QC
Avro
C-105
7-0400-44
Iss. 11

QCX
Avro
CF105
R-7-0400-44
Iss-11

FILE IN VAULT

C-105 MK 1 Report # 7-0400-44
1st A/C Issue 11

SECRET

UNCLASSIFIED
NON-CLASSIFIE

WEIGHT & C.G. SUMMARY

N.A.E. Nov. 1/57

SECRET

UNCLASSIFIED
NON-CLASSIFIE

AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

UNCLASSIFIED
NON CLASSIFIE

Ref. 3398/11/J
Date November 1st, 1957
To See Distribution
From Mr. E.F. Burnett
Subject ARROW MK 1 WEIGHT & C.G. SUMMARY - REPORT # 7-0400-44 Issue 11.

Attached is a copy of Weight and C.G. Summary, Report # 7-0400-44 Issue 11, dated November 1st, 1957 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

To: Messrs.

J. C. Floyd	D. Hayward
R. N. Lindley	H. Shoji
F. P. Mitchell	G. Hake
J. A. Chamberlin	A. Buley
R. Marshall	R. Nash
W. Czerwinski	N. Ring
A. Cornish	D. Moore
F. Brame	D. Scard
S. Kwiatkowski	K. Wreghitt
J. Lucas	D. Wade
J. Hodge	R. Cairns
C. Marshall	J. Zurakowski
E. Burnett	J. Ames
K. Griffin	J. Booth
B, Alford	G. Eves
H. Lee	E. Kosko
R. Vale	A. D. Crust (5)

National Research Council
NOV 12 1957
Aeronautical Library

50244

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

UNCLASSIFIED
NON CLASSIFIE

I N D E X

Sheet #	Content
1-1 to 1-4	Introductory notes and explanations of Weight Changes.
2-1 to 2-2	Weight & C.G. Summaries
3-1	Horizontal C.G. Envelopes for Flight conditions with fuel proportioners used.
4-1 to 4-15	I.B.M. Detail Sheets of Weights & C.G.'s.

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

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

UNCLASSIFIED
NON CLASSIFIE

INTRODUCTION & WEIGHT CHANGES

The following is a Weight & C.G. Summary for the 1st C-105 Aircraft, with J75 P3 Engines, based on the latest information currently available. All weight & C.G. changes are relative to Issue 10 of October 1st, 1957.

Note: 1) This Summary does not apply for the 2nd and subsequent MK 1 Aircraft see context below.

2) The statement herein is for the 1st Aircraft complete to drawings and not necessarily in the condition for first flight. 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.

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

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 & subsequent MK 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 A/C's Nos. 1 to 3 differing from those for A/C's No. 4 and 5 (which are to be used for Astra 1 Trial Installations.).

A relatively detailed estimate of other proposed Flight Test Installations throughout the aircraft has been made. These installations amount to 1,398 lb (figure partially confirmed by actual weights of cable assys.)

c) Emergency lowering for the Undercarriages and additional fire protection, to be installed in the 1st Aircraft, are allowed for in the summary. There is no provision to jettison any or all of the Instrument Package in an emergency.

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) 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.

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.

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

S E C R E T
Report # 7-0400-44 Iss. 11
Sheet # 1-2

UNCLASSIFIED
NON CLASSIFIE

INTRODUCTION & WEIGHT CHANGES

GENERAL:

f) (Continued)

The following weight penalities 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) 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 manfacturer'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 the percentage of actual weight recorded within the report.

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

Structure	-	74.91%
Undercarriage	-	97.86%
Power Plant	-	92.71%
Flying Controls	-	47.59%
Equipment	-	23.39%

i.e. 70.11% of the Basic Weight of the 1st Aircraft.

h) 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 first flight the aft restriction is 30% M.A.C., this may be achieved by installing maximum ballast.

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

1. STRUCTURE — WEIGHT (lb)

a) Wings:

Dorsal Fairing - Actual weight of fibreglass fairing	+	4.04
Weight Increase Wings	+	4.04

b) Fin and Rudder:

No Weight Change.

UNCLASSIFIED
NON CLASSIFIE

INTRODUCTION & WEIGHT CHANGES

1. STRUCTURE (Cont'd.) — WEIGHT (lb)

c) Fuselage Fwd. Sta. 255"

Nose Structure Fwd: 120" - delete de-icing tank and filler radome de-icing no longer a requirement	-	2.66
Skin F.F. - General production drawing revisions	+	1.05
Weight Decrease Front Fuselage	-	1.61

d) Centre Fuselage Sta. 255"-485"

Radar Access Door - alterations to removable panel	+	0.30
Pack Mounting Structure - modifications to Beam Sta. 292 to accommodate Ram Air Turbine installation	+	0.72
Electonics Bay Structure - delete L.H. Access Door for Ram Air Turbine	-	5.82
delete L.H. cover panel for Ram Air Turbine	-	3.92
Structure for Ram Air Turbine - no allowances were previously made for the extensive provisions for the Ram Air Turbine (Net Structural change = 40.74 - 3.92 -5.82 + .72 = 31.72 lb)	+	40.74
Weight Increase Centre Fuselage	+	32.02

e) Duct Bay Sta. 485"-591.65"

No Weight Change

f) Engine Bay Sta. 591.65"to 742.5"

Outer Skins E.B. - Alterations to hardware 'call-up"	+	1.52
Heavy Formers - miscellaneous production drawing changes	+	1.65
Actual weights of parts	+	1.43
Weight Increase Engine Bay	+	4.60

g) Rear Fuselage Sta. 742.5 Aft.

Tailcones - Actual weight obtained - considerable steel packing used on asembly also tolerances on such low gauges often account for high percentage weight deviation	+	15.24
Weight Increase Rear Fuselage	+	15.24

h) Fuselage 'Marry-Up'

No Weight Change

TOTAL STRUCTURAL INCREASE	+	54.29

UNCLASSIFIED
NON CLASSIFIE

Date: November 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st A/C

INTRODUCTION & WEIGH CHANGES

2. LANDING GEAR	WEIGHT (lb)
Main U/C Doors - Actual weights of Doors	- 10.34
Actual weights of Fairings	+ 0.80
TOTAL LANDING GEAR DECREASE	- 9.54

3. POWER PLANT & SERVICES

No Weight Change

4. FLYING CONTROLS GROUP

No Weight Change

5. EQUIPMENT GROUP

Radome De-icing - this no longer a basic requirement	- 8.88
Electrics F.F. - addition of E49 panel for Ram Air Turbine and capacitor mounting for Air Conditioning	+ 3.38
Electrics C.F - addition of E50 Air Conditioning Panel	+ 2.37
Utility Hydraulics E.B. - alterations to piping routes etc.	+ 1.13
Ram Air Turbine - estimated to installation drawings with manufacturer's weights of equipment, previously only an allowance made	+ 15.41
Damping System - production drawing estimates of installations	+ 3.09
Cable allowance deleted now fully detailed with Radar System below	- 43.14
Interim Radio & Radar - addition of cables for M.H.64 Damping System - see above	+ 81.07
Miscellaneous equipment and mounting detail changes	+ 11.56
Doppler not available	- 100.00
Flight Test Installations - production drawing estimates of installations on Engines	- 6.68
Addition of Flight Test Damping System wiring etc.	+ 57.02
addition of Flight Test Power System wiring etc.	+ 24.00
Ejector Seats - The redesigned Martin-Baker seat was weighed and the weight agreed with manufacturer's quotation.. Redesign of installation and emergency O_2 System	- 0.36
Crew's personal parachutes are packed in the seat and remain with the seat, consequently they have been removed from Operational Load and included with Equipment Group. Parachute allowance was 20 lb each now actual weight of 27.5 lb each	+ 55.00
TOTAL EQUIPMENT GROUP INCREASE	+ 94.97

Date: November 1st, 1957
Aircraft: C-105 MK 1 with
J75 P3 Engines
1st A/C

S E C R E T
Report # 7-0400-44 Iss. 11
Sheet # 2-1

UNCLASSIFIED
NON CLASSIFIE

WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb	H. ARM ins.	V. ARM ins.
STRUCTURE	18,585.79	561.67	137.48
Wings	9,963.50	642.82	142.26
Fin & Rudder	1,025.85	754.34	209.31
Fuselage Fwd. Sta. 255"	2,628.42	181.75	128.18
Sta. 255"-485"	1,682.14	377.80	130.20
Sta. 485"-591.65"	998.59	534.01	104.59
Sta. 591.65"-742.5"	1,433.13	661.00	107.31
Sta. 742.5" Aft.	801.58	801.04	129.05
"Marry-Up"	52.58	468.91	103.89
UNDERCARRIAGE - Retracted -	2,600.31	488.39	134.91
Main Undercarriages	1,959.62	539.48	141.00
Main U/C Doors & Fairings	282.34	537.60	138.37
Nose Undercarriage	333.81	170.81	99.70
Nose U/C Door & Fairing	24.54	162.24	88.23
POWER PLANT & SERVICES	14,365.59	652.98	120.35
Engines & 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 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	893.00	536.67	136.12
FLYING CONTROLS GROUP	1,857.18	686.26	139.66
Mechanical Flying Controls	949.04	687.85	148.43
Hydraulic Flying Controls	908.14	684.60	130.50
EQUIPMENT FIXED AND REMOVABLE	9,507.18	404.46	113.31
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	223.59	253.72	156.43
Air Conditioning System	812.41	335.87	134.32
Surface Finish	100.00	591.52	140.20
Hydraulics Main System	639.97	504.37	117.71
Cabin Insulation	14.31	187.48	132.00
Brake Parachute	90.78	786.65	143.16
Electrical System	1,118.98	417.54	112.96
Low Pressure Pneumatics	54.39	432.79	129.22
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
MK 64 Damping System	99.08	450.83	140.34
Interim Radio & Radar	635.61	338.85	124.03
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation 1st A/C	3,036.00	395.45	95.00
Flight Test Installations	1,398.43	491.44	129.55
Additional Fire Protection 1st A/C	154.17	425.05	102.89

continued.

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

SECRET
Report # 7-0400-44 Iss. 11
Sheet # 2-2

UNCLASSIFIED
NON CLASSIFIE

WEIGHT & C.G. SUMMARY

DESCRIPTION	WEIGHT lb	H. ARM ins.	V. ARM ins.	M.A.C. %
Equipment (Fixed & Removable)(Continued)				
Emergency Landing Gear Lowering	12.91	458.83	128.60	
Ram Air Turbine Equipment	90.41	336.64	104.73	
AIRCRAFT BASIC WEIGHT	46,916.05	558.64	127.28	
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	984.00	86.81	116.50	
U/C Up		545.50	127.16	30.25
Operational Weight Empty	48,821.07			
U/C Down		547.50	123.84	30.80
Maximum Internal Fuel (2,544 gal @ 7.8 lb/gal.)	19,843.00	538.88	144.32	
U/C Up		543.59	132.12	29.72
A.U.W. Maximum Internal Fuel	68,664.07			
U/C Down		545.02	129.76	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 681 lb on the Shear Panel.

REPORT NO: 7-0400-44-11

BY: Kathleen Griffin

DATE: Nov 1st 1957

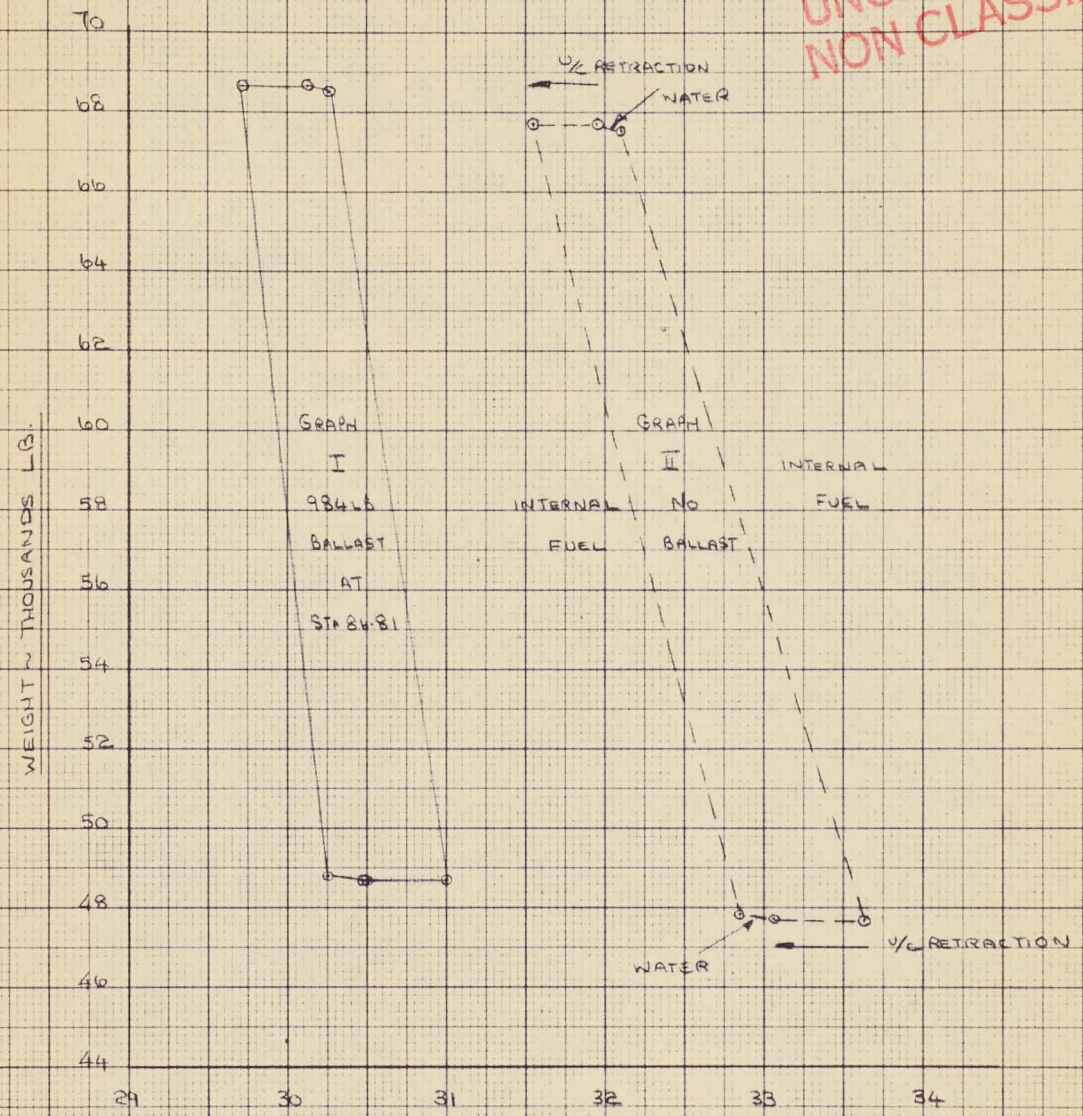
SHEET: 3

HORIZONTAL C.G. ENVELOPE

C105 MK I A/C ~ NORMAL FLIGHT CONDITION

FOR 1ST A/C (1ST FLIGHT DIFFERS)

FUEL SYSTEM PROPORTIONERS USED



UNCLASSIFIED
NON CLASSIFIE

G9-12
10 X 10 TO THE ½ INCH
MADE IN CANADA

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT G-105 MK 1, 1st A/C

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	TOTAL WING GROUP	1000000			
	OUTER WING	1010000			
100	OUTER WING SKINS	101000164		929107	0
100	POSTS AND INTERCOSTALS	101000264		24367	3
100	OUTER WING SPARS	101000364		392587	0
100	OUTER WING RIBS	101000464		134566	9
98	AILERON CONTROL BOX	101000664		375307	7
100	RIB 12	101000764		76266	4
100	O W AILERON JACK FITTING	101000964		10467	2
	AILERON JOINTS AND FAIRING	1010010		32937	8
	BUZZ DAMP STRUC PROV O W	101001164		8007	5
				198355	
	AILERON	1020000			
100	AILERON STRUCTURE	102000174		33600	7 9
				33600	
97	ELEVATOR	103000082		44900	7 5
97	ELEVATOR MARRY UP	1030000		1597	7 3
				46497	
	INNER WING	1040000			
96	MAIN U C STRUCTURE	104000162		3307	1 5 7
100	FRONT SPAR I W	104000262		1111	0 4 8
100	MAIN SPAR I W	104000362		1510	6 5 6
100	FWD CENTRE SPAR I W	104000462		536	4 6 0
100	AFT CENTRE SPAR I W	104000562		366	6 6 5
100	REAR SPAR I W	104000662		766	7 7 0
94	I W STRUCTURE F S TO M S	104000762		10591	8 4 9
100	STRUCTURE MS TO R S	104000862		1497	9 6 0
100	STRUCTURE AFT OF REAR SPAR	104000962		3221	2 7 1
40	ELEVATOR CONTROL BOX	104001062		428	3 8 7 2
25	TRANSP JOINT MARRY UP	10400 11		706	5 6 3
100	INNER WING JOINTS	104001262		634	7 1 6 6
100	SKINS M S TO R S	104001362		2190	3 8 6 2
100	STRUT PICK UP FITTINGS	104001462		539	1 5 6
100	RIBS 1 TO 9 INNER WING	104001662		512	0 4 6 1
74	DORSAL FAIRING I W	104001762			9 5 4 8
100	RIB 10	104001862		108	0 0 6 3
77	FUSELAGE HINGE JOINT	104001962		126	2 8 6 1
65	TRANSPORT JOINT O W TO I W	104002062		129	4 2 6 3
49	FUSELAGE HINGE JOINT	10400 21		37	4 0 5 2
	BUZZ DAMP STRUC PROV I W	104002262		5	5 2 7 4
74	DORSAL FAIRING C A	10400 23		60	3 3 5 7
				6648	9 0

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL C COMPONEN

PROJECT

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
100 LEADING EDGE I W	105000062		22138	46
			22138	
LEADING EDGE O W	106000065		30870	63
			30870	

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	TOTAL FUSELAGE GROUP	3000000			
	FUSELAGE BASIC STRUCTURE	3010000			
	RADOME	3010001	51	17728	
100	RADAR NOSE ACCESS DOORS	3010002	51	8008	
	NOSE STRUCTURE FWD STA 120	3010003	51	12188	
	SKIN F F	3010004	52	11054	1
88	SKIN C F	3010005	54	21182	3
	SKIN D B	3010006	56	5880	5
3	SKIN E B	3010007	58	17725	6
4	FORMERS F F	3010011	52	10531	1
100	FORMERS C F	3010012	54	27824	3
	FORMER D B	3010013	56	7457	5
	LIGHT FORMERS E B	3010014	58	13501	6
72	HEAVY FORMERS E B	3010015	58	21890	6
	LOWER LONGERONS F F	3010016	52	6846	1
	LONGITUDINAL MEMBERS E B	3010017	58	1106	7
75	LOWER LONGERON E B	3010018	58	6842	6
	TOP LONGERONS E B	3010019	58	638	6
	LOWER SHEAR PANEL	3010020	52	2988	2
	TOP WING LONGERONS D B	3010021	56	498	5
	LONGERONS C F	3010022	52	532	5
	LONGERONS C F	3010023	54	13813	4
43	LONGERONS F D B	3010024	54	1258	4
43	LONGERONS A D B	3010025	56	8655	5
	ELECTRONICS BAY STRUCTURE	3010026	54	2596	2
59	LONGITUDINAL BEAMS D B	3010027	56	6570	5
	RADAR ACCESS DOORS C F	3010028	54	2138	2
72	MAIN FRAME AT STN 538 77	3010029	56	5980	5
	DIVE BRAKE ACCOM STRUCTURE	3010030	56	3634	5
30	TOP LONGERONS F F	3010031	52	18649	1
100	DUCT C F	3010032	54	33286	3
97	DUCT D B	3010033	56	31633	5
22	CANOPY ARCHES	3010034	52	8461	2
4	ACCESS PANEL STIFFNERS	3010036	56	3865	5
66	NOSE U C SUPPORT STRUCTURE	3010037	52	3343	2
3	CREW BULKHEADS	3010038	52	12272	2
51	EQUIPMENT BAY STRUCTURE	3010039	54	6150	2
86	WINDSCREEN	3010041	52	13003	1
33	SERVICE ACCESS DOORS	3010042	58	6704	6
	TORSION BOX E B	3010043	58	6042	6
	DORSAL FAIRING AIR OUTLET	3010044	54	2061	2
66	INTERMEDIATE FORMERS	3010045	58	5154	6
	ENGINE ACCESS DOORS	3010046	58	14659	6
	SEALING MISSILE BAY	3010047	54	697	3
100	MISCELLANEOUS ITEM C F	3010048	54	392	3
98	ARMAMENT BAY ROOF	3010049	54	13216	3
	BULKHEAD AT STA 120	3010050	52	3060	1
	BULKHEAD AT STA 255	3010051	52	10429	2
100	BULKHEAD AT STA 485	3010052	54	11245	4
13	ENGINE TUNNEL	3010054	58	47572	6

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	INTEGRAL FUS FUEL TANK	3010055	54	20359	39
	COCKPIT FLOOR	3010056	52	5904	17
	CENTRE BEAM 697 28 717 36	3010059	58	557	71
	DORSAL OVER FUEL TANK	3010061	54	5097	41
	SHIELD EXHAUST DEFLECTOR	3010062	54	1965	33
	SHEAR PANEL BELOW NAV ARCH	3010063	52	2074	25
33	PACK MOUNTING STRUCTURE	3010064	54	2119	29
88	ENG ACCESS DOORS R F	3010065	59	8457	77
99	TUNNEL FIXED R F	3010066	59	10403	77
100	SKIN AND STIFFENERS R F	3010067	59	5122	77
100	FAIRING UNDER RUDDER R F	3010068	59	2616	78
100	FORMERS FIXED R F	3010069	59	9001	77
100	LONGERONS C BEAM FIXED R F	3010070	59	2799	77
100	TAILCONES	3010071	59	3000	82
100	CNTR STRUC STING REMOV R F	3010072	59	1176	83
	MISCELLANEOUS ITEMS E B	3010073	58	923	66
	MTG BRKTS SIDE PANEL D B	3010075	56	213	52
	FORMERS LOWER PANEL D B	3010076	56	760	54
	LOWER PANEL D B	3010077	56	505	45
	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		443	74
	MISC STRUCTURE F F	3010086	52	552	18
	STRUCT REQUIRM FOR R A T	3010090	54	407	42
				632389	
96	DIVE BRAKES	3020000	72	11150	50
96	DIVE BRAKES C A	3020001		406	48
				11556	
	AIR INTAKES	3030000			
18	AIR INTAKES	3030100	55	7624	8 21
				76248	
	PILOTS AND NAVIG CANOPIES	3040000			
76	PILOTS CANOPY	3040100	53	2415	4 17
				24154	
100	NAVIGATORS CANOPY	3040200	53	1529	7 23
				15297	

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL G COMPONEN

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	UNDERCARRIAGE UP POSITION	4000000			
	MAIN UNDERCARRIAGE GROUP	4010000			
100	MAIN UNDERCARRIAGE	401010092		1959 62	53
				1959 62	
89	MAIN U C DOORS FAIRINGS	401020062		282 34	53
				282 34	
	NOSE UNDERCARRIAGE GROUP	4020000			
100	NOSE UNDERCARRIAGE	402010091		333 81	17
				333 81	
	NOSE U C DOOR AND FAIRING	402020052		245	16
				245 4	

IGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

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		2454	16224	8823	398137	216516
			2454			398137	216516

UNCLASSIFIED
NON CLASSIFIE

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT
23 FUEL SYSTEM C F	5080001	54	134744
27 FUEL SYSTEM D B	5080002	56	168575
17 FUEL SYSTEM E B	5080003	58	35926
49 FUEL SYSTEM I W	5080004	62	539975
FUEL SYSTEM ENG	5080005		6266
FUEL SYSTEM C A	5080006		7546
			89300

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
5080001	54	13474	40781	14045	5494832	1892423
5080002	56	16857	53575	11233	9031138	1893547
5080003	58	3592	66531	12549	2389794	450760
5080004	62	53997	55804	14420	30132486	7786367
5080005		6266	5901	9594	412540	60058
5080006		754	61525	9658	463899	72821
		89300			47924689	12155976

UNCLASSIFIED
NON CLASSIFIE

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

UNCLASSIFIED
NON CLASSIFIE

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	6000000						
	6010000						
F	601000152		87591580	7115543		1384535	1011051
F	601000254		8853392	0115526		300192	102005
B	601000356		3504869	9118880		170447	41580
IN	601000583		12626788	03221773		99496667	27995563
W	601000662		41202717	39143350		29557903	59124287
W	601000764		30436770	75135561		23458547	41274226
A	6010008		6467098	2143338		458544	92623
			94904			65279835	14086735
ULICS	6020000						
S D B	602000156		2391573	95 9691		1372314	231712
S E B	602000258		4362965	3871 10067		28527694	4828421
S R F	602000359		48758	75 10824		36420	5196
T I W	602000462		2729470	3581 4721		19203513	4017950
T O W	602000564		1193074	0561 3580		8834881	1620094
	602000683		552275	9962 0784		4196499	1147692
			90814			62171321	11851065

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL C COMPONEN

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H.
	FIXED EQUIPDENT GROUP	7000000			
	INSTRUMENTS	7010000			
	INSTRUMENTS F F	701000152		440716	
	NAVIG TABLE AND STOWAGE	701000452		20022	
				4607	
	COCKPIT PRESSURE SEALING	702000052		50018	
				500	
	OXYGEN SYSTEM	7030000			
	OXYGEN SYSTEM	703000152		235925	
				2359	
	AIR CONDITIONING SYSTEM	7040000			
54	AIR CONDITIONING F F	704000152		354917	
54	AIR CONDITIONING C F	704000254		4721229	
54	AIR CONDITIONING D B	704000356		114851	
54	AIR CONDITIONING C A	7040005		2736339	
54	AIR CONDITIONING ENG	7040006		188964	
54	AIR CONDITIONING I W	704000762		8051	
				81241	
	HYDRAULICS MAIN SYSTEM	7050000			
32	UTILITY HYDRAULICS F F	705000152		841820	
31	UTILITY HYDRAULICS C F	705000254		427243	
20	UTILITY HYDRAULICS D B	705000356		2733855	
66	UTILUTY HYDRAULICS E B	705000458		735360	
23	UTILITY HYDRAULICS I W	705000562		1331155	
32	UTILITY HYDR NOSE U C	705000691		32519	
23	UTILITY HYDR MAIN U C	705000792		298054	
28	EMERGENCY LOWERING M U C	705000862		85358	
35	EMERGENCY LOWERING N U C	705000952		43821	
				6528 8	
1	RAM AIR TURB EMERG POWER	706000054		904133	
				9041	
	CABIN INSULATION	707000052		143118	
				1431	

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL COMPONE

PROJECT_____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H
	BRAKE PARACHUTE	7080000			
	BRAKE PARACHUTE F F	7080001	52	455	16
	BRAKE PARACHUTE R F	7080005	59	8499	82
	BRAKE PARACHUTE I W	7080006	62	124	62
				9078	
	ELECTRICAL SYSTEM	7090000			
33	ELECTRICAL WIRING R N	7090001	51	129	9
33	ELECTRICAL WIRING F F	7090002	52	2966	19
33	ELECTRICAL WIRING C F	7090003	54	1304	41
33	ELECTRICAL WIRING A I	7090004	55	1274	21
33	ELECTRICAL WIRING D B	7090005	56	6515	53
33	ELECTRICAL WIRING E B	7090006	58	64	59
33	ELECTRICAL WIRING I W	7090008	62	8909	54
33	ELECTRICAL WIRING FIN	7090009	83	352	79
33	ELECTRICAL WIRING NUC	7090010	91	330	18
33	ELECTRICAL WIRING ENG	7090011		2002	58
33	ELECTRICAL WIRING C A	7090012		13746	33
58	ELECTRICS F F	7090013	52	15586	15
26	ELECTRICS C F	7090014	54	7596	44
85	ELECTRICS E B	7090015	58	670	67
85	ELECTRICS ENG	7090016		11632	56
85	ELECTRICS C A	7090017		718	61
	ELECTRICS FIN	7090018	83	83	89
	ELECTRICS I W	7090019	62	2336	62
	ELECTRICS CAW	7090020		112	62
	ELECTRICS MUC	7090021	92	74	51
19	ELECTRICS A I	7090022	55	5303	22
93	ELECTRICS D B	7090023	56	27132	51
	ELECTRICS R F	7090024	59	136	80
	WINDSCREEN DEMISTING	7090025	52	2929	19
				11198	
	L P PNEUMATICS	7100000			
26	L P PNEUMATICS F F	7100001	52	2060	19
18	L P PNEUMATICS C F	7100002	54	671	33
	L P PNEUMATICS D B	7100003	56	418	55
	L P PNEUMATICS E B	7100004	58	1526	65
	L P PNEUMATICS FIN	7100005	83	640	75
	L P PNEUMATICS R N	7100006	51	124	7
				5439	
	INTAKE DEICING	7120000	55	5184	19
				5184	
5	RADIO RADAR INT SYST R N	7150001	51	2244	10

IGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

UNCLASSIFIED
NON CLASSIFIE

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
ROUP	8000000						
	8010100	52	33906	20443	13410	6931404	4546795
			33906			6931404	4546795
	8020000						
	8030000						
	8030101	52	78417	2011	2047	134856	94448
	8030102	54	2303	3221	3109	741865	252155
	8030103	58	369	3242	1343	233363	49564
	8030104	62	6070	5278	1157	3203807	954204
	8030105	64	95	7485	5140	71112	13300
	8030106	51	287	7350	9340	21095	26806
			9908			4406098	1390477
	8050800	54	6868	3858	1 9468	2649743	6502622
			68680			26497431	65026 22
	8050900	54	3036	3954	5 9500	120058620	28842000
			303600			120058620	28842000
C CF	8051000	54	1402	4095	6 9982	5745717	1400375
C DB	8051001	56	806	5494	0 12883	442816	103837
C EB	8051002	58	582	6263	4 14095	364530	82033
			15417			6553063	1586245

EIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

UNCLASSIFIED
NON CLASSIFIE

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	9000000						
	90100000	52	39000	19400	13650	7566000	5323500
			39000			7566000	5323500
	9020000						
	90200001		881661246	12186		5399447	1074318
G	90200002		17736267	6116	40	11112245	206377
B	902000356		192558084	9555		11118117	183934
B	902000458		90959928	9704		544746	88209
			13423			81735555	1552838
	9040000						
	904000152		7220493	13200		14755	9504
	904000254		126726280	16150		332968	204621
			1339			347723	214125
	9060000		2500730	00129	00	1825000	322500
			2500			1825000	322500
	9070000						
	907000154		46803942	4123	00	1845043	575640
	907000262		171605975	5137	05	10253958	2351778
			21840			12099001	2927418
ONING	910000054		12500	26800	13200	3350000	1650000
RCOND	910000154		1500	26700	12700	400500	190500
			14000			3750500	1840500