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CF105
R-7-0400-44
Iss-13

FILE IN VAULT

ARROW 1
A/C 25201

Report # 7-0400-44
Issue 13

WEIGHT & C.G. SUMMARY

RCAF **SECRET** Jan. 1/58

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A

DATE
JAN. 07 1993

Report no.: QCX - AVRO - CF105- R-7-0400-44-Iss-13

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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AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

Ref. 5048/11/E
Date January 1st, 1958
To See Distribution
From Mr. E. F. Burnett
Subject ARROW 1 A/C 25201 WEIGHT & C.G. SUMMARY - Report # 7-0400-44 Iss. 13

Attached is a copy of Weight and C.G. Summary Report # 7-0400-44 Issue 13, 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: 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
Weight Supervisor

cc: Messrs.

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Date: January 1st, 1958
Aircraft: ARROW 1, A/C 25201
with J75 P3 Engines.

Report # 7-0400-44 Iss. 13

INDEX

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1-1 to 1-5	Introductory notes and explanations of Weight Changes.
2-1 to 2-2	Weight & C.G. Summaries.
3	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 A/C 25201 with fuel sequencing has been omitted until a fully approved sequencing is established.

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Date: January 1st, 1958
ARROW 1 A/C 25201 With
J75 P3 Engines

INTRODUCTION & WEIGHT CHANGES

The following is a Weight and C.G. Summary for the first Arrow 1 Aircraft # 25201, with J75 P3 Engines, based on the latest information currently available. All Weight and C.G. changes are relative to Issue 12 of December 1st, 1957.

Note: 1) This summary does not apply for Aircraft # 25202 and 25203 which will have J75 P5 Engines, nor for Aircraft # 25204 and 25205 which are for full Astra I trial installations etc.

2) The statement herein is for the Aircraft complete to drawings and not necessarily in the condition to be encountered for first flight.

For early flights there may be some shortages in non-essential equipment, some flight test installations will probably be incomplete etc. (See also General Note (j). A statement for first flight will be issued later.

GENERAL:

a) Pratt & Whitney J75 P3 Engines comprise the Power Plant for Aircraft # 25201. J75 P5 Engines, which are partially redesigned versions of the P3 Engines, are to be installed on Aircraft # 25202 and subsequent Arrow 1 Aircraft (J75 P3 Engines = 6,175 lb each; J75 P5 Engines = 5,950 lb each).

b) An Instrument Package containing Flight Instrumentation is installed, this also varies, the package for Aircraft # 25201 to Aircraft # 25203 differing from those for Aircraft # 25204 and 25205 (Astra I Trial Installations.)

A relatively detailed estimate of other proposed Flight Test Installations throughout the aircraft has been made. These installations amount to 1,457 lb (figure partially confirmed by Actual Weights of some cable assemblies.)

c) Emergency lowering for the Landing Gear and additional Fire Protection to be installed in the first aircraft, are allowed for in the summary.

d) An Interim Radio & Radar System with Minneapolis-Honeywell M.H.64 Damping System is installed. Currently there is no Doppler or Tacan installation, although provisions for future installation of Doppler, which is not yet available, will be made.

e) The original design of tailcones and stinger are recorded, the redesigned versions will be recorded at a later date, when they are available for retrofit. The ensueing weight changes will be:

Tailcones	+ 127.3 lb/A/C
Stinger	- 29.7 lb
Net Change	+ 97.6 lb/A/C

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.

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INTRODUCTION & WEIGHT CHANGES

GENERAL:

f) (Continued)

The following weight penalaties ensue:

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

g) It should be noted that due to material substitutions and concessions introduced by Planning & Production Departments there is a structural weight penalty of 203 lb to-date. 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.

h) A considerable number of Actual Weights have now been obtained. Structural weights are checking within 0.5% of estimates of 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 of actual weight recorded within the report.

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

Structure	74.76%
Landing Gear	97.86%
Power Plant	92.97%
Flying Controls	59.01%
Equipment	23.12%

i.e. 70.42% of the Basic Weight of Aircraft 25201.

j) The Aircraft is ballasted such that the C.G. on a flight envelope (using fuel proportioners) does not travel aft of 31% M.A.C.

For the first flight the aft restriction is 30% M.A.C., this may be achieved by installing maximum ballast in the Radar Nose, and any further ballast requirements in the Observer's cockpit.

C.G. Envelopes showing fuel sequencing have currently been omitted until a fully approved sequencing is established.

1. STRUCTURE — WEIGHT (lb)

a) Wings

No Weight Change.

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INTRODUCTION & WEIGHT CHANGES

1. STRUCTURE		WEIGHT (lb)
b) Fin and Rudder:		
No Weight Change		
c) Fuselage Fwd. Sta. 255"		
Formers - incorporation of miscellaneous E.C.N's	+	1.33
Top Longerons - some actual weights and E. C.N's incorporated	+	2.17
Crew's Bulkheads - addition of brackets & stiffeners	+	1.67
Upper Shear Panel - addition of fillet fairing at rear arch	+	0.39
Cockpit Floor - addition channel support for uplocks and incorporation of E.C.N's	+	0.79
Lower Shear Panel - delete circular door at L band antenna location (duplication of parts)	-	0.48
Air Intakes - Actual weights of fairings & tip support casting, incorporation of E.C.N's	+	3.37
Pilot's Canopy - addition of insulation batting	+	0.54
Miscellaneous Items F.F. - small bracketry changes	+	0.26
Weight Increase Front Fuselage	+	10.04
d) Centre Fuselage Sta. 255"-485"		
No Weight Change		
e) Duct Bay Sta. 485"-591.65"		
Formers Side - incorporation of E.C.N's etc.	+	0.34
Formers Lower - production drawing re-issues & E.C.N's incorporated	+	0.34
Access Panel - minor changes on production drawing re-issues	+	0.89
Mounting Brackets - miscellaneous changes & drawing re-issues	+	0.30
Skin - addition of small steel doubler & stiffener	+	0.57
Lower Panel Assy. - miscellaneous alterations to brackets etc.	+	0.83
Weight Increase Duct Bay	+	3.27
f) Engine Bay Sta. 591.65"-742.5"		
No Weight Change		
g) Rear Fuselage Sta. 742.5 Aft.		
No Weight Change		
h) Fuselage "Marry-Up"		
Joint D.B to E.B. - miscellaneous hardware changes etc.	+	0.13
Weight Increase "Marry-up"	+	0.13
TOTAL STRUCTURAL INCREASE	+	13.44

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INTRODUCTION & WEIGHT CHANGES

2. LANDING GEAR	WEIGHT (lb)
Nose U/C Door & Fairing - addition of seal, indentification plates etc.	+ 0.52
TOTAL LANDING GEAR INCREASE	+ 0.52

N.B. Anti-skid devives are Not yet included, but may be fitted at a later date if pilot requests same.

3. POWER PLANT & SERVICES

No Weight Change

4. FLYING CONTROLS GROUP	
Flying Control Hydraulics I/Wing - addition of dampers to elevator jack control valves	+ 1.50
Flying Control Hydraulics O/Wing - addition of dampers to aileron jack control valves	+ 1.50
Flying Control Hydraulics Fin - addition of damper to rudder jack control valve	+ 0.75
TOTAL FLYING CONTROLS INCREASE.	+ 3.75

5. EQUIPMENT GROUP	
Utilities Hydraulics I/Wing - Dowty increase in Weight of Main U/C door Jacks.	+ 2.00
Flight Test Installations - addition of telemetry blade type antenna - Engine Bay	+ 14.00
Wiring for power supplies & control circuits estimated.	+ 24.47
$\alpha\beta$ sub-system added	+ 3.40
TOTAL EQUIPMENT INCREASE	+ 43.87

SUMMARY

Weight Change - Aircraft Basic Weight

Structure	+ 13.44
Landing Gear	+ 0.52
Flying Controls	+ 3.75
Equipment	+ 43.87
	+ 61.58

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

Issue 12	Issue 13	
47,938.10 lb	47,999.68 lb	+ 61.58 lb

CONTINUED.

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Date: January 1st, 1958
ARROW 1, A/C 25201 with
J75 P3 Engines

INTRODUCTION & WEIGHT CHANGES.

N.B. If Aircraft Ballasted such that the C.G. in the flight envelope, using correctly functioning fuel system proportioners, does not exceed 31% M.A.C., further 905 lb of ballast are necessary.

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Date: January 1st, 1958
Aircraft ARROW 1, with
J75 P3 Engines
A/C 25201

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WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb	H. ARM ins.	V. ARM ins.
STRUCTURE	18,605.97	561.31	137.47
Wings	9,963.50	642.82	142.26
Fin & Rudder	1,025.85	754.34	209.31
Fuselage Fwd. Sta. 255"	2,644.99	181.59	128.16
Sta. 255"-485"	1,682.14	377.80	130.20
Sta. 485"-591.65"	1,001.86	533.99	104.61
Sta. 591.65" - 742.5"	1,433.13	661.00	107.31
Sta. 742.5 Aft.	801.79	801.03	129.06
"Marry-Up"	52.71	469.18	103.86
LANDING GEAR - RETRACTED	2,600.83	488.32	134.91
Main Landing Gear	1,959.62	539.48	141.00
Main Gear Doors & Fairings	282.34	537.60	138.37
Nose Landing Gear	333.81	170.81	99.70
Nose Gear Door & Fairing	25.06	161.94	88.24
POWER PLANT & SERVICES	14,391.81	652.82	120.34
Engine & Accessories J75 P3	12,562.29	664.92	119.78
Gear Box & Drives on Fuselage	275.54	601.39	102.98
Gear Box & Starters on Engine	286.30	589.08	105.59
Engine Control	32.43	375.76	118.62
Engine Nose Bullets	70.58	562.75	115.07
Fire Extinguishing System	65.46	700.45	134.21
Engine Mountings	206.21	635.04	127.71
Fuel System	893.00	536.67	136.12
FLYING CONTROLS GROUP	1,853.01	685.49	139.59
Mechanical Flying Controls	941.12	686.14	148.31
Hydraulic Flying Controls	911.89	684.81	130.60
EQUIPMENT FIXED & REMOVABLE	9,627.10	403.43	113.45
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	339.06	204.43	134.10
Oxygen System	26.07	240.54	156.70
Air Conditioning System	812.41	335.87	134.32
Surface Finish	100.00	591.52	140.20
Hydraulics Main System	641.97	504.41	117.78
Cockpit Insulation	14.31	187.48	132.00
Drag Chute	90.78	786.65	143.16
Electrical System	1,118.98	417.54	112.96
Low Pressure Pneumatics	54.65	433.30	129.37
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	64.92	221.99	154.35
Console Panels	17.45	174.76	124.34
MH 64 Damping System	99.08	450.83	140.34
Interim Radio & Radar	631.89	340.18	124.23
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation (A/C 25201)	3,036.00	395.45	95.00
Flight Test Installations	1,456.73	488.48	128.90
Additional Fire Protection	177.67	402.00	109.57
Emergency Landing Gear Lowering	12.91	458.83	128.60
Ram Air Turbine Equipment	91.35	336.08	104.74

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Date: January 1st, 1958
Aircraft: ARROW 1 with
J75 P3 Engines
A/C 25201

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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	47,078.72	557.85	127.26	
	U/C Down		559.93	123.82	
USEFUL LOAD (less Fuel)		921.02	366.58	132.34	
Crew		390.00	194.00	136.50	
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		905.00	86.10	116.50	
Operational Weight Empty	U/C Up	48,904.74	545.52	127.16	30.25
	U/C Down		547.52	123.84	30.80
Maximum Internal Fuel (2,544 gals. @ 7.8 lb/gal.)		19,843.00	538.88	144.32	
A.U.W. Max. Internal Fuel	U/C Up	68,747.74	543.60	132.11	29.72
	U/C Down		545.02	129.75	30.11

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. Envelope does not exceed 31% M.A.C. i.e. 303 lb on Former Sta. 68.5 and 602 lb on the Shear Panel.

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PROJECT ARROW 1 A/C 25201

WEIGHT AND C. OF G BY FUNCTIONAL C COMPONEI

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. A
	TOTAL WING GROUP	1000000			
	OUTER WING	1010000			
100	OUTER WING SKINS	1010001	64	9291070	
100	POSTS AND INTERCOSTALS	1010002	64	2436733	
100	OUTER WING SPARS	1010003	64	3925870	
100	OUTER WING RIBS	1010004	64	1345669	
98	AILERON CONTROL BOX	1010006	64	3753077	
100	RIB 12	1010007	64	7626645	
100	O W AILERON JACK FITTING	1010009	64	1046727	
	AILERON JOINTS AND FAIRING	1010010		3293787	
	BUZZ DAMP STRUC PROV O W	1010011	64	800758	
				198355	
	AILERON	1020000			
100	AILERON STRUCTURE	1020001	74	3360079	
				33600	
97	ELEVATOR	1030000	82	4490075	
97	ELEVATOR MARRY UP	1030000		159773	
				46497	
	INNER WING	1040000			
96	MAIN U C STRUCTURE	1040001	62	3307157	
100	FRONT SPAR I W	1040002	62	1111048	
100	MAIN SPAR I W	1040003	62	1510656	
100	FWD CENTRE SPAR I W	1040004	62	536460	
100	AFT CENTRE SPAR I W	1040005	62	366665	
100	REAR SPAR I W	1040006	62	766770	
94	I W STRUCTURE F S TO M S	1040007	62	10591849	
100	STRUCTURE MS TO R S	1040008	62	1497960	
100	STRUCTURE AFT OF REAR SPAR	1040009	62	3221271	
40	ELEVATOR CONTROL BOX	1040010	62	4283872	
25	TRANSP JOINT MARRY UP	1040011		706563	
100	INNER WING JOINTS	1040012	62	6347166	
100	SKINS M S TO R S	1040013	62	21903862	
100	STRUT PICK UP FITTINGS	1040014	62	5391567	
100	RIBS 1 TO 9 INNER WING	1040016	62	5120461	
74	DORSAL FAIRING I W	1040017	62	9548	
100	RIB 10	1040018	62	1080063	
77	FUSELAGE HINGE JOINT	1040019	62	1262861	
65	TRANSPORT JOINT O W TO I W	1040020	62	1294263	
49	FUSELAGE HINGE JOINT	1040021		374052	
	BUZZ DAMP STRUC PROV I W	1040022	62	552741	
74	DORSAL FAIRING C A	1040023		603357	
				664890	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
~~100 FIN~~	~~201000083~~		~~851707~~	~~74~~
BUZZ DAMP STRUC PROV FIN	201000183		1858	0
~~12 FIN TO WING MARRY UP~~	~~2010002~~		~~48306~~	~~8~~
			~~90185~~	
95 RUDDER	202000084		124008	1
			12400	

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	TOTAL FUSELAGE GROUP	3000000			
	FUSELAGE BASIC STRUCTURE	3010000			
100	RADOME	3010001	51	18100	
100	RADAR NOSE ACCESS DOORS	3010002	51	8008	
	NOSE STRUCTURE FWD STA 120	3010003	51	12188	
	SKIN F F	3010004	52	110541	
88	SKIN C F	3010005	54	211823	
	SKIN D B	3010006	56	59375	
3	SKIN E B	3010007	58	177256	
4	FORMERS F F	3010011	52	106641	
100	FORMERS C F	3010012	54	278243	
	FORMERS D B	3010013	56	74915	
	LIGHT FORMERS E B	3010014	58	135016	
72	HEAVY FORMERS E B	3010015	58	218906	
	LOWER LONGERONS F F	3010016	52	68461	
	LONGITUDINAL MEMBERS E B	3010017	58	110676	
75	LOWER LONGERON E B	3010018	58	68426	
	TOP LONGERONS E B	3010019	58	6386	
	LOWER SHEAR PANEL F F	3010020	52	29402	
	TOP WING LONGERONS D B	3010021	56	4985	
	LONGERONS C F	3010022	52	532	
	LONGERONS C F	3010023	54	138134	
43	LONGERONS F D B	3010024	54	12584	
43	LONGERONS A D B	3010025	56	86555	
	ELECTRONICS BAY STRUCTURE	3010026	54	25962	
59	LONGITUDINAL BEAMS D B	3010027	56	65705	
	RADAR ACCESS DOORS C F	3010028	54	21382	
72	MAIN FRAME AT STN 538 77	3010029	56	59805	
	DIVE BRAKE ACCOM STRUCTURE	3010030	56	36345	
48	TOP LONGERONS F F	3010031	52	188661	
100	DUCT C F	3010032	54	332863	
97	DUCT D B	3010033	56	316335	
22	CANOPY ARCHES	3010034	52	84612	
4	ACCESS PANEL STIFFENERS	3010036	56	39545	
66	NOSE U C SUPPORT STRUCTURE	3010037	52	33432	
3	CREW BULKHEADS	3010038	52	127182	
51	EQUIPMENT BAY STRUCTURE	3010039	54	61502	
86	WINDSCREEN	3010041	52	130031	
33	SERVICE ACCESS DOORS	3010042	58	67046	
	TORSION BOX E B	3010043	58	60426	
	DORSAL FAIRING AIR OUTLET	3010044	54	20612	
66	INTERMEDIATE FORMERS	3010045	58	51546	
	ENGINE ACCESS DOORS	3010046	58	146596	
	SEALING MISSILE BAY	3010047	54	69732	
100	MISCELLANEOUS ITEM C F	3010048	54	3923	
98	ARMAMENT BAY ROOF	3010049	54	132163	
	BULKHEAD AT STA 120	3010050	52	30601	
	BULKHEAD AT STA 255	3010051	52	104292	
100	BULKHEAD AT STA 485	3010052	54	112454	
13	ENGINE TUNNEL	3010054	58	475726	

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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			
100	MAIN UNDERCARRIAGE	401010092		19596253	
				195962	
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		250616	
				2506	

EIGHT 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
TION	4000000						
OUP	4010000						
	401010092		195962	53948	14100	105717580	27630642
			195962			105717580	27630642
GS	401020062		28234	53760	13837	15178598	3906739
			28234			15178598	3906739
OUP	4020000						
	402010091		33381	17080	9970	5701475	3328086
			33381			5701475	3328086
RING	402020052		2506	16194	8824	405822	221129
			2506			405822	221129

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONI

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
ENGINE GROUP	5000000			
99 ENGINE J 75	5010000		12527076	
			1252707	
J 75 ENGINE SERV ACCESS	5010100		35226	
			3522	
68 ACC GEAR BOXES ON FUS D B	502000156		45245	
68 ACC GEAR BOXES ON FUS E B	502000258		230306	
			27554	
ENGINE CONTROLS	5030000			
36 ENGINE CONTROLS F F	503000152		14581	
36 ENGINE CONTROLS C F	503000254		2643	
36 ENGINE CONTROLS D B	503000356		5084	
36 ENGINE CONTROLS E B	503000458		10136	
			3243	
83 GEARBOX AND STARTER ON ENG	5040000		286305	
			28630	
91 ENGINE ANTI ICING	5050000		70585	
			7058	
FIRE EXT SYSTEM	5060000			
55 FIRE EXT SYSTEM D B	506000256		1465	
55 FIRE EXT SYSTEM E B	506000358		64007	
			6546	
ENGINE MTGS AND BRACKETS	5070000			
64 ENG MOUNTING AND BRKTS	5070001		146536	
ENGINE MTGS ACCESSORIES	5070002		52026	
ENGINE MTGS ACCESSORIES CA	5070003		7666	
			20621	
FUEL SYSTEM	5080000			

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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~~	~~4~~
27 FUEL SYSTEM D B	5080002	56	16857	5
~~17 FUEL SYSTEM E B~~	~~5080003~~	~~58~~	~~3592~~	~~6~~
49 FUEL SYSTEM I W	5080004	62	53997	5
~~FUEL SYSTEM ENG~~	~~5080005~~		~~6266~~	~~5~~
FUEL SYSTEM C A	5080006		7546	3
			89300	

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

UNCLASSIFIED / NON CLASSIFIÉ

REPORT NO.

SHEET

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	6000000						
	6010000						
F	601000152		925716454	11489		1523147	1063537
F	601000254		939391	32	11765	367449	110473
IN	601000583		1242378817	22159		9791436	2752813
W	601000662		406107173	2	14375	29130365	5837688
W	601000764		3023777068	13562		23303051	4100742
A	6010008		646709	82	14338	458544	92623
			94112			64573992	13957876
ULICS	6020000						
S D B	602000156		2391	57395	9691	1372314	231712
S E B	602000258		4362965	387	11067	28527694	4828421
S R F	602000359		48758	75	10824	36420	5196
S I W	602000462		2744470	359	14721	19309324	4040031
S O W	602000564		1208074	061	13580	8946569	1640464
S FIN	602000683		559776	013	20796	4254448	1163952
			91189			62446769	11909776

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
5 RADIO RADAR INT SYST F F	715000252		96991	
5 RADIO RADAR INT SYST C F	715000354		225012	
5 RADIO RADAR INT SYST I W	715000562		49275	
5 RADIO RADAR INT SYST O W	715000664		10497	
5 RADIO RADAR INT SYST FIN	715000783		33807	
5 RADIO RADAR INT SYST C A	715000 8		197483	
5 RADIO RADAR INT SYST D B	715000959		137	
			63189	
29 CANOPY ACTUATION	716000052		64922	
			6492	
CABIN CONSOLES	717000052		17451	
			1745	
SURFACE FINISH F F	719000152		3631	
SURFACE FINISH CANOPY	719000253		642	
SURFACE FINISH C F	719000354		14003	
SURFACE FINISH INTAKES	719000455		4082	
SURFACE FINISH D B	719000556		3775	
SURFACE FINISH E B	719000658		4436	
SURFACE FINISH R F	719000759		6488	
SURFACE FINISH I W	719000862		31516	
SURFACE FINISH O W	719000964		10677	
SURFACE FINISH O W L EDGE	719001065		3196	
SURFACE FINISH AILERON	719001174		3537	
SURFACE FINISH ELEVATOR	719001282		5667	
SURFACE FINISH FIN	719001383		6397	
SURFACE FINISH RUDDER	719001484		2028	
			10000	
FLIGHT TEST INSTALLATION	7200000		1456734	
			145673	

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WEIGHT AND C. OF G BY FUNCTIONAL G
COMPONEN

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. A
REMOVABLE EQUIPMENT GROUP	8000000			
77 EJECTOR SEATS	8010100	52	33906	20
			33906	
RADAR REMOV GROUP	8020000			
DAMPING SYSTEM	8030000			
DAMPING SYSTEM F F	8030101	52	78	417
DAMPING SYSTEM C F	8030102	54	230	332
DAMPING SYSTEM E B	8030103	58	36	963
DAMPING SYSTEM I W	8030104	62	607	052
DAMPING SYSTEM O W	8030105	64	95	74
DAMPING SYSTEM R N	8030106	51	287	7
			9908	
98 INSTRUMENT PACK	8050800	54	68680	38
			68680	
INSTRUMENTATION	8050900	54	30360	39
			30360	
FIRE PREVENT FIRST A C CF	8051000	54	16379	38
FIRE PREVENT FIRST A C DB	8051001	56	806	54
FIRE PREVENT FIRST A C EB	8051002	58	582	62
			1776	7

VEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

UNCLASSIFIED / NON CLASSIFIÉ

SHEET

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
GROUP	8000000						
	8010100	52	33906	20443	13410	6931404	4546795
			33906			6931404	4546795
	8020000						
	8030000						
	8030101	52	78	41720	11204	7	134856	94448
	8030102	54	2303	3221	3109	49	741865	252155
	8030103	58	36	9632	4213	432	233363	49564
	8030104	62	607	0527	8115	720	3203807	954204
	8030105	64	9	5748	5514	000	71112	13300
	8030106	51	287	7350	9340		21095	26806
			9908				4406098	1390477
	8050800	54	6868	0385	8194	68	26497431	6502622
			68680				26497431	6502622
	8050900	54	3036	0039	5459	500	120058620	28842000
			303600				120058620	28842000
C CF	8051000	54	16379	3868	0107	50	6335397	1760743
C DB	8051001	56	806	5494	0128	83	442816	103837
C EB	8051002	58	582	6263	4140	95	364530	82033
			17767				7142743	1946613

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WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
OPERATIONAL LOAD	9000000			
CREW MEMBERS	901000052		39000	19
			39000	
ENGINE OIL	9020000			
ENGINE OIL USABLE	9020001		88166	1
ENGINE OIL TRAPPED ENG	9020002		17736	2
ENGINE OIL TRAPPED D B	902000356		19258	
ENGINE OIL TRAPPED E B	902000458		9095	9
			13423	
OXYGEN CHARGE	9040000			
OXYGEN CHARGE F F	904000152		722	0
OXYGEN CHARGE C F	904000254		12672	6
			1339	
100 ENGINE FIRE EXT FLUID	9060000		25007	1
			2500	
RESIDUAL FUEL	9070000			
RESIDUAL FUEL C F	907000154		46803	9
RESIDUAL FUEL I W	907000262		171605	9
			21840	
WATER FOR AIR CONDITIONING	910000054		12500	2
UNUSABLE WATER FOR AIRCOND	910000154		1500	2
			14000	