TL.113-59/01

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AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

Ref: 9266/11/J
Date: 1 January, 1959
To: See Distribution
From: E.F. Burnett - Weight Supervisor
Subject: Arrow 2 Production A/C Weight & C.G. Summary Report: 7-0400-34 Issue 27

Attached is a copy of Weight and C.G. Summary Report: 7-0400-34 Issue 27, dated January 1st, 1958, for your retention.

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

E.F. Burnett

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cc: Messrs. J.C. Floyd, R.N. Lindley, R. Marshall, C.V. Lindow, F.P. Mitchell, T. Higgins, A.R. Buley, B.C. Alford, D. Wade, D. Scard, F. Brame, W. Czerwinski, J. Lucas, S. Kwiatkowski, A. Cornish, T. Roberts, C. Marshall, W. Potocki, A. Crust, (6 copies R.C.A.F.), D. Inglis, D. Moore, R. Cairns, D. Danby

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

Aircraft: Arrow 2
Prod. A/C
Date : 1 January, 1959

Report: 7-0400-34
Issue : 27

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Sheet	Content
1-1 to 1-4	Introductory notes and explanation of Weight changes.
2-1 to 2-2	Weight & C.G. Summary
3	Horizontal C.G. plot showing the fixed points on flight envelope. The possible varations of C.G. with fuel used has been ommitted until such time as fully approved fuel sequencing is established.
4-1 to 4-15	I.B.M. Detail sheet of Weight and C.G.'s.

Aircraft: Arrow 2
Prod. A/C
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Introduction and Weight Changes

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

All weight and C.G. changes are relative to issue 26 of this report of December 1st, 1958.

Early Arrow 2 Aircraft will not be as this summary designates but will be Flight Test Vehicles with Instrumentation. Reference should be made to the following reports:-

A/C 25206 Weight Report - 7-0400-82 Issue 5
A/C 25207 Weight Report - 7-0400-85 Issue 3

General:

a) Orenda P,S. 13 Engines comprise the Power Plant, weight 4835 lb each excluding Nose Bullet, Inlet Frame and Avro installed accessories.

b) A package containing one GENIE missile (828 lb), four FALCON missiles (148.1 lb)each, a fixed fuel tank 154 gals) and a removable fuel tank 174 gals) forms the current armament pack. Capability exists for the fitment of a second GENIE missile in lieu of the removable fuel tank.

c) The Hughes MA 1 Electronic System is installed with an estimated weight of the system comprising both removable and fixed equipment of 2648 lb.

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

d) Where actual weights of Arrow 1 parts that apply to Arrow 2 Aircraft have been obtained, these weights have been recorded in the Arrow 2 records a considerable number of Arrow 2 components and parts have been weighed.

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

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	Weight lb
1. Structure	
a) Wings No weight change.	
b) Fin & Rudder No weight change.	
c) Fuselage Fwd. Sta. 255 ins	
Navigators Canopy Assign X74-158 addition of window blinds	+ 8.35
Cockpit Formers re-estimated	+ 0.04
Air Intakes re-estimated	- 0.90
Front Fuselage Increase	+ 7.49
d) Centre Fuselage Sta 255 - 485 ins No weight change	
e) Duct Bay Sta. 485 - 591.65	
Skins Duct Bay. Shroud beam now part of Duct Bay was previously included with Engine Shroud	+ 1.39
Total Duct Bay Increase	+ 1.39
f) Engine Bay Sta. 591 - 742.5 ins	
Engine Shroud - shroud beam deleted now in Duct Bay - incorporated of minor changes	+ 0.26
Engine Access Doors - re-estimated	+ 0.03
Heavy Formers - increase in "V" struts	+ 0.26
Total Engine Bay Increase	+ 0.55
g) Rear Fuselage Sta. 742.5 - aft	
Remov. Engine Doors - actual weights obtained	+ 2.47
Total Rear Fuselage Increase	+ 2.47
h) Fuselage Joints No weight changes.	
	+ 11.90
Total Structural Increase	+ 11.90
2. Landing Gear	
Nose U/C Door - re-estimated	+ 0.05
Main U/C Doors & Fairings Assign X74-4297 - Locking of Pivot Door incorporated	+ 5.21
Total Landing Gear Increase	+ 5.26
3. Power Plant & Service No weight change.	
4. Flying Controls No weight change.	

5. Equipment Fixed & Removable

	Weight lb
Damping System - addition of Command Signal Converter (X74.117)	+ 10.00
Electrical System - re-estimated	- 3.01
Brake Parachute - actual weight of Arrow 1 chute obtained	+ 3.70
Air Conditioning	+ 56.07

Weighed weight in excess of heat exchanger spec. weight. + 15.86
Increase due to act. weight of shut off valves + 0.50
Weighed weight in excess of weight allowance for flexible metal joints (C.S-J-106,7,8,9,10) + 27.88
Increase due to under estimate of ducts + 3.59
Increase due to Assign. X74.4070 (cockpit & Radar Temp Control) + 8.99
Increase due to Misc. changes + 1.85
Deletion of Oil Heat exchanger replaced by duct - 8.04
Deletion of Nitrogen line to IR seeker - 2.34
Deletion of Air Conditioning in Fin - 12.22
Additional installations for Hughes MA 1 Electronics System + 20.00

Radio and Radar Removable. This has been re-estimated and is based on Hughes Report X470000-100 issue C for Electronic System for Arrow 1A/C 25202 plus the following functions. + 211.70

a) ARN 6 Compass
b) J4 Compass
c) Air to Air I.F.F.
d) A1C10 Interphone
e) Additional AFCS components
f) Inverter for missile firing
g) Cockpit Presentation - two instruments replacing Artificial Horizon and R.M.I. This results in a system total comprising equipment and Hughes supplied racks of 2068.7 lb.

Radio & Radar Fixed Re-estimate of cabling	+ 30.00
Armament Pack Structure addition of pressurized bulkhead	+ 9.50
Armament Pack Mechanisms - evaluation of Bohanan ejector rack	+ 15.00
Armament Pack Hydraulics - initial schematic estimated	+ 40.61
Armament Pack Fuel System - initial schematic estimated	- 5.67
Removable Tank Genie Bay - Fuel system added	+ 5.67
Total Equipment Increase	+ 373.57

6. Trapped Fuel

No weight change.

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7. Useful Load

		Weight lb
Missiles - latest estimates incorporated		+ 84.40
Genie now 828 lb was 812 lb	+ 16.00 lb	
(4 off) Falcon GAR3A now 148.1 lb ea was 131.0 lb ea.	+ 68.40 lb	
Total Useful Load Increase		+ 84.40

Maximum Internal Fuel

a) Tanks 1-8 2491 gal @ 7.8 lb/gal - 19433.00 lb is unchanged
b) Armament Pack 154 gal @ 7.8 lb/gal - 1201.20 ϕ
c) Armament Pack Remov. Tank 174 gal @ 7.8 lb/gal - 1358.00 lb is unchanged.

ϕ The capacity of the Armament Pack integral tank has been reduced by 26 gal. (199.68 lb) to provide space for hydraulic valves and fuel disconnects mounted in the Pack.

Summary

Weight Change - Aircraft Basic Weight

Structure	+ 11.90
Landing Gear	+ 5.26
Equipment	+ 373.57
Total	+ 390.73
Useful Load Increase	+ 84.40

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Weight Change - Operational Weight Empty

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46,061.21	46,536.34	+ 475.13 lb

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Weight & C.G. Summary

Description	Weight lb	H. Arm ins	V. Arm ins
Structure	19,460.95	566.31	137.16
Wings	10,050.85	642.93	142.17
Fin & Rudder	1,030.94	754.65	208.99
Fuselage Fwd Sta. 255 ins	2,673.08	182.48	128.43
Sta. 255 - 485 ins	1,734.42	374.84	129.81
Sta. 485 - 591.65 ins	1,172.08	538.75	105.54
Sta. 591.65 - 742.5 ins	1,597.61	659.08	111.66
Sta. 742.5 ins. aft.	1,158.79	809.83	129.05
"Marry-Up"	43.18	467.77	109.69
Landing Gear - Retracted	2,703.24	489.49	135.07
Main Landing Gear	2,048.67	538.68	141.00
Main Gear Doors & Fairings	293.19	539.39	138.30
Nose Landing Gear	333.81	170.80	99.70
Nose Gear Door & Fairing	27.57	162.25	88.68
Power Plant & Services	11,450.87	675.26	121.79
Engines Bare PS 13	9,670.00	693.16	121.25
Engine Accessories (Inlet Frame etc)	388.00	620.58	120.47
Engine Controls	32.32	279.90	117.49
Gear Boxes & Drives on Fuselage	291.87	608.57	103.28
Gear Boxes & Starters on Engine	146.45	601.97	113.57
Fire Extinguisher System	73.58	686.35	131.21
Engine Mountings	75.39	671.91	141.52
Fuel System	773.26	529.49	135.09
Flying Controls Group	1,959.46	655.69	138.11
Mechanical Flying Controls	958.44	677.70	147.62
Hydraulic Flying Controls	1,001.02	634.62	129.01
Equipment Fixed and Removable	8,512.23	331.82	113.61
Instruments	34.61	167.52	138.92
Probe	14.86	-34.07	108.00
Cockpit Pressure Sealing	5.00	186.00	130.00
Cabin Consoles	17.68	175.29	124.49
Oxygen System	21.16	259.40	156.88
Ejector Seats	342.94	204.50	134.11
Cockpit Equipment	6.00	187.50	145.00
Air Conditioning System	943.04	344.82	135.23
Cockpit Insulation	14.31	187.48	132.00
Hydraulics Utilities System	650.75	498.84	117.86
Mech. Door Stops Main U/C Doors	3.02	516.00	120.00
Anti Skid Controls System	37.68	479.24	113.38
Drag Chute	96.26	786.06	143.24
Electrical System	1,225.59	427.45	112.54
Low Pressure Pneumatics	50.08	394.66	126.02
Surface Finish	100.00	572.83	140.20
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	63.52	209.61	154.34
Radar Door Actuation	10.00	268.00	95.00
Radio & Radar Removable	2,068.70	178.45	104.58
Radio & Radar Fixed	579.09	254.00	122.48
MH 64 Damping System	196.42	466.19	134.46

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Description	Weight lb	H. Arm ins	V. Arm ins	M.A.C. %
Armament Pack Structure	760.25	389.33	98.73	
Armament Pack Hydraulics	220.61	418.34	100.32	
Armament Pack Mechanisms	605.00	379.92	94.33	
Armament Pack Air Conditioning	5.21	305.50	102.50	
Armament Pack Pneumatics	24.45	286.92	103.50	
Armament Pack Electrics	108.00	367.00	101.00	
Armament Pack Fuel System	14.33	467.00	90.00	
Removable Tank for Genie Bay	205.67	367.96	99.72	
Trapped Fuel	213.80	548.26	141.79	
U/C Up		548.65	128.60	
Aircraft Basic Weight	44,300.55			
U/C Down		550.98	124.75	
Useful Load (less usable fuel)	2,235.79	357.23	109.29	
Crew	390.00	194.00	136.50	
Engine Fire Ext. Fluid	25.00	730.00	129.00	
Oil	162.00	638.31	110.89	
Oxygen Charge	13.39	259.69	159.91	
Water for Air Conditioning	225.00	267.91	131.56	
Missiles	1,420.40	378.49	97.29	
U/C Up		539.45	127.67	28.58
Operational Weight Empty	46,536.34			
U/C Down		541.67	124.01	29.19
Half Max. Int. Fuel	10,996.10	-	-	-
Combat Weight (½ Max. Int. Fuel)	57,532.44	-	-	-
Max. Int. Fuel	21,992.20	525.32	138.67	
a) Tanks 1-8: 2491 gal @ 7.8 lb/gal	19,433.00	541.85	144.16	
b) Arm. Pack 154 gal@ 7.8 lb/gal	1,201.20	446.00	97.00	
c) Arm. Pack Remova. Tank (174 gal @ 7.8 lb/gal)	1,358.00	359.00	97.00	
U/C Up		534.92	131.20	27.33
Gross Weight (Max. Int. Fuel)	68,528.54			
U/C Down		536.42	128.71	27.74
Max. Ext. Fuel (500 gal @ 7.8 lb/gal + drop tank)	4,242.36	520.32	60.79	
U/C Up		534.07	127.10	27.10
Max. Gross Weight (Int. + Ext. Fuel)	72,770.90			
U/C Down		535.48	124.75	27.48

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

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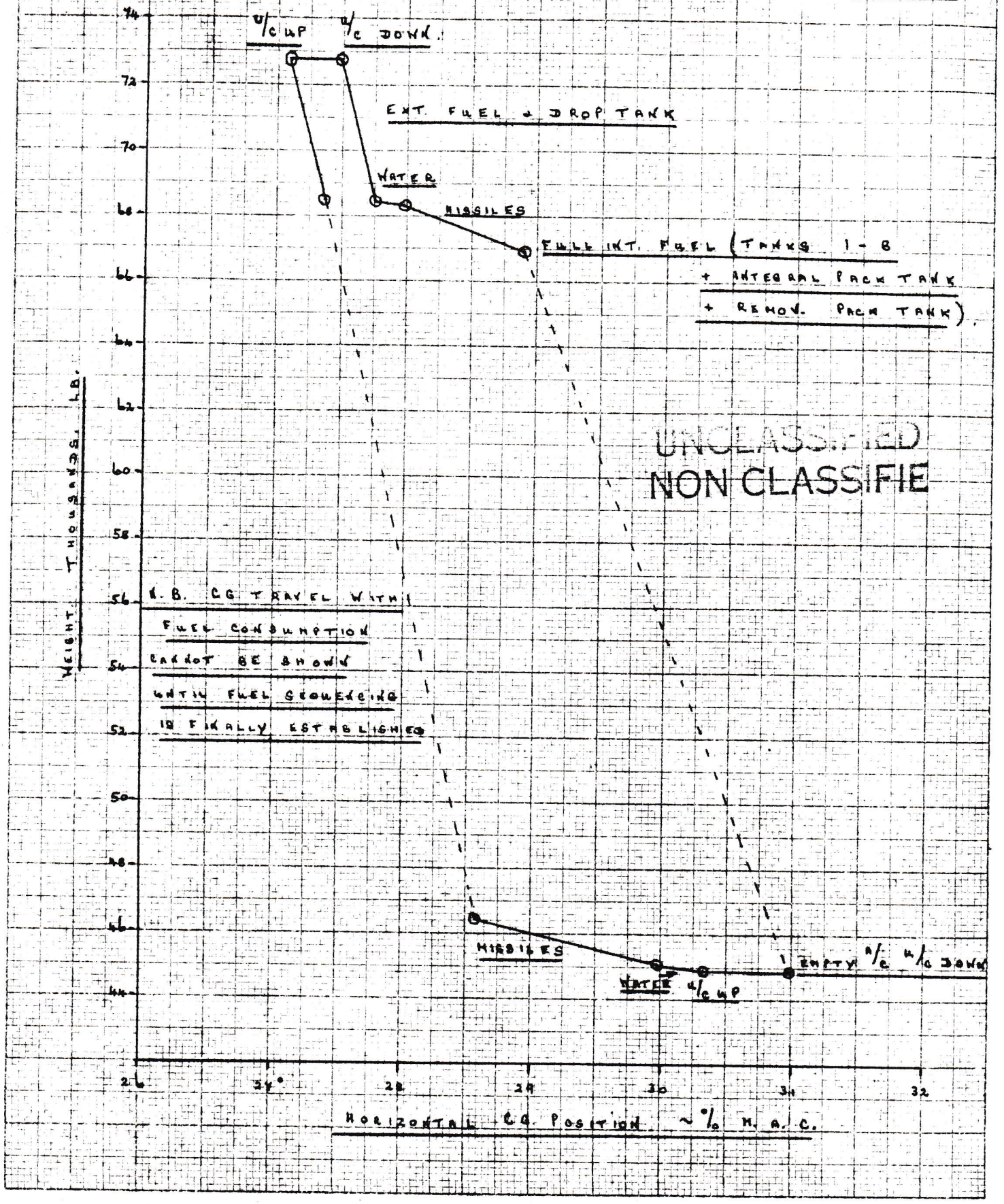
DATE JAN. 1st 1959

SHEET 3

BY: P. E. French

HORIZONTAL C.G. PLOT OF FIXED POINTS OF NARROW 2 FLIGHT ENVELOPE



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PROJECT Arrow 2 Prod. A/C

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. [illegible]

SHEET 5 to 15

UNCLASSIFIED
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DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
TOTAL WING GROUP 2 PROD	1000000						
OUTER WING	1010000						
100 OUTER WING SKINS	101000164		929	1070	646	13597	6563719 9	1263297 3
100 POSTS AND INTERCOSTALS	101000264		243	673	207	13410	178332 3	32666 8
100 OUTER WING SPARS	101000364		392	587	060	8 13579	2771928 9	533084 4
100 OUTER WING RIBS	101000464		134	566	950	6 13650	935272 7	183674 4
18 AILERON CONTROL BOX	101000664		379	207	740	9 13508	2935349 3	512223 4
100 RIB 12	101000764		76	266	487	3 13832	494721 5	105482 8
100 O W AILERON JACK FITTING	101000964		10	467	279	1 13670	76139 4	14298 8
AILERON JOINTS AND FAIRING	1010010		32	937	872	6 13224	259244 7	43546 6
			197945				142147087	26882745
100 AILERON	102000074		336	007	921	3 13556	2661556 8	455481 6
			33600				26615568	455481 6
20 ELEVATOR	103000082		446	387	561	8 14260	3375436 3	636537 9
20 ELEVATOR MARRY UP	1030001		15	977	381	0 14260	117874 6	22773 2
			46235				34933109	659311 1
INNER WING	1040000							
81 MAIN U C STRUCTURE	104000162		332	175	774	8 13984	1918215 3	464506 5
95 INNER WING SPARS	104000262		419	175	790	2 14321	2427078 1	600293 4
61 I W STRUCTURE F S TO M S	104000762		1085	394	984	6 14399	5410235 0	1562853 1
17 I W STRUCTURE M S TO R S	104000862		150	016	086	8 14563	913080 9	218459 6
30 CENTRE TRAILING EDGE	104000962		318	987	204	1 14887	2297963 8	474865 5
40 ELEVATOR CONTROL BOX I W	104001062		433	987	247	2 14327	3145139 9	621763 1
25 TRANSP JOINT MARRY UP	1040011		70	656	362	1 13876	449482 4	98033 9
61 CENTRE LINE JOINTS	104001262		582	816	623	3 15028	3860125 5	875846 9
91 INNER WING SKINS	104001362		2280	486	268	9 14462	14296101 1	3298030 2
63 STRUT PICK UP FITTINGS	104001462		123	166	165	4 14580	759330 7	179567 3
62 RIBS 1 TO 9	104001662		485	166	113	3 14513	2965928 6	704112 7
DORSAL FAIRING I W	104001762		11	348	270	16150	5454 5	1825 0
100 RIB 10	104001862		107	066	368	3 13835	881790 2	148117 5
49 FUSELAGE HINGE JOINT I W	104001962		126	286	168	8 13790	778996 1	174140 1
25 TRANSP JOINT	104002062		129	426	307	1 13710	816264 9	177434 8
49 FUSELAGE HINGE JOINT	1040021		39	355	332	3 14364	209475 8	56522 3
DORSAL FAIRING C A	1040023		59	135	674	0 15963	335503 6	94389 2
SHUT OFF VALVE OPERAT MECH	104002462		5	135	496	5 14180	28197 0	7274 3
62 LEADING EDGE I W	104002562		214	894	683	0 14423	1006329 9	309935 6
			696435				423046933	100679712
LEADING EDGE O W	105000065		308	706	301	3 13561	1945211 3	418628 1
			30870				19452113	4186281

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WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
FIN AND RUDDER GROUP	2000000						
FIN	2010000	83	85517	75003	21150	64140316	18086846
FIN TO WING MARRY UP	2010001		4943	68510	15356	3306449	759047
			90460			67526765	18845893
94 RUDDER	2020000	84	12634	81316	21374	10273463	2700391
			12634			10273463	2700391

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	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	TOTAL FUSELAGE GROUP	3000000						
	RADAR NOSE STRUCTURE	3010000						
	RADOME	3010001	51	10743	29031	0976	311869	1179152
	RADAR NOSE STRUCTURE C A	3010002		270	12000	11200	32400	30240
	RADAR NOSE STRUCTURE R N	3010003	51	27375	84601	1363	2315925	3110621
				38388			2660194	4320013
	FRONT FUSELAGE STRUCTURE	3020000						
	SKIN F F	3020001	52	8264	19296	12301	1594621	1016555
	COCKPIT FORMERS	3020002	52	10728	18257	12024	1958611	1289935
	LOWER LONGERONS F F	3020003	52	6837	18460	9045	1262110	618407
31	TOP LONGERONS F F	3020004	52	18947	19430	14763	3681402	2797146
66	NOSE U C SUPPORT STRUCT	3020005	52	3343	21049	9186	703668	307088
	CREW BULKHEADS	3020006	52	13224	20528	12377	2714623	1636734
	BULKHEAD STA 120	3020007	52	3110	12000	11477	373200	356935
	BULKHEAD STA 255	3020008	52	11045	25500	11907	2816475	1315128
	COCKPIT FLOOR	3020009	52	5881	17695	11569	1040643	680373
	SHEAR PANEL BELOW NAV ARCH	3020010	52	2057	25706	15352	528772	315791
3	MISC STRUCTURE F F	3020011	52	1600	18821	12072	301136	193152
	LOWER SHEAR PANEL	3020012	52	3141	23423	8900	735716	279549
22	CANOPY ARCHES	3020013	52	8553	22594	16023	1932465	1370447
58	WIND SCREEN	3020014	52	13285	13828	15000	1837050	1992750
				110015			21480492	14169990
	CENTRE FUSELAGE STRUCTURE	3030000						
	SKIN C F	3030001	54	22112	36736	14420	8123064	3188550
	FORMERS C F	3030002	54	28749	37520	13317	10786625	3828504
5	BULKHEAD STA 485	3030003	54	12815	48500	10337	6215275	1324687
66	LONGERONS C F	3030004	54	14453	41038	12144	5931222	1755172
	STR BELOW LOWER LONGERONS	3030005	54	4892	27363	9604	1338598	469828
	RADAR ACCESS DOOR	3030006	54	3057	27949	9019	854401	275711
	FWD DORSAL FAIRING	3030008	54	2969	28927	16400	858843	486916
	DEFLECTOR SHIELD	3030009	54	2045	33739	16400	689963	335380
	DORSAL FAIRING OVER TANK	3030010	54	4185	41268	14208	1727066	594605
	PACK MTG STRUCTURE	3030011	54	2515	29458	10282	740869	258592
	SEALING MISSILE BAY	3030012	54	559	29616	11074	165553	61904
	MISC ITEMS C F	3030013	54	1216	37000	12500	449920	152000
	ARAMENT BAY ROOF	3030014	54	12432	38370	11428	4770158	1420729
	FUSELAGE FUEL TANK	3030015	54	22644	39454	14535	8933964	3291305
	DUCT C F	3030016	54	31867	35898	12969	11439616	4132831
	EQUIPMENT BAY STRUCTURE	3030017	54	6932	28681	13514	1988167	936790
				173442			65013304	22513504
	DUCT BAY STRUCTURE	3040000						

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WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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REPORT NO. _____

SHEET _____

PROJECT _____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	SKIN D B	304000156		6366	53560	11243	3409630	715729
5	FORMERS D B	304000256		7335	53530	11438	3926426	838977
	TOP LONGERONS	304000356		498	53899	13550	268417	67479
	MTG BRKTS SIDE PANEL	304000456		190	51866	13066	98545	24825
	LOWER LONGERONS	304000556		10301	52236	9914	5380830	1021241
72	MAIN FRAME STA 538 77	304000656		5980	53877	10383	3221845	620903
	ACCESS PANELS	304000756		3874	52818	9976	2046169	386470
	LOWER PANEL ASSY	304000856		217	54557	8901	118389	19315
	DROP TANK MTG STRUCTURE	304000956		841	58554	8847	492439	74403
20	LOWER SIDE PANELS FWD	304001056		10756	50854	9269	5469856	996974
	LOWER CENTRE PANEL FWD	304001156		2791	51322	8886	1432397	248008
16	LOWER CENTRE PANEL AFT	304001256		699	56790	8860	396921	61931 4
	LOWER CENTRE PANEL AFT	304001356		2609	56600	8794	1476694	229435
60	FLOATING DUCT	304001456		45627	55370	11712	25263670	5343834
	HEAT EXCHANGER MTG	304001556		705	57950	9080	408548	64014
				105080			56983476	11270921
	ENGINE BAY	3050000						
100	TOP LONGERONS	305000158		674	66778	13921	450084	93828
84	BOTTOM LONGERONS	305000258		8464	65909	11446	5578538	968789
	ENGINE ACCESS DOORS	305000358		13494	63878	9050	8619697	1221207
	ENGINE TUNNEL	305000458		63135	65552	12158	4138 6255	767595 3
71	ENG RAILS ATTACH TO FORM	305000558		2906	68763	11364	198253	330238
	PANELS AT ENG ACCESS DOORS	305000658		11272	64996	9253	7326349	1042998
	BOTTOM CTR PANEL FWD	305000758		4727	61754	8919	2919112	421601
	BOTTOM CTR PANEL CENTRE	305000858		4168	67085	9247	2796103	385415
	BOTTOM CTR PANEL AFT	305000958		7719	72116	9554	5566634	737473
5	SIDE PANEL FWD	305001058		8597	61609	11693	5296526	1005247
5	SIDE PANEL CENTRE	305001158		748	67063	11922	5016983	891885
32	SIDE PANEL AFT	305001258		7463	72146	12188	5384256	909590
41	HEAVY FORMERS	305001358		1966	66051	10968	12986287	2156418
				159761			105325077	17840642
	REAR FUSELAGE	3060000						
	OUTER SKINS FIXED	306000159		5658	77270	13708	4371937	775599
	FORMERS FIXED R F	306000259		10509	77990	13734	8195969	1443306
	LONGERONS FIXED R F	306000359		2519	77159	12810	1943635	322684
	TUNNEL FIXED R F	306000459		10994	77552	13214	8526067	1452747
85	ENGINE ACCESS DOORS R F	306000559		9270	77500	9856	7184250	913651
29	FAIRING UNDER RUDDER FIXED	306000659		2901	78276	15586	2270787	452150
	REMOVABLE TAILCONES	306000759		6309	38278	12782	5222 9016	8064547
	CENTRE STRUC AND STING REM	306000859		10935	83325	13910	9111589	1521059
				115879			93833250	14945743
96	DIVE BRAKES	307000172		1170	65088	5 9048	5956598	1059159
96	DIVE BRAKES C A	3070002		42	24879	7 9360	205923	39499
				12128			6162521	1098658

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5 AIR INTAKES	3080001	55	76949	21129	11828	16258554	9101528
			76949			16258554	9101528
FUSELAGE JOINTS	3090000						
JOINT AIR INTAKES TO F F	3090001		663	22000	12000	145860	79560
JOINT F F TO C F	3090002		1036	25706	12250	266314	126910
JOINT D B TO C F	3090003		428	47940	11590	205183	49605
JOINT D B TO E B	3090004		1467	58957	9157	864899	134333
JOINT AT STA 742 50	3090005		724	74250	11500	537570	83260
			4318			2019826	473668
CANOPIES	3100000						
28 PILOTS CANOPY	3100001	53	2448	4	17693	15915	4331954	3896629
NAVIGATORS CANOPY	3100002	53	1747	2	23158	16266	4046166	2841996
			41956				8378120	6738625

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UNDERCARRIAGE UP POSITION	4000000						
MAIN UNDERCARRIAGE GROUP	4010000						
MAIN UNDERCARRIAGE	4010100	92	204867	53868	14100	110357756	28886247
			204867			110357756	28886247
78 MAIN U C DOORS FAIRINGS	4010200		29319	53939	13830	15814375	4054818
			29319			15814375	4054818
NOSE UNDERCARRIAGE GROUP	4020000						
100 NOSE UNDERCARRIAGE	4020100	91	33381	17080	9970	5701475	3328086
			33381			5701475	3328086
NOSE U C DOOR AND FAIRING	4020200	52	2757	16225	8868	447323	244491
			2757			447323	244491

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ENGINE GROUP	5000000						
PS 13 ENGINES	5010000		1005500	69037	12123	694167035	121896765
PS 13 ENGINES C A	5010002		300	65853	10306	197559	30918
			1005800			694364594	121927683
ACC GEAR BOX ON FUS D B	502000156		36	76577	68	9442	2123552	347088
ACC GEAR BOX ON FUS E B	502000258		235	33612	95	10307	14424552	2425546
ACC GEAR BOX ON FUS C A	5020003		80	61550		9700	492400	77600
ACC GEAR BOX ON FUS I W	502000462		11	78612	70	13950	721761	164331
			291	87			17762265	3014565
ENGINE CONTROLS	5030000							
ENGINE CONTROLS F F	503000152		15	76167	23	12368	263554	194920
ENGINE CONTROLS C F	503000254		10	92644	41	11800	28824	12862
ENGINE CONTROLS E B	503000458		8	89666	33	9904	592367	88047
ENGINE CONTROLS I W	503000562		6	58521	42	12751	343094	83902
			32	32			1227839	379731
STARTER AND GEARBOX	5040000							
STARTER AND GEARBOX ENG	5040001		146	45601	97	11357	8815851	1663233
			146	45			8815851	1663233
FIRE EXT SYSTEM	5060000							
ENG FIRE EXT SYSTEM E B	506000158		59	85710	74	13583	4253779	812943
ENG FIRE EXT SYSTEM D B	506000256		12	31568	56	11237	699897	138327
ENG FIRE EXT SYSTEM ENG	5060003		14	26796	0	9970	96503	14157
			73	58			5050179	965427
ENGINE MTGS AND BRACKETS	5070000							
ENGINE MOUNTS	5070001		75	39671	91	14152	5065529	1066919
			75	39			5065529	1066919
FUEL SYSTEM	5080000							
30 FUEL SYSTEM C F	508000154		116	15402	26	14021	4672250	1628539
30 FUEL SYSTEM D B	508000256		164	00536	68	11056	8801552	1813184
30 FUEL SYSTEM E B	508000358		18	36613	92	11024	1127157	202401
30 FUEL SYSTEM I W	508000462		472	80554	32	14346	26208250	6782789
30 FUEL SYSTEM C A	5080005		19	56863	0	9920	133829	19344
			773	26			40943038	10446257

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FIXED EQUIPMENT GROUP	7000000						
INSTRUMENTS	7010000						
INSTRUMENTS	701000152		3261	16430	13947	535782	454812
NAVIG TABLE AND STOWAGE	701000452		200	22000	13000	44000	26000
			3461			579782	480812
COCKPIT SEALING	702000052		500	18600	13000	93000	65000
			500			93000	65000
OXYGEN SYSTEM	7030000						
OXYGEN SYSTEM	703000152		2116	25940	15688	548890	331958
			2116			548890	331958
AIR CONDITIONING SYSTEM	7040000						
28 AIRCONDITIONING F F	704000152		11239	21908	11931	2462240	1340925
28 AIRCONDITIONING C F	704000254		5484	28852	13572	15823014	7443156
28 AIRCONDITIONING D B	704000356		706	51474	12263	363406	86577
28 AIRCONDITIONING C A	7040005		2594	34943	14108	12823625	3660038
28 AIRCONDITIONING ENG	7040006		1503	67100	14000	1008513	210420
28 AIRCONDITIONING I W	704000762		715	22471	15728	37095	11167
			94304			32517893	12752283
HYDRAULICS MAIN SYSTEM	7050000						
28 UTILITY HYDRAULICS F F	705000152		9602	20241	10816	1943541	1038552
3 UTILITY HYDRAULICS C F	705000254		5068	42772	10325	2167685	523271
19 UTIL&TY HYDRAULICS D B	705000356		2179	55492	10950	11969814	2386553
67 UTILITY HYDRAULICS E B	705000458		1107	56074	11152	6727730	1235084
30 UTILITY HYDRAULICS I W	705000562		1444	15524	14254	7977208	2058420
28 UTILITY HYDR NOSE U C	705000691		114	18860	9320	21500	10625
30 UTILITY HYDR MAIN U C	705000792		2980	54325	14100	1618885	420180
ANTI SKID SYSTEM C F	705000854		3134	47200	10800	1479248	338472
ANTI SKID SYSTEM MUC	705000992		634	51500	14000	326510	88760
			68843			34232121	8099917
MUC DOOR STOPS	706000056		302	51600	12000	155832	36240
			302			155832	36240
CABIN INSULATION	707000052		1431	18748	13200	268284	188892
			1431			268284	188892

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	FLYING CONTROLS GROUP	6000000						
	MECHANICAL CONTROLS	6010000						
60	MECHANICAL CONTROLS F F	601000152		10694	16454	11411	1759591	1220298
	MECHANICAL CONTROLS C F	601000254		1290	39654	11727	511537	151278
70	MECHANICAL CONTROLS FIN	601000583		12443	78819	22157	9807448	2756996
71	MECHANICAL CONTROLS I W	601000662		40234	71800	14382	28888012	5786454
80	MECHANICAL CONTROLS O W	601000764		30520	77053	13561	23516576	4138817
	MECHANICAL CONTROLS C A	6010008		663	70984	14338	470624	95061
				95844			64953788	14148898
	FLYING CONTROLS HYDRAULICS	6020000						
6	FLYING CONTROLS HYDR D B	602000156		3299	55757	10910	1839423	359921
6	FLYING CONTROLS HYDR E B	602000258		39097	64760	10982	25319217	4293633
6	FLYING CONTROLS HYDR R F	602000359		347	5440	10814	25650	3677
73	FLYING CONT HYDRAULICS I W	602000462		27988	70369	14716	19694876	4118714
66	FLYING CONT HYDRAULICS O W	602000564		13170	74034	13586	9750278	1789276
72	FLYING CONT HYDRAULICS FIN	602000683		5820	75988	20762	4422502	1208348
6	FLYING CONTROLS HYDR F F	602000852		7713	17716	10582	1366435	816190
6	FLYING CONTROLS HYDR C F	602000954		2981	37175	10879	1108187	324303
				100102			63526568	12914062

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BRAKE PARACHUTE	7080000						
83 BRAKE PARACHUTE F F	7080001	52	479	15664	12903	75031	61805
83 BRAKE PARACHUTE R F	7080005	59	9018	82187	14401	741162 4	1298682
83 BRAKE PARACHUTE I W	7080006	62	129	61969	14200	79940	18318
			9626			7566595	1378805
ELECTRICAL SYSTEM	7090000						
ELECTRICAL WIRING R N	7090001	51	129	9285	12000	11978	15480
ELECTRICAL WIRING F F	7090002	52	2966	19977	11200	592518	332192
ELECTRICAL WIRING C F	7090003	54	2354	39703	11000	934609	258940
ELECTRICAL WIRING A I	7090004	55	1274	21984	12000	280076	152880
ELECTRICAL WIRING D B	7090005	56	9015	52769	9921	4757125	894378
ELECTRICAL WIRING E B	7090006	58	64	59500	9200	38080	5888
ELECTRICAL WIRING I W	7090008	62	9236	53995	13900	4986978	1283804
ELECTRICAL WIRING FIN	7090009	83	352	79754	30000	280734	105600
ELECTRICAL WIRING NUC	7090010	91	330	18600	9800	61380	32340
ELECTRICAL WIRING ENG	7090011		2002	60683	10000	1214874	200200
ELECTRICAL WIRING C A	7090012		1374	63347	31123 4	4601199	1544226
ELECTRICS F F	7090013	52	1642	91554	7105 38	2554217	1731288
ELECTRICS C F	7090014	54	863	64519	3107 67	3902867	929838
ELECTRICS E R	7090015	58	111	76154	5107 65	687458	120245
ELECTRICS ENG	7090016		1755	45864	9116 04	10295245	2036966
ELECTRICS C A	7090017		80	26135	0115 91	492027	92960
ELECTRICS FIN	7090018	83	44	89050	2884 0	39182	12690
ELECTRICS I W	7090019	62	227	56205	3145 00	1411706	329875
ELECTRICS CAW	7090020		120	67488	1366 1	80986	16393
ELECTRICS MUC	7090021	92	7	45160	0137 00	38184	10138
ELECTRICS A I	7090022	55	490	62209	2139 88	1083834	686251
ELECTRICS D B	7090023	56	2546	85184	7102 44	13204394	2608942
ELECTRICS R F	7090024	59	176	80759	1168 7	142136	20569
WINDSCREEN DEMISTING	7090025	52	349	01995	4106 38	696395	371266
			122559			52388182	13793349
L P PNEUMATICS	7100000						
L P PNEUMATICS F F	7100001	52	199	31958	6122 09	390349	243325
L P PNEUMATICS C F	7100002	54	79	63239	7116 10	257680	92416
L P PNEUMATICS FIN	7100005	83	41	47496	6252 34	310359	104469
L P PNEUMATICS R N	7100006	51	199	7067	9261	14063	18429
L P PNEUMATICS ENG	7100008		140	36389	7 9987	896475	140118
L P PNEUMATICS I W	7100009	62	20	35288	0159 30	107346	32338
			5008			1976472	631095
INTAKE DE ICING	7120000	55	880	19582	1180 0	1723216	1038400
			8800			1723216	1038400
RADIO AND RADAR FIXED	7140000						

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RADIO AND RADAR FIXED R N	714000151		500	8000	10000	40000	50000
RADIO AND RADAR FIXED F F	714000252		21501	18728	11277	4026707	2424668
RADIO AND RADAR FIXED C F	714000354		8400	26471	10015	2223564	841260
RADIO AND RADAR FIXED F IN	714000583		3200	76180	24600	2437760	787200
RADIO AND RADAR FIXED C A	7140006		22500	22200	12000	4995000	2700000
RADIO AND RADAR FIXED I W	714000762		1808	54513	16000	985595	289280
			57909			14708626	7092408
60 CANOPY ACTUATION	716000052		6352	20961	15434	1331443	980368
			6352			1331443	980368
CABIN CONSOLES	717000052		1768	17529	12449	309913	220098
			1768			309913	220098
RADAR DOOR ACTUATION	718000054		1000	26800	9500	268000	95000
			1000			268000	95000
SURFACE FINISH R N	719000151		246	8720	11264	21451	27709
SURFACE FINISH F F	719000252		363	18744	12200	68041	44286
SURFACE FINISH CANOPY	719000353		64	20218	15900	12940	10176
SURFACE FINISH C F	719000454		928	36356	13907	337384	129057
SURFACE FINISH INTAKES	719000555		408	22798	12020	93016	49042
SURFACE FINISH O B	719000656		349	54064	11373	188683	39692
SURFACE FINISH E B	719000758		443	66701	11200	295485	49616
SURFACE FINISH R F	719000859		402	77722	12770	312442	51335
SURFACE FINISH I W	719000962		3151	60144	14400	1895137	453744
SURFACE FINISH O W	719001064		1067	70650	13590	753836	145005
SURFACE FINISH O W L EDGE	719001165		319	63948	13526	203994	43148
SURFACE FINISH DIVE BRAKES	719001272		28	50884	9048	14248	2533
SURFACE FINISH AILERON	719001374		353	79190	13556	279541	47853
SURFACE FINISH ELEVATOR	719001482		566	75523	14260	427460	80712
SURFACE FINISH FIN	719001583		639	74663	20837	477097	133148
SURFACE FINISH RUDDER	719001684		202	81279	21431	164184	43291
SURFACE FINISH ARM PACK	719001794		472	38850	9600	183372	45312
			10000			5728311	1395659

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REMOVABLE EQUIPMENT GROUP	8000000						
94 EJECTOR SEATS	8010100	52	34294	204501	3411	7013123	4599168
			34294			7013123	4599168
RADIO AND RADAR REMOVABLE	8020100		97610	7835	10098	7647744	9856658
RADIO AND RADAR REM R N	8020101	51	43610	2346	3111	10232214	4854229
RADIO AND RADAR REM F F	8020102	52	61650	2729	6101	16827984	6282752
RADIO AND RADAR REM C F	8020103	54	4000	552	00160	2208000	640000
RADIO AND RADAR REM I W	8020108	62	206870			36915942	21633639
DAMPING SYSTEM	8030000						
DAMPING SYSTEM F F	8030101	52	7841	7201	12047	134856	94448
DAMPING SYSTEM C F	8030102	54	24733	1766	10860	785573	268568
DAMPING SYSTEM E B	8030103	58	3696	3242	13432	233363	49564
DAMPING SYSTEM I W	8030104	62	6070	5378	15720	3264507	954204
DAMPING SYSTEM O W	8030105	64	9574	8551	14000	71112	13300
DAMPING SYSTEM R N	8030106	51	287	7350	9340	21095	26806
DAMPING SYSTEM C A	8030107		8564	4797	2128 93	4108322	1104157
DAMPING SYSTEM D B	8030108	56	10005	3800	13000	538000	130000
			19642			9156828	2641047
MISSILE PACK	8050000						
MISSILE PACK STRUCTURE	805010094		76025	3893	3 9873	29598813	7505948
			76025			29598813	7505948
MISSILE PACK MECHANISMS	805020094		60500	3799	2 9433	22985160	5706965
			60500			22985160	5706965
MISSILE PACK HYDRAULICS	805030094		22061	4183	4 10032	9228999	2213160
			22061			9228999	2213160
MISSILE PACK ELECTRICS	805040094		10800	3670	0 10100	3963600	1090800
			10800			3963600	1090800

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MISSILE PACK PNEUMATICS	805050094		2445	38692	10350	946019	253058
			2445			946019	253058
MISSILE PACK FUEL SYSTEM	805060094		1433	46700	9000	669211	128970
			1433			669211	128970
REM TANK FOR GENIE BAY	806000094		20567	36796	9972	7567833	2050941
			20567			7567833	2050941
MISSILE AIRCONDITIONING	807000094		521	30550	10250	159166	53403
			521			159166	53403
COCKPIT EQUIPMENT	808000052		600	18750	14500	112500	87000
			600			112500	87000

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OPERATIONAL LOAD	9000000						
CREW MEMBERS	9010000	52	39000	19400	13650	7566000	5323500
			39000			7566000	5323500
ENGINE OIL	9020000						
ENGINE OIL DRAINABLE ENG	9020001		9290	64000	11940	5945600	1109226
ENGINE OIL DRAINABLE E B	902000258		4110	65640	9769	2697804	401506
ENGINE OIL TRAPPED D B	902000356		753	58176	9677	438065	72868
ENGINE OIL TRAPPED E B	902000458		2047	61512	10398	1259151	212847
			16200			10340620	1796447
MISSILES	9030000	94	14204	0 37849	9729	53760720	13819072
			142040			53760720	13819072
OXYGEN CHARGE	9050000						
OXYGEN CHARGE F F	905000152		72	20493	13200	14755	9504
OXYGEN CHARGE C F	905000254		1267	26280	16150	332968	204621
			1339			347723	214125
ENGINE FIRE EXT FLUID	9060000		2500	73000	12900	1825000	322500
			2500			1825000	322500
TRAPPED FUEL	9080000						
TRAPPED FUEL C F	908000154		243	41426	13106	1006652	318476
TRAPPED FUEL D B	908000256		69	49400	13350	340860	92115
TRAPPED FUEL I W	908000362		1826	56814	14353	10374236	2620858
			21380			11721748	3031449
WATER FOR AIRCOND	910000054		2000	0 26800	13200	5360000	2640000
UNUSABLE WATER FOR AIRCOND	910000154		250	0 26700	12700	667500	317500
			22500			6027500	2957500

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