000			
	MAIN UNDERCARRIAGE	401010092		19016253	
				190162	
89	MAIN U C DOORS FAIRINGS	401020062		2823453	
				28234	
	NOSE UNDERCARRIAGE GROUP	4020000			
100	NOSE UNDERCARRIAGE	402010091		3338117	
				33381	
	NOSE U C DOOR AND FAIRING	402020052		245416	
				2454	

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PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
19 FUEL SYSTEM C F	5080001	54	107134	0
20 FUEL SYSTEM D B	5080002	56	149555	4
FUEL SYSTEM E B	5080003	58	68564	
28 FUEL SYSTEM I W	5080004	62	439005	5
FUEL SYSTEM ENG	5080005		62665	
FUEL SYSTEM C A	5080006		75461	
			71633	

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PROJECT

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	FLYING CONTROLS GROUP	6000000			
	MECHANICAL CONTROLS	6010000			
68	MECHANICAL CONTROLS F F	601000152		95231	6
	MECHANICAL CONTROLS C F	601000254		9543	8
70	MECHANICAL CONTROLS FIN	601000583		124237	8
70	MECHANICAL CONTROLS I W	601000662		406707	1
46	MECHANICAL CONTROLS O W	601000764		302377	7
	MECHANICAL CONTROLS C A	6010008		6467	0
				94453	
	FLYING CONTROLS HYDRAULICS	6020000			
	FLYING CONT HYDRAULICS D B	602000156		23325	7
37	FLYING CONT HYDRAULICS E B	602000258		390766	4
	FLYING CONT HYDRAULICS R F	602000359		487	5
80	FLYING CONT HYDRAULICS I W	602000462		262647	0
74	FLYING CONT HYDRAULICS O W	602000564		117017	4
60	FLYING CONT HYDRAULICS FIN	602000683		5406	7
				84827	

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PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	BRAKE PARACHUTE I W	708000662		12462	
				9107	
	ELECTRICAL SYSTEM	7090000			
	ELECTRICAL WIRING R N	709000151		129	9
	ELECTRICAL WIRING F F	709000252		29661	9
	ELECTRICAL WIRING C F	709000354		23543	9
	ELECTRICAL WIRING A I	709000455		12742	1
	ELECTRICAL WIRING D B	709000556		90155	2
	ELECTRICAL WIRING E B	709000658		645	9
	ELECTRICAL WIRING I W	709000862		89095	4
	ELECTRICAL WIRING FIN	709000983		3527	9
	ELECTRICAL WIRING NUC	709001091		3301	8
	ELECTRICAL WIRING ENG	7090011		20026	0
	ELECTRICAL WIRING C A	7090012		1374633	
	ELECTRICS F F	709001352		1524815	
	ELECTRICS C F	709001454		870945	
	ELECTRICS E B	709001558		67067	
	ELECTRICS ENG	7090016		1863258	
	ELECTRICS C A	7090017		71861	
	ELECTRICS FIN	709001883		8389	
	ELECTRICS I W	709001962		23366	2
	ELECTRICS CAW	7090020		1126	2
	ELECTRICS MUC	709002192		745	1
20	ELECTRICS A I	709002255		49002	2
	ELECTRICS D B	709002356		309895	1
	ELECTRICS R F	709002459		1368	0
	WINDSCREEN DEMISTING	709002552		35641	9
	SPARROW ELECTRICS F F	709002652		2541	8
	SPARROW ELECTRICS C F	709002754		602	7
				127626	
	L P PNEUMATICS	7100000			
24	L P PNEUMATICS F F	710000152		22551	9
18	L P PNEUMATICS C F	710000254		6713	3
	L P PNEUMATICS D B	710000356		4185	5
	L P PNEUMATICS E B	710000458		15266	5
	L P PNEUMATICS FIN	710000583		6407	5
	L P PNEUMATICS R N	710000651		124	7
	L P PNEUMATICS S P	710000794		602	9
				5694	
	INTAKE DE ICING	712000055		8800	1 9
				8800	
	RADIO AND RADAR FIXED	7140000			

IGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

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SHEET

REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
70800062		124	62022	14500	76907	17980
		9107			7164303	1304054
7090000						
709000151		129	9285	12000	11978	15480
709000252		2966	19977	11200	592518	332192
709000354		2354	39703	11000	934609	258940
709000455		1274	21984	12000	280076	152880
709000556		9015	52769	9921	4757125	894378
709000658		64	59500	9200	38080	5888
709000862		8909	54111	13900	4820749	1238351
709000983		352	79754	30000	280734	105600
709001091		330	18600	9800	61380	32340
70900011		2002	60683	10000	1214874	200200
70900012		13746	33473	11234	4601199	1544226
709001352		1524	8 15464	11095	2357951	1691766
709001454		8709	45415	10760	3955192	937088
709001558		670	67944	11597	455225	77700
70900016		18632	58904	11520	10974993	2146406
70900017		718	61350	12000	440493	86160
709001883		83	89550	28840	74327	23937
709001962		2336	62053	14500	1449558	338720
70900020		112	62946	13561	70500	15188
709002192		74	51600	13700	38184	10138
709002255		4900	22079	13954	1081871	683746
709002356		309895	18867	10264	16073065	3180711
709002459		136	80200	11360	109072	15450
709002552		3564	19898	9980	709165	355687
709002652		254	18242	11255	46335	28588
709002754		60	27300	11255	16380	6753
		127626			55445633	14378513
7100000						
710000152		2255	19158	12353	432013	278560
710000254		671	33431	11033	224322	74031
710000356		418	55545	11592	232178	48455
710000458		1526	65650	9737	1001819	148587
710000583		640	75818	25515	485235	163296
710000651		124	7431	9955	9214	12344
710000794		60	29800	10400	17880	6240
		5694			2402661	731513
712000055		8800	19582	11800	1723216	1038400
		8800			1723216	1038400
7140000						

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PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
RADIO AND RADAR FIXED R N	714000151		20400	9
RADIO AND RADAR FIXED F F	714000252		50001	8
RADIO AND RADAR FIXED C F	714000354		19000	26
RADIO AND RADAR FIXED D B	714000456		18001	51
RADIO AND RADAR FIXED F I N	714000583		47007	9
RADIO AND RADAR FIXED C A	714000 6		17600	21
			68500	
29 CANOPY ACTUATION	716000052		6492	22
			6492	
CABIN CONSOLES	717000052		1738	17
			1738	
RADAR DOOR ACTUATION	718000054		1000	26
			1000	
SURFACE FINISH F F	719000152		36318	
SURFACE FINISH CANOPY	719000253		6420	
SURFACE FINISH C F	719000354		14003	7
SURFACE FINISH 2NTAKES	719000455		4082	2
SURFACE FINISH D B	719000556		3775	3
SURFACE FINISH E B	719000658		4436	6
SURFACE FINISH R F	719000759		6488	0
SURFACE FINISH I W	719000862		31516	0
SURFACE FINISH O W	719000964		10677	0
SURFACE FINISH O W L EDGE	719001065		3196	3
SURFACE FINISH AILERON	719001174		3537	9
SURFACE FINISH ELEVATOR	719001282		5667	5
SURFACE FINISH FIN	719001383		6397	4
SURFACE FINISH RUDDER	719001484		2028	1
			10000	

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PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
REMOVABLE EQUIPMENT GROUP	8000000			
77 EJECTOR SEATS	8010100	52	3390620	
			33906	
RADAR REMOVABLE	8020100			
RADAR REMOVABLE R N	80201	51	102130	8
RADAR REMOVABLE F F	80201	52	2090018	
RADAR REMOVABLE C F	80201	54	5812027	
RADAR REMOVABLE D B	80201	56	515051	
RADAR REMOVABLE F I N	80201	83	1100085	
RADAR REMOVABLE C A	8020106		383055	
			201130	
DAMPING SYSTEM	8030000			
DAMPING SYSTEM F F	80301	52	78417	
DAMPING SYSTEM C F	80301	54	230332	
DAMPING SYSTEM E B	80301	58	36963	
DAMPING SYSTEM I W	80301	62	607053	
DAMPING SYSTEM O W	80301	64	9574	
DAMPING SYSTEM R N	80301	51	287	7
DAMPING SYSTEM C A	8030107		810749	
			18015	
SPARROW PACK	8050000			
SPARROW PACK STRUCTURE	80501	94	8901938	
			89019	
SPARROW PACK MECHANISMS	80502	94	5511237	
			55112	
SPARROW PACK HYDRAULICS	80503	94	3319437	
			33194	
SP PACK ELECTRONICS FIXED	80504	94	1535034	
			15350	

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WEIGHT AND C. OF G BY FUNCTIONAL C
COMPONE

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
OPERATIONAL LOAD	9000000			
CREW MEMBERS	901000052		3900019	
			39000	
ENGINE OIL	9020000			
ENGINE OIL DRAINABLE	9020001		929065	
ENGINE OIL TRAPPED ENG	9020002		177363	
ENGINE OIL TRAPPED D B	902000356		192558	
ENGINE OIL TRAPPED E B	902000458		90959	
			13897	
SPARROW MISSILES	903000094		17280038	
			172800	
OXYGEN CHARGE	9040000			
OXYGEN CHARGE F F	904000152		7220	
OXYGEN CHARGE C F	904000254		126726	
			1339	
ENGINE FIRE EXT FLUID	9060000		250073	
			2500	
RESIDUAL FUEL	9070000			
RESIDUAL FUEL C F	907000154		465039	
RESIDUAL FUEL I W	907000262		171659	
			21840	
WATER FOR AIR CONDITIONING	910000054		2600026	
UNUSABLE WATER FOR AIRCOND	910000154		150026	
			27500	