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UNCLASSIFIED
Approved by Authority of AVRS Report: 7-0400-64
A/C 25202 & 25203 Issue 23
Date 23 Sept
Signature WEIGHT & C.G. SUMMARY B. Bully
Unclassified Document AVRS
SECRET 1 July/58

SECRET

ANALYZED

AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

Ref: 1667/11/J
Date: 1 July, 1958
To: See Distribution
From: E.F. Burnett - Weight Supervisor
Subject: Arrow 1 A/C 25202 & 25203 - Weight and C.G. Summary Report: 7-0400-64
Issue 3

Classification cancelled / Changed to UNCLASS

By authority of AVES

Date 28 Sept 56

Signature EFB

Unit / Rank / Appointment AVES 5

Attached is a copy of Weight and C.G. Summary Report 7-0400-64
Issue 3 dated July 1, 1958, for your retention.

This report concludes the Monthly Weight Reports for these
aircraft and all future weight reporting will be done on the
standard "Weight Statement for Flight Testing", form as
established for Arrow 25201.

E.F. Burnett
E.F. Burnett

EFB/ag

cc: Messrs.	J.C. Floyd	J.P. Booth	J. Zurakowski
	R.N. Lindley	F. Brame	A.J. Crust
	C.V. Lindow	W. Czerwinski	(6 copies for
	J.W. Ames	J. Lucas	R.C.A.F.)
	B.C. Alford	S. Kwiatkowski	D. Inglis
	D. Wade	A. Cornish	D. Moore
	D.N. Scard	T. Roberts	R.B. Cairns
	R. Marshall	C. Marshall	D. Brownridge



125-14917

56473

S E C R E T

Aircraft: Arrow 1
A/C 25202 & 25203
Date: 1 July, 1958

Report: 7-0400-64
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I N D E X

Sheet	Content
1-1 to 1-4	Introductory notes and explanations of Weight changes.
2-1 to 2-3	Weight and C.G. Summary
3	Horizontal C.G. Envelopes for Flight conditions with fuel proportioners used.
4-1 to 4-15	I.B.M. Detail sheets of Weight and C.G.s.

N.B.

Work has been cancelled on the fuel C.G. management system for Arrow 1 aircraft due to the satisfactory functioning of the proportioners.

S E C R E T

Aircraft: Arrow 1
A/C 25202 & 25203
Date: 1 July, 1958

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Sheet : 1-1

Introduction & Weight Changes

The following is a weight and C.G. summary for the second and third Arrow 1 Aircraft Nos. 25202 and 25203, with J75P5 Engines, based on the latest information available. All weight and C.G. changes are quoted relative to 7-0400-64 Issue 2 of June 1st, 1958.

NOTE:

- 1) This issue of report 7-0400-64 now closes the monthly weight reports on A/C 25202 & 25203. In future these Aircraft will be covered by Weight Statements for Flight Testing.
- 2) Neither a dry nor a drained weighing has yet been obtained for Aircraft No. 25202. Based on the good agreement shown between estimated and actual weights of A/C 25201 it is felt that this summary is completely representative of the subject aircraft within $\pm 0.30\%$.
- 3) This summary will not apply for A/C 25204 and 25205 which are to be used for full Astra I Trial Installations. Reference Weights Report #7-0400-63 Issue 2.
- 4) After Phase I of the flight test programme A/C 25203 will be fitted with a weapons pack trial installation, in lieu of the instrumentation package installed here.
- 5) In this summary the aircraft is ballasted such that the aft C.G. shall not exceed 31% M.A.C. - which is the theoretical aft limit.

General:-

- a) Pratt and Whitney J75 P5 Engines comprise the Power Plant for A/C's 25202 and 25203. (5850 lb each, Pratt and Whitneys latest brochure weight with their installation kit, confirmed by P & W actual weight recorded in engine inspection records).
- b) The Instrument Package containing Flight Instrumentation is installed. The Packages for A/C's 25201 to 25203 differ from those for A/C's 25204 and 25205.

The weight recorded here is Flight Test Department's estimate of cable and instruments; An actual weight will be obtained as soon as a complete pack is available.

For early flights the package will not have complete instrumentation, but ballast will be installed to exactly simulate the completed weight and C.G.

A relatively detailed estimate of other proposed Flight Test Installations throughout the Aircraft has been made. These installations amount to 1457 lb (figure partially confirmed by actual weights of some cable assys).

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Aircraft: Arrow 1
A/C 25202 & 25203
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General:- Cont'd

- c) In A/C 25201 Emergency Fire Protection, landing gear lowering etc. were installed. These are no longer necessary in A/C's 25202 and 25203 and have been deleted from the weight records.
- d) An Interim Radio & Radar System with Minneapolis-Honeywell MH64 Damping System is installed. Currently there is no Doppler or Tacan installation, though space provision for future installation of Doppler, which is not yet available, is made.
- e) The Mk 1A Tailcones and Stinger are fitted. Possibly these may not be available for first flights of A/C 25202, however, they will be retrofit as soon as available.
- f) On A/C 25202, the set of control surfaces modified structurally for "buzz damper" installation are fitted. The control boxes are already modified for all Mk 1 A/C. If it is decided to fit a trial installation of the "buzz damper" system there will be the following additional wt to A/C 25202.....

Buzz Damping Equipment +124lb

This weight report incorporates the modified surfaces as on A/C 25202, however, if A/C 25203 does not have a "buzz damper" installation then the following changes ensue:-

Elevators	- 11.07 lb/A/C
Ailerons	- 11.68 lb/A/C
Rudder	- 8.78 lb
	- 31.53 lb

When the split control surfaces are introduced this will entail a further weight increase, however, details of these amendments to the design are not yet available.

- g) Due to material substitutions and concessions introduced by Planning and Production Departments, there is a structural weight penalty of 72 lb approx. 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. Major repair schemes e.g. cracked outer skin on Air Intakes have been assessed and recorded.
- h) Preceding 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. (See also note 2) on sht. 1-1).
- 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.
- k) No further work is being proceeded with in the fuel management system for Arrow I Aircraft. The fuel proportioners are functioning satisfactorily and it is not considered necessary to fit the fuel sequencing system.

Aircraft: Arrow 1
A/C 25202 & 25203
Date: 1 July, 1958

S E C R E T

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<u>1. Structure</u>	<u>Weight lb</u>
a) <u>Wings</u>	
I/W Struct. F/S to M/Spar - Additional stiffening elements in U/C Bay	+ 4.75
b) <u>Fin & Rudder</u>	
No weight change	
c) <u>Fuselage Complete</u>	
No weight change	
<u>Total Structural Increase</u>	+ 4.75
 2. <u>Landing Gear</u>	
No Weight Change	
 3. <u>Power Plant & Services</u>	
No weight change	
 4. <u>Flying Controls Group</u>	
Mechanical F/Controls - redesign of elevator quadrant with one bob weight etc	- 2.89
Misc. changes throughout system	+ 3.71
<u>Total Flying Controls Increase</u>	+ 0.82
 5. <u>Equipment Group</u>	
Undercarriage Door Sequencing - an electrical system for operating the nose U/C door is already installed, now a mechanical system is to be introduced to close the main U/C Doors with wheels extended	+ 33.30
<u>Total Equipment Group Increase</u>	+ 33.30

S E C R E T

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6. Trapped Fuel

Weight lb

This is defined as part of the Aircraft basic weight - aircraft 25201 was weighed firstly dry and then in the drained condition, thus establishing a weight of fuel trapped within the system

* + 372.00

Total Trapped Fuel

+ 372.00

7. Operational Load

Residual Fuel - this is the fuel that is drainable, but unusable, the figure has also been established experimentally. Previously this report contained both trapped and residual fuel, which were theoretically underestimated

+ 66.60

*

Total Operational Load Increase

+ 66.60

N.B. * These have not influenced the Gross Weight of the Aircraft, see also not following Wt. and C.G. Summary Sht. 2-2.

Summary

Weight Change - Aircraft Basic Weight

Structure	+ 4.75
Flying Controls	+ 0.82
Equipment	+ 33.30
Trapped Fuel	+ 372.00
	<u>+ 410.87</u>

Weight Change - Operational Load

Residual Fuel + 66.60

Weight Change - Operational Weight Empty (A/C Less usable Fuel)

UNBALLASTED Condition

Issue 2

Issue 3

47,591.68

48,069.15

+ 477.47 lb

S E C R E T

Aircraft: Arrow 1
A/C 25202 & 25203
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Description	Weight lb	H. Arm ins	V. Arm ins
Structure	18,797.46	563.30	137.45
Wings	10,007.76	643.06	142.24
Fin & Rudder	1,034.63	754.84	209.36
Fuselage - Fwd Sta. 255 ins	2,669.92	181.78	128.17
Sta 255 - 485 ins	1,670.36	380.23	130.70
Sta 485 - 591.65 ins	1,010.63	533.81	104.49
Sta 591.65 ins - 742.5 ins	1,437.47	660.98	107.30
Sta 742.5 ins aft	912.38	807.53	128.96
"Marry-Up"	54.31	462.81	104.25
Landing Gear - Retracted	2,661.39	488.88	135.01
Main Landing Gear	2,018.57	538.99	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	26.67	161.77	88.25
Power Plant & Services	13,770.66	652.46	120.35
Engines & Accessories J75P5	11,913.81	665.32	119.78
Gear Box & Drives on Fus.	276.70	603.71	103.24
Gear Box & Starters on Engines	286.80	589.18	105.54
Engine Controls	33.35	375.79	118.49
Engine Nose Bullets	75.61	562.69	115.11
Fire Extinguishing System	65.53	700.45	134.21
Engine Mountings	206.21	635.04	127.71
Fuel System	912.65	537.27	135.48
Flying Controls Group	2,007.99	652.17	137.19
Mechanical Flying Controls	953.45	675.98	147.72
Hydraulic Flying Controls	1,054.54	630.64	127.67
Equipment - Fixed & Removable	9,472.03	403.28	113.61
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	342.94	204.50	134.11
Oxygen System	22.40	252.82	156.03
Air Conditioning System	822.07	339.45	134.46
Surface Finish	100.00	591.52	140.20
Cockpit Insulation	14.31	187.48	132.00
Drag Chute	90.99	786.18	143.17
Low Pressure Pneumatics	54.65	433.30	129.37
Electrical System	1,126.18	415.86	112.91
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	65.86	222.01	154.36
Console Panels	17.45	174.76	124.34
MH64 Damping	99.08	450.83	140.34
Interim Radio & Radar	648.68	342.30	124.04

S E C R E T

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Description	Weight lb	H. Arm ins	V Arm ins	% MAC
Equipment - Fixed & Removable Cond'd				
Hydraulics Utilities System	654.93	503.19	117.65	
U/C Doors - Sequencing	66.89	345.66	116.36	
Instrument Pack Structure	686.80	385.81	94.68	
Pack Instrumentation	3,048.00	394.00	95.00	
Flight Test Installations	1,456.73	488.48	128.90	
Trapped Fuel	372.00	560.00	136.00	
Aircraft Basic Weight	47,081.53	556.74	127.49	
U/C Up				
U/C Down		558.89	123.94	
Useful Load (Less usable Fuel)	987.62	380.34	133.04	
Crew	390.00	194.00	136.50	
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	
Fire Extinguisher Fluid	25.00	730.00	129.00	
Residual Fuel	285.00	557.84	136.07	
Ballast	802.00	84.96	116.50	
Operational Wt. Empty	48,871.15	545.44	127.42	30.23
U/C Up				
U/C Down		547.51	124.00	30.80
Max. Internal Fuel (2452 gals at 7.8 lb/gal)	19,123.00	540.80	144.09	
U/C Up		544.14	132.11	29.87
Gross Weight (Max Int. Fuel)	67,994.15			
U/C Down		545.63	129.65	30.28

N.B.

- 1) A/C Datum = 120 ins 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, using fuel proportioners, does not exceed 31% M.A.C. ie 303 lb on Former Sta 68.5 ins and 499 lb on the Shear Panel.

These figures are theoretical requirements only and are not to be confused with full nose ballast normally installed (1,397 lb total).

* The trapped and residual fuel within the Aircraft was determined experimentally by actual weightings in dry and drained conditions etc for A/C 25201. The figures obtained were considerably in excess of those originally calculated.
Experimentally determined figure = 675 lb
Calculated figure = 218 lb

Increase in trapped + resid fuel = +439 lb

S E C R E T

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Now actual weighings of A/C 25201 in a fully fuelled condition have indicated that it would not be desirable to alter the total estimated fuel within the aircraft at this time. Hence since the unusable fuel has been increased by 439 lb, the usable fuel has been decreased by a similar amount.

It is hoped that in the near future an experimental determination of the volume of fuel contained in individual tanks will be possible, since currently only calculated figures are available.

REPORT NO: 7-0400-64 ISSUE 3

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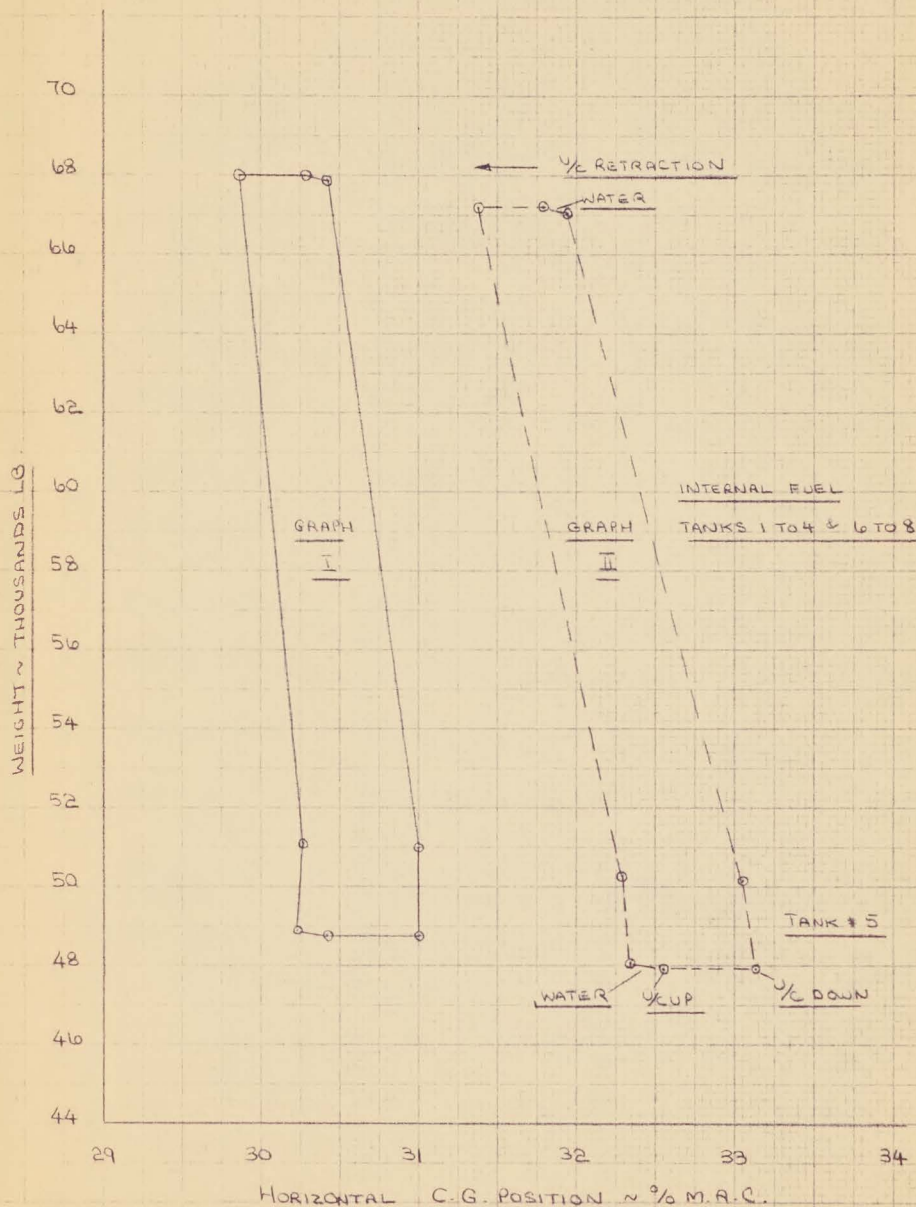
BY: Kathleen Syffert

HORIZONTAL C.G. ENVELOPE

ARROW I ~ A/C 25202 & 25203

NORMAL FLIGHT CONDITIONS

FUEL PROPORTIONERS USED



AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT Arrow 1 A/C 25202 & 25203

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
TOTAL WING GROUP		1000000			
OUTER WING		1010000			
100	OUTER WING SKINS	1010001	64	92910	706
100	POSTS AND INTERCOSTALS	1010002	64	2436	732
100	OUTER WING SPARS	1010003	64	39258	701
100	OUTER WING RIBS	1010004	64	13456	695
98	AILERON CONTROL BOX	1010006	64	37530	774
100	RIB 12	1010007	64	7626	648
100	O W AILERON JACK FITTING	1010009	64	1046	727
	AILERON JOINTS AND FAIRING	1010010		3293	787
	BUZZ DAMP STRUC PROV O W	1010011	64	800	758
				198355	
96 AILERON		1020000	74	35380	791
				35380	
95 ELEVATOR		1030000	82	46007	755
95	ELEVATOR MARRY UP	1030001		15977	738
				47604	
INNER WING		1040000			
96	MAIN U C STRUCTURE	1040001	62	33071	577
100	FRONT SPAR I W	1040002	62	11110	484
100	MAIN SPAR I W	1040003	62	15106	565
100	FWD CENTRE SPAR I W	1040004	62	5364	600
100	AFT CENTRE SPAR I W	1040005	62	3666	654
100	REAR SPAR I W	1040006	62	7667	703
100	I W STRUCTURE F S TO M S	1040007	62	10737	9499
100	STRUCTURE MS TO R S	1040008	62	14979	609
100	STRUCTURE AFT OF REAR SPAR	1040009	62	32212	718
40	ELEVATOR CONTROL BOX	1040010	62	42838	724
25	TRANSP JOINT MARRY UP	1040011		7065	636
100	INNER WING JOINTS	1040012	62	63471	1662
100	SKINS M S TO R S	1040013	62	21903	8624
100	STRUT PICK UP FITTINGS	1040014	62	5391	567
100	RIBS 1 TO 9 INNER WING	1040016	62	51204	612
74	DORSAL FAIRING I W	1040017	62	95482	
100	RIB 10	1040018	62	10800	636
77	WING TO FUS JOINT I W	1040019	62	12628	616
65	TRANSPORT JOINT O W TO I W	1040020	62	12942	630
77	WING TO FUS JOINT C A	1040021		3818	529
	BUZZ DAMP STRUC PROV I W	1040022	62	5527	41
74	DORSAL FAIRING C A	1040023		6033	570
				666429	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO.

SHEET

REFERENCE NO.		COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
1050000	62		22138	46841	14423	10369661	3192964
			22138			10369661	3192964
1060000	65		30870	63013	13561	19452113	4186281
			30870			19452113	4186281

WEIGHT AND C. OF G BY FUNCTIONAL GR COMPONENT

PROJECT_____

[illegible]

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
P	3000000						
CTURE	3010000						
DOORS	301000151		18100	3796	11037	687076	1997697
STA 120	301000251		8008	9509	11450	761481	916916
	301000351		12207	9477	11401	1156857	1391720
	301000452		11054	19058	12024	2106671	1329133
	301000554		21263	37670	14300	8009772	3040609
	301000656		59375	3413	11157	3171130	662391
	301000758		17725	66945	10996	11866001	1949041
	301001152		10717	18294	12036	1960568	1289898
	301001254		27824	37482	13306	10428992	3702261
	301001356		74915	3710	11316	4023416	847682
	301001458		13501	66827	11119	9022313	1501176
	301001558		21890	66217	10984	14494901	2404398
S E B	301001652		6969	18483	9044	1288080	630276
	301001758		11067	70853	9611	783634	106298
	301001858		6842	65810	9781	4502720	669216
	301001958		6386	66605	13911	424940	88752
F	301002052		2952	23414	8900	691181	262728
D B	301002156		4985	3899	13550	268417	67479
	301002354		14453	41038	12144	5931222	1755172
	301002454		1258	48717	10700	612860	134606
UCTURE	301002556		8655	52931	9759	4581178	844641
D B	301002654		3570	27359	9197	976716	328333
F	301002756		6570	52007	9125	3416860	599513
38 77	301002854		2160	27400	8976	591840	193882
ATIONS	301002956		5980	53877	10383	3221845	620903
	301003056		3620	50328	9339	1821874	338072
	301003152		19253	19308	14763	3717369	2842320
	301003254		33475	37249	12917	12469103	4323966
	301003356		31663	54471	11812	17247153	3740034
	301003452		8659	22804	16053	1974598	1390029
RUCTURE	301003656		3964	54013	10340	2141075	409878
	301003752		3343	21049	9186	703668	307088
TURE	301003852		13101	20619	12291	2701295	1610244
	301003954		6211	28362	13736	1761564	853143
S	301004152		13057	13814	15006	1803694	1959333
	301004258		6704	66397	9189	4451255	616031
	301004358		6046	61926	9058	3744046	547647
OUTLET	301004454		2143	29245	16400	626720	351452
S	301004558		5154	69289	10257	3571155	528646
	301004658		14739	62867	8874	9265967	1307939
	301004754		743	31991	10964	237693	81463
C F	301004854		392	37000	12500	145040	49000
	301004954		13326	38460	11427	5125180	1522762
	301005052		3144	12000	12280	377280	386083
	301005152		10473	25500	12033	2670615	1260216
	301005254		11254	48500	10530	5458190	1185046
	301005458		47926	66524	11574	31882292	5546955
ANK CF	301005554		21168	39722	14553	8408353	3080579

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM
COCKPIT FLOOR	3010005652		6160	1763
CENTRE BEAM 697 28 717 36	3010005958		5577	113
DORSAL OVER FUEL TANK	3010006154		5007	414
SHIELD EXHAUST DEFLECTOR	3010006254		1981	3342
SHEAR PANEL BELOW NAV ARCH	3010006352		2115	2569
33 PACK MOUNTING STRUCTURE	3010006454		2119	2928
88 ENG ACCESS DOORS R F	3010006559		8457	7728
99 TUNNEL FIXED R F	3010006659		10403	7716
100 SKIN AND STIFFENERS R F	3010006759		5143	7714
100 FAIRING UNDER RUDDER R F	3010006859		2616	7813
100 FORMERS FIXED R F	3010006959		9001	7792
100 LONGERONS C BEAM FIXED R F	3010007059		2799	7717
TAILCONES	3010007159		4398	48316
CNTR STRUCT STING REM R F	3010007259		8835	8318
MISCELLANEOUS ITEMS E B	3010007358		9196	6640
MTG BRKTS SIDE PANEL D B	3010007556		2435	5251
FORMERS LOWER PANEL D B	3010007656		7640	5447
LOWER PANEL D B	3010007756		5348	5524
JOINT F F TO C F	30100078		855	2550
JOINT AIR INTAKES TO F F	30100079		1092	2200
JOINT C F TO D B	30100080		520	4850
JOINT D B TO E B	30100081		2521	5847
FUS JOINT AT STA 742 50	30100082		4437	7425
6 MISCELLANEOUS ITEMS F F	3010008652		850	1908
			6465	34
DIVE BRAKES	3020000072		11790	5088
DIVE BRAKES C A	30200001		406	4879
			12196	
AIR INTAKES	30300000			
7 AIR INTAKES	303010055		77248	210
			77248	
PILOTS AND NAVIG CANOPIES	30400000			
76 PILOTS CANOPY	304010053		24208	176
			24208	
100 NAVIGATORS CANOPY	304020053		15321	232
			15321	

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT _____

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
ENGINE GROUP		5000000			
ENGINE J 75		5010000		1187578	665.
				1187578	
J 75 ENGINE SERV ACCESS		5010100		3803629	
				3803	
ACC GEAR BOXES ON FUS D B		5020001	56	4445578	
ACC GEAR BOXES ON FUS E B		5020002	58	23225608	
				27670	
ENGINE CONTROLS		5030000			
35 ENGINE CONTROLS F F		5030001	52	1558166	
35 ENGINE CONTROLS C F		5030002	54	117268	
35 ENGINE CONTROLS E B		5030004	58	946637	
35 ENGINE CONTROLS I W		5030005	62	689497	
35 ENGINE CONTROLS ENG		5030006		25641	
				3335	
83 GEARBOX AND STARTER ON EN		5040000		28680	589
				28680	
91 ENGINE ANTI ICING		5050000		7561	562
				7561	
FIRE EXT SYSTEM		5060000			
FIRE EXTING SYSTEM D B		5060002	56	146553	
FIRE EXTING SYSTEM E B		5060003	58	6407703	
				6553	
ENGINE MTGS AND BRACKETS		5070000			
64 ENG MOUNTING AND BRKTS		5070001		14653	625
ENGINE MTGS ACCESSORIES		5070002		5202	662
ENGINE MTGS ACCESSORIES C		5070003		766	642
				20621	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	5000000						
	5010000		118757866543	11983		790250029	142307472
			1187578			790250029	142307472
CESS	5010100		380362941	10354		2393646	393763
			3803			2393646	393763
US D B	502000156		444557866	9765		2572144	434054
US E B	502000258		2322560850	10431		14132413	2422600
			27670			16704557	2856654
	5030000						
	503000152		155816668	12431		259687	193675
	503000254		11726800	11800		31356	13806
	503000458		94663787	10081		603425	95366
	503000562		68949745	13137		342743	90514
	5030006		2564137	10000		16034	2500
			3335			1253245	395861
ON EN	5040000		2868058918	10554		16897682	3026887
			28680			16897682	3026887
	5050000		756156269	11511		4254499	870347
			7561			4254499	870347
D B	5060000						
E B	506000256		14655318	13749		80764	20074
	506000358		640770381	13414		4509311	859435
			6553			4590075	879509
CKETS	5070000						
KTS	5070001		1465362504	12935		9158711	1895366
RIES	5070002		520266213	12248		3444400	637141
RIES C	5070003		76664236	13192		492048	101051
			20621			13095159	2633558

WEIGHT AND C. OF G BY FUNCTIONAL G
COMPONEN

PROJECT_____

PROJECT		DESCRIPTION	REFERENCE NO.			COMP. NO.	WEIGHT	H. AREA
		FUEL SYSTEM	5080000	00				
23		FUEL SYSTEM C F	5080001	15	4		13483	407
29		FUEL SYSTEM D B	5080002	56			17382	534
16		FUEL SYSTEM E B	5080003	58			36496	668
49		FUEL SYSTEM I W	5080004	62			54349	555
		FUEL SYSTEM ENG	5080005				16488	685
		FUEL SYSTEM C A	5080006				75461	15
		MECHANICAL CONTROLS F I R						
		MECHANICAL CONTROLS I R					91265	
		MECHANICAL CONTROLS R F						
		MECHANICAL CONTROLS C A						
		FLYING CONTROLS HYDRAULIC						
30		FLYING CONT HYDRAULIC						
32		FLYING CONT HYDRAULIC						
33		FLYING CONT HYDRAULIC						
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WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT_____

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WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

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	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	7080000559		851382210	14392		6998537	1225191
	7080000662		12462022	14500		76907	17980
			9099			7153499	1302654
	70900000						
N	7090000151		129	9285	12000	11978	15480
F	7090000252		2966	19977	11200	592518	332192
F	7090000354		130441878	11000		546089	143440
I	7090000455		127421984	12000		280076	152880
B	7090000556		651553375	9200		3477381	599380
B	7090000658		6459500	9200		38080	5888
W	7090000862		890954111	113900		4820749	1238351
I	7090000983		35279754	30000		280734	105600
UC	7090001091		33018600	9800		61380	32340
NG	70900011		200258583	10000		1172832	200200
A	70900012		1374633473	11234		4601199	1544226
	7090001352		1627115582	11097		2535347	1805593
	7090001454		759644897	10870		3410376	825685
	7090001558		67067944	11597		455225	77700
	70900016		1163256207	11472		6537998	1334423
	70900017		71861350	12000		440493	86160
	7090001883		8389550	28840		74327	23937
	7090001962		233662053	14500		1449558	338720
	70900020		11262946	13561		70500	15188
	7090002192		7451600	13700		38184	10138
	7090002255		530322076	13833		1170690	733564
	7090002356		2713251861	10254		14070927	2782115
	7090002459		13680200	11360		109072	15450
G	7090002552		296419896	9981		589717	295837
			112618			46835430	12714487
	71000000						
	7100000152		2060	19474	12434	401164	256140
	7100000254		67133431	11033		224322	74031
	7100000356		44455296	11859		245514	52654
	7100000458		152665650	9737		1001819	148587
	7100000583		64075818	25515		485235	163296
	7100000651		124	7431	9955	9214	12344
			5465			2367268	707052
	7120000055		8800	19582	11800	1723216	1038400
			8800			1723216	1038400
I	7150000151		1872	9909	9034	185496	169116
T	7150000252		8996	19356	12003	1741266	1079790
I	7150000354		23438	27488	10315	6442637	2417630

WEIGHT AND C. OF G BY FUNCTIONAL GR COMPONENT

PROJECT_____

PROJECT	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM
29	RADIO RADAR INT SYST I W	71500005	62	4827	5719
29	RADIO RADAR INT SYST O W	71500006	64	1049	7464
29	RADIO RADAR INT SYST FIN	71500007	83	3380	7617
29	RADIO RADAR INT SYST C A	71500008		21293	3619
29	RADIO RADAR INT SYST O B	71500009	59	1374	55
				64868	
37	CANOPY ACTUATION	71600000	52	6586	2220
				6586	
	CABIN CONSOLES	71700000	52	1745	1747
				1745	
	SURFACE FINISH F F	71900001	52	363	1874
	SURFACE FINISH CANOPY	71900002	53	642	2021
	SURFACE FINISH C F	71900003	54	1400	3719
	SURFACE FINISH INTAKES	71900004	55	4082	279
	SURFACE FINISH O B	71900005	56	3775	382
	SURFACE FINISH E B	71900006	58	4436	670
	SURFACE FINISH R F	71900007	59	6488	036
	SURFACE FINISH I W	71900008	62	3151	6014
	SURFACE FINISH O W	71900009	64	1067	7065
	SURFACE FINISH O W L EDGE	71900010	65	3196	394
	SURFACE FINISH AILERON	71900011	74	3537	919
	SURFACE FINISH ELEVATOR	71900012	82	5667	552
	SURFACE FINISH FIN	71900013	83	6397	466
	SURFACE FINISH RUDDER	71900014	84	2028	127
				10000	
	FLIGHT TEST INSTALLATION	72000000		145673	4884
				145673	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET _____

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
T I W	7150000562		4827	57199	15674	2760996	756584
T O W	7150000664		1049	74642	13720	782995	143923
T F I N	7150000783		3380	76179	25195	2574850	851591
T C A	71500008		21293	36192	12330	7706363	2625427
T O B	7150000959		1374550	15800		9692	2054
			64868			22204295	8046115
	7160000052		6586	22201	15436	1462158	1016615
			6586			1462158	1016615
	7170000052		1745	17476	12434	304956	216973
			1745			304956	216973
	7190000152		363	18744	12200	68041	44286
PY	7190000253		64202	1815900		12940	10176
	7190000354		14003	719712455		520758	174370
KES	7190000455		40822	79812020		93016	49042
	7190000556		37753	82811200		202932	42224
	7190000658		44366	70111200		295485	49616
	7190000759		64880	36213175		520746	85374
	7190000862		315160	14414400		1895137	453744
	7190000964		10677	065013590		753836	145005
L EDGE	7190001065		31963	94813526		203994	43148
RON	7190001174		35379	19013556		279541	47853
ATOR	7190001282		5667	552314260		427460	80712
	7190001383		6397	466320837		477097	133148
ER	7190001484		2028	127921431		164184	43291
			10000			5915167	1401989
ATION	72000000		145673	4884812890		71158347	18777250
			145673			71158347	18777250

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT_____

PROJECT		DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
		REMOVABLE EQUIPMENT GROUP	8000000			
94	EJECTOR SEATS		801010052		34294	204
					34294	
	RADAR REMOV GROUP		8020000			
	DAMPING SYSTEM		8030000			
	DAMPING SYSTEM F F		803010152		784	172
	DAMPING SYSTEM C F		803010254		2303	322
	DAMPING SYSTEM E B		803010358		3696	32
	DAMPING SYSTEM I W		803010462		6070	527
	DAMPING SYSTEM O W		803010564		957	48
	DAMPING SYSTEM R N		803010651		287	73
					9908	
98	INSTRUMENT PACK		805080054		68680	385
					68680	
	INSTRUMENTATION		805090054		304800	394
					304800	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

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