

QCX
Avro
CF105
R-7-0400-63
Iss-3

Classification control: changed to UNCLASSIFIED
Arrow 1 Report: 7-0400-63
A/C 25201 & 25205 Issue: 3 AVES
Date 27 Sept 58
Weight & C.G. Summary PPS-04
CONFIDENTIAL AVES
1 Aug/58

C O N F I D E N T I A L

AVRO AIRCRAFT LIMITED
INTER-DEPARTMENTAL MEMORANDUM

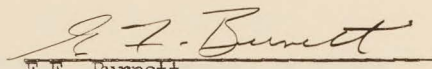
Ref: 2633/11/J
Date: 1 August, 1958
To: See Distribution
From: E.F. Burnett - Weight Supervisor
Subject: Arrow 1 - A/Cs 25204 & 25205 Weight and C.G. Summary
Report: 7-0400-63 Issue 3

Classification cancelled / changed to UNCLASS
By authority of AVES
Date 27 Sept 56
Signature RBiel
Unit / Rank / Appointment AVES

Attached is a copy of Weight and C.G. Summary Report 7-0400-63
Issue 3 dated August 1, 1958.

The report defines the aircraft to the completed configuration
including the fitment of full Astra. An appendix is attached
which indicates the Weight and Balance for Phase I Flight Testing
prior to fitment of full Astra.

The report will be issued monthly until the actual weight of the
Aircraft has been obtained.


E.F. Burnett

EFB/ag

cc: Messrs.	J.C. Floyd	J.P. Booth	A.J. Crust
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C O N F I D E N T I A L

Aircraft: Arrow 1
A/C 25204 & 25205
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I N D E X

<u>Sheet</u>	<u>Content</u>
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2-1 to 2-2	Weight and C.G. Summary
3-1 to 3-4	Appendix I - 4th and 5th Aircraft prior to installation of Full Astra I trials.
4-1	Horizontal C.G. Envelope for A/C with full Astra I.
4-2	Horizontal C.G. Envelope for ballasted Aircraft.
5-1 to 5-15	I.B.M. detail sheets of Weight and C.G. for an A/C with full Astra I T.I.

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Description	Weight lb	H. Arm ins	V. Arm ins	M.A.C. %
Radio & Radar Fixed	892.15	220.66	111.93	
Radio & Radar Removable	2,067.58	206.59	109.54	
Missile Seeker	167.00	519.29	50.64	
Trapped Fuel	238.20	553.66	141.42	
U/C Up		541.21	126.62	
Aircraft Basic Weight	48,078.68			
U/C Down		543.32	123.14	
Useful Load (less fuel)	1,129.62	355.75	128.26	
Crew	390.00	194.00	136.50	
Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
Residual Fuel	287.00	508.14	135.33	
Oxygen Charge	13.39	259.69	159.91	
Water for Air Conditioning	280.00	315.00	114.00	
Oil	134.23	608.92	115.68	
U/C Up		537.18	126.66	27.95
Operational Weight Empty	49,208.30			
U/C Down		539.24	123.26	28.52
Max. Internal Fuel (2468 gals * at 7.8 lb/gal)	19,253.00	540.80	144.09	
U/C Up		538.20	131.56	28.23
Gross Weight (Max. Int. Fuel)	68,461.30			
U/C Down		539.67	129.12	28.64

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

- 2) * The trapped and residual fuel figures have now been calculated in detail (the experimentally determined figures of July 1st, 1958, being deemed unacceptable - see notes in text of report).

Figures obtained by actual weighing 675 lb
Revised calculated figure 525.2 lb

Decrease in trapped + residual fuel - 131.8 lb

Hence since the trapped + residual fuel have decreased by approx. 132 lb, the usable fuel has increased by a similar amount, it not being considered desirable to alter the total estimate fuel within the aircraft at this time.

It is hoped, in the near future, to made an accurate check on the total volumes contained in each tank, since currently only calculated figures are available.

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Introduction and Weight Changes

The following is a weight & C.G. Summary for the fourth and fifth Arrow 1 Aircraft serial Nos. 25204 & 25205, with J75 P5 Engines, based on the latest information available.

All weight and C.G. changes are quoted relative to Issue 2 of July 1st, 1958.

Note:

This summary is for the Aircraft in the completed stage with full Astra I trial installations and a completed Instrument Package.
For a preliminary estimate of the condition of the Aircraft at first flights see Appendix I.

General:

- a) Pratt and Whitney J75 P5 Engines comprise the Power Plant for A/C 25204 & 25205 (5,850 lb each, Pratt and Whitney's 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. This pack is entirely different from those for A/C's 25201 to 25203.

Initial proposals have been received from RCA as to their instrumentation requirements in the pack - these, together with Flight Test requirements total 1,157 lb unit weights. It is felt that the current estimate of 2,000 lb of equipment in the pack will adequately cover further allowances for cabling and additional Air Conditioning equipment, detailed estimates of which are not yet available. Additional water required for Air Conditioning is considered separately as an item of Operational Load.

A reasonably detailed estimate of other proposed Flight Test Installations throughout the Aircraft has been made. These installations amount to 887 lb.

- c) In A/C 25201 for early flights additional emergency fire protection and additional emergency provisions for landing gear lowering were installed. These are no longer considered necessary and consequently are not be installed on A/C's 25204 and 25205.
- d) A missile seeker is installed, mounted beneath the Aircraft, between A/C Sta. 485 and 538.7 ins, from the dive brake jack beams. Canadair has supplied information to the effect that missile seeker shall weigh 124.4 lb.

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A/C 25204 & 25205
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General: Cont'd

- e) There is to be a trial installation in these A/C of the full R.C.A. Astra I system, weights of which are based on R.C.A.'s statement dated June 5th, 1958, but with the following amendments:-

1. A complete J4 compass system is added.
2. The missile auxiliaries normally housed within, or in close proximity to, the missile pack, will not be necessary, however, one each of the Range Slaving, Angle Slaving and Optical mode units will be installed in the Instrument Pack.
3. The miniature stable platform, amplifier assy and platform repeater will not be required.

N.B. When Astra I is first installed the I.R. Tracker system and ARD501 Homer system may not be available.

- f) The Mk 1A Tailcones and Stinger are fitted.
- 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 nor of minor 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) A dry weighing of A/C 25201 has now been obtained. Based on the good agreement shown between estimated and actual weights of the first Arrow I it is felt that this summary is entirely representative of the subject aircraft in the completed state, within $\pm 0.30\%$.
- 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.
- j) No further work is being proceeded with in the fuel management system for Arrow 1 Aircraft. The fuel proportioners are functioning satisfactorily and it is not considered necessary to fit the fuel sequencing system.
- k) The Aircraft as recorded with full Astra I trial installation (ref note (e)) is not ballasted. However, in Appendix I will be found an estimate of A/C 25204 and 25205 for early Flight Testing, these Aircraft are ballasted such that the C.G. on a flight envelope (using fuel proportioners) does not travel aft. of 31% M.A.C.

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<u>1. Structure:</u>	<u>Weight lb</u>
a) <u>Wings</u>	
Elevators - Introduction of slotted surface; false rib added, steel seal strip, T/Edge shear link etc.	+ 4.36
Buzz damping provisions were previously erroneously included	- 11.07
<u>Total Wing Decrease</u>	<u>- 6.71</u>
b) <u>Fin & Rudder</u>	
Rudder - introduction of slotted surface	+ 2.34
Buzz damping provisions erroneously included	- 8.78
<u>Fin & Rudder Decrease</u>	<u>- 6.44</u>
c) <u>Fuselage Fwd Sta 255 ins</u>	
Bulkhead Sta 120 ins - additional doublers etc, A/Conditioning requirements	+ 0.21
Miscellaneous Items - addition of hand control mounting & arm rest assy.	+ 1.75
<u>Front Fuselage Increase</u>	<u>+ 1.96</u>
d) <u>Centre Fuselage Sta 255 - 485 ins</u>	
Armament Bay Roof - mounting  sections added for IR singal processor etc.	+ 1.68
<u>Total Centre Fuselage Increase</u>	<u>+ 1.68</u>
e) <u>Duct Bay Sta 485 - 591.65 ins</u>	
No weight change.	
f) <u>Engine Bay Sta 591.65 - 742.5 ins</u>	
No weight change.	
g) <u>Rear Fuselage Sta 742.5 ins aft.</u>	
Tailcones - actual weight obtained of Mk 1 A tailcone, this was 1.8% heavier than the estimate, probably due to gauge tolerances on relatively thin sheet metal	+ 8.16
<u>Rear Fuselage Increase</u>	<u>+ 8.16</u>
h) <u>Fuselage "Marry-Up"</u> No weight change.	
<u>Total Structural Decrease</u>	<u>- 1.35</u>

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2. <u>Landing Gear</u>	<u>Weight lb</u>
No weight change.	
3. <u>Power Plant & Services</u>	
Fuel System - Act. Wt. of pressure regulator valve obtained at 5.13 lb, Spec. wt. quoted at 3.25 lb (2 off) thus	+ 3.76
<u>Total Power Plant Group Increase</u>	<u>+ 3.76</u>
4. <u>Flying Controls Group</u>	
No weight change.	
5. <u>Equipment Group</u>	
Instruments - initial evaluation made specifically for the 4th and 5th A/C	+ 3.02
L.P. Pneumatics - misc. prodn. drg. changes	- 0.40
Radio & Radar Remov. - Full Astra I installed as for a prodn. Mk 2 A/C, less missile auxiliaries but with a complete J4 compass system added and the miniature stable platform, amp assy and platform repeater not needed. Wts to R.C.A.'s statement of June 5th, 1958. There are one each angle slaving, range slaving and optical mode units included in the Instrument Pack for the missile seeker	+ 15.48
Radio & Radar Fixed - R.C.A.'s estimate of rack weights revised estimate of JB R2 based on that for A/C 25206 with applicable changes made	+ 16.50
	+ 22.01
<u>Total Equipment Increase</u>	<u>+ 56.61</u>
6. <u>Trapped Fuel</u>	
Trapped fuel - the figures established last month were considered unacceptable due to possible inaccuracies in the method of obtaining them. Now detailed estimates, partially supported by test rig results reveal that the trapped fuel in the system is probably 238.2 lb. Hence a decrease in wt. is shown here (372 lb July 1st, 1958)	- 133.80
<u>Total Trapped Fuel Decrease</u>	<u>- 133.80</u>

*

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7. Operational Load

Weight lb

Residual Fuel - On July 1st the weight of this item was quoted from an experimental determination. However, since the method has some possible inaccuracies the figures have been checked by detail calculations. Similar weights are applicable to the Mk 2 A/C, but in these A/C it is proposed to modify the fuel no-air valves and to introduce a sump in tank #5 such that the fuel is recoverable. Thus if Mk 1 A/C fuel system were similarly modified it would be possible to recover 287 lb of currently unusable fuel.

Wt. change + 2.00

* Total Operational Load Increase + 2.00

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

Summary

Weight Change - Aircraft Basic Weight

Structure	-	1.35
Power Plant	+	3.76
Equipment	+	56.61
Trapped Fuel	-	133.80
	-	<u>74.78</u>

Weight Change - Operational Load

Residual Fuel + 2.00

Weight Change - Operational Weight Empty (A/C less usable fuel)

Issue 2

Issue 3

49,281.08

49,208.30

- 72.78 lb

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Wt. & C.G. Summary
Full Astra I Installed

Description	Weight lb	H. Arm ins	V. Arm. ins
Structure	18,785.39	564.35	137.48
Wings	10,002.20	643.01	142.24
Fin & Rudder	1,038.94	754.52	209.77
Fuselage Fwd Sta. 255 ins	2,626.69	184.18	128.30
Sta. 255 - 485 ins	1,686.53	379.30	130.44
Sta. 485 - 591.65 ins	1,018.71	533.73	104.38
Sta. 591.65 - 742.5 ins	1,437.47	660.98	107.30
Sta. 742.5 ins Aft.	920.54	807.74	128.96
"Marry-Up"	54.31	462.81	104.25
Landing Gear - Retracted	2,662.42	488.76	135.00
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	27.70	162.60	88.70
Power Plant & Services	13,774.42	652.51	120.36
Engines & Accessories J75 P5	11,913.81	665.32	119.78
Gear Box & Drives on Fuselage	276.70	603.71	103.24
Gear Box & Starters on Engine	286.80	589.18	105.54
Engine Controls	33.35	375.79	118.49
Engine Nose Bullets	75.61	562.62	115.11
Fire Extinguishing System	65.53	700.45	134.21
Engine Mountings	206.21	635.04	127.71
Fuel System	916.41	538.53	135.54
Flying Controls Group	2,153.25	624.75	134.90
Mechanical Flying Controls	953.45	675.98	147.72
Hydraulic Flying Controls	1,199.80	584.03	124.71
Equipment - Fixed & Removable	10,465.00	349.06	111.21
Instruments	49.09	159.10	136.11
Probe	15.25	-23.71	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	853.20	338.84	130.01
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	56.31	423.31	127.57
Electrical System	1,131.18	414.71	112.90
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	65.86	222.01	154.36
Cabin Consoles	23.62	180.23	125.05
Hydraulics Utilities System	654.93	503.19	117.65
Sequencing of U/C Doors	66.89	345.66	116.36
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation	2,000.00	394.00	95.00
Flight Test Installations	886.78	468.12	118.21
MH64 Damping System	184.72	464.22	135.05

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Appendix I

Introduction:-

This appendix is to cover the condition of A/C 25204 & 25205 prior to the installation of full Astra I.

All weight changes will be quoted relative to the completed aircraft as defined in the main text of this report.

Changes Applicable to Early Phases of A/C 25204 and 25205	<u>Weight lb</u>
--	------------------

1. Structure

Fin Structure for 1 R tracker - not installed initially	- 10.75
Radome - longer radome fitted as A/C 25201, full electrical properties unnecessary	+ 21.42
<u>Total Structural Increase</u>	<u>+ 10.67</u>

2. Landing Gear

No weight change.

3. Power Plant Group

No weight change.

4. Flying Controls

No weight change.

5. Equipment

Interim Radio & Radar - this will be installed initially until Astra I units become available	+ 648.68
Radio & Radar Remov. - Full Astra I units will not be installed	-2067.58
Radio & Radar Fixed - the wiring & racks etc for complete Astra I will not be installed	- 892.15
Missile Seeker - this will not be installed	- 167.00
Probe - Mk 2 A/C probe is replaced by Mk 1 since Mk 1 radome is fitted	- 0.25
MH 64 Damping system - delete cable allowance - now in Interim Radio & Radar weight	- 85.64
Instrumentation in Pack - full instrumentation will not be available initially, but it is assumed that the pack will be ballasted to simulate the completed condition, the weight of the pack - with water for Air Conditioning will be maintained by ballast. <u>Total Equipment Decrease</u>	+ 140.00 <u>-2423.94</u>

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6. Trapped Fuel

Weight lb

No weight change.

7. Operational Load

Water for Air Conditioning ~ since an incomplete pack will probably be fitted initially the Air Conditioning equipment may not be installed. Thus the weight of water in the second boiler will be simulated by ballast (see Equip. Group)

- 140.00

Operational Load

- 140.00

Summary

Weight Change - Aircraft Basic Weight

Structure	10.67
Equipment	<u>-2423.94</u>
	<u>-2413.27</u>
Ballast	+1012.00
<u>Op. Load - Water</u>	<u>- 140.00</u>

Weight Change - Operational Weight Empty (A/C less usable fuel)

BALLASTED Condition

Complete A/C

Early A/C

49,208.30

47,667.03

-1541.27 lb

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Wt. & C.G. Summary
A/C Prior to Astra I Inst.

Description	Weight lb	H. Arm ins	V. Arm ins
Structure	18,796.06	563.62	137.28
Wings	10,002.20	643.01	142.24
Fin & Rudder	1,028.19	754.46	209.25
Fuselage Fwd Sta 255 ins	2,648.10	182.88	127.45
Sta 255 - 485 ins	1,686.53	379.30	130.44
Sta 485 - 591.65 ins	1,018.71	533.73	104.38
Sta 591.65 - 742.5 ins	1,437.47	660.98	107.30
Sta 742.5 ins aft	920.54	807.74	128.96
"Marry-Up"	54.31	462.81	104.25
Landing Gear - Retracted	2,662.42	488.76	135.00
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	27.70	162.60	88.70
Power Plant & Services	13,774.42	652.51	120.36
Engines & Accessories J75 P5	11,913.81	665.32	119.78
Gear Box & Drives on Fuselage	276.70	603.71	103.24
Gear Box & Starter on Engines	286.80	589.18	105.54
Engine Controls	33.35	375.79	118.49
Engine Nose Bullets	75.61	562.62	115.11
Fire Extinguisher System	65.53	700.45	134.21
Engine Mountings	205.21	635.04	127.71
Fuel System	916.41	538.53	135.54
Flying Controls Group	2,153.25	624.75	134.90
Mechanical Flying Controls	953.45	675.98	147.72
Hydraulic Flying Controls	1,199.80	584.03	124.71
Equipment Fixed & Remov.	8,041.06	394.57	113.05
Instruments	49.09	159.10	136.11
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	853.20	338.84	130.01
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	56.31	423.31	127.57
Electrical System	1,131.18	414.71	112.90
Intake De-icing Boots	88.00	195.82	118.00
Canopy Actuation	65.86	222.01	154.36
Cabin Consoles	23.62	180.23	125.05
Hydraulics Utilities System	654.93	503.19	117.65
Landing Gear Door Sequencing	66.89	345.66	116.36
Instrument Pack Structure	686.80	385.81	94.68
Pack Instrumentation (probably ballasted)	2,140.00	391.50	95.00
Flight Test Installations	886.78	468.12	118.21
MH 84 Damping System	92.08	450.83	140.34
Interim Radio & Radar	646.68	342.30	124.04

C O N F I D E N T I A L

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Description	Weight lb	H. Arm ins	V. Arm ins	M.A.C. %
Trapped Fuel	238.20	553.66	141.42	
U/C Up		559.13	127.69	
Aircraft Basic Weight	45,665.41			
U/C Down		561.35	124.02	
Useful Load	989.62	366.28	132.83	
Crew	390.00	194.00	136.50	
Engine Fire Extinguisher Fluid	25.00	730.00	129.00	
Residual Fuel	287.00	508.14	135.33	
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	1,012.00	100.29	113.65	
U/C Up		545.38	127.50	30.21
Operational Wt. Empty	47,667.03			
U/C Down		547.50	123.99	30.80
Max. Internal Fuel (2468 gals* at 7.8 lb/gal)	19,253.00	540.80	144.09	
U/C Up		544.06	132.27	29.85
Gross Weight (Max. Int Fuel)	66,920.03			
U/C Down		545.57	129.77	30.27

N.B.

- 1) Aircraft Datum = 120 ins above an arbitrarily chosen ground line
- 2) * See note 2) on Sheet 2-3.
- 3) 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. i.e. 1012 lb distributed on the Shear Panel and the Slide rail mounting brackets between Sta. 67.5 and 96.25 ins.

These figures are theoretical only. Currently provision is only made for approx. 900 lb of ballast at these locations, however, further details and calculations on A/C 25204 and 25205 reveal that 900 lb is adequate, since this summary is necessarily only of a preliminary nature.

HORIZONTAL C.G. ENVELOPE
ARROW I ~ A/C 25204 & 25205
NORMAL FLIGHT CONDITIONS
FUEL PROPORTIONERS USED

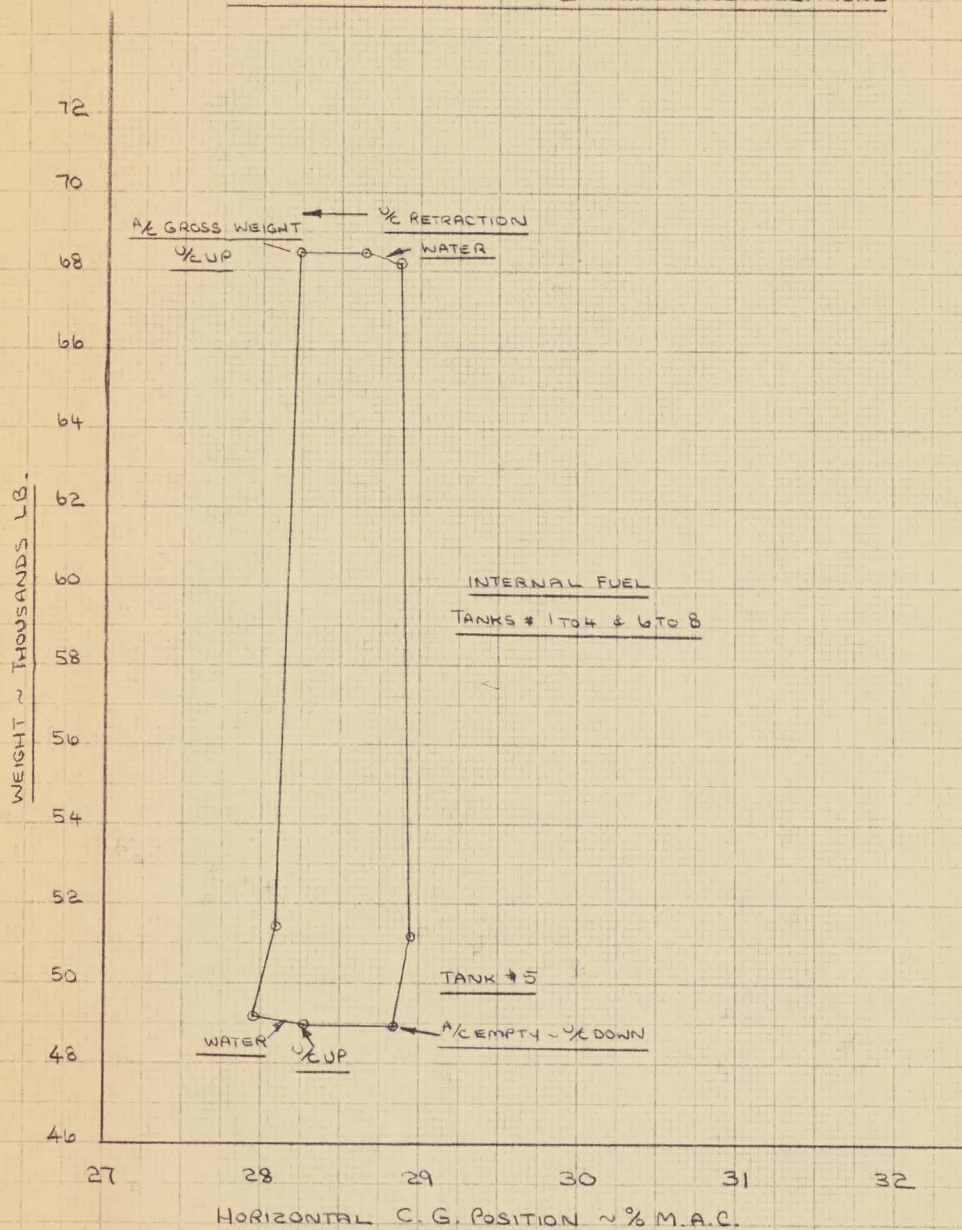
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SHEET: 4-1

BY: Kathleen Griffin

A/C WITH FULL ASTRA I TRIAL INSTALLATIONS



AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT Arrow 1 A/C 25204 & 25205

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
TOTAL WING GROUP		1000000			
OUTER WING		1010000			
100	OUTER WING SKINS	1010001	64	92910706	
100	POSTS AND INTERCOSTALS	1010002	64	2436732	
100	OUTER WING SPARS	1010003	64	39258701	
100	OUTER WING RIBS	1010004	64	13456695	
98	AILERON CONTROL BOX	1010006	64	37530774	
100	RIB 12	1010007	64	7626648	
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	
96 AILERON		1020000	74	35380791	
				35380	
94 ELEVATOR		1030000		1597738	
94	ELEVATOR MARRY UP	1030001	82	45336755	
				46933	
INNER WING		1040000			
96	MAIN U C STRUCTURE	1040001	62	33071577	
100	FRONT SPAR I W	1040002	62	11110484	
100	MAIN SPAR I W	1040003	62	15106565	
100	FWD CENTRE SPAR I W	1040004	62	5364600	
100	AFT CENTRE SPAR I W	1040005	62	3666654	
100	REAR SPAR I W	1040006	62	7667703	
100	I W STRUCTURE F S TO M S	1040007	62	107379499	
100	STRUCTURE MS TO R S	1040008	62	14979609	
100	STRUCTURE AFT OF REAR SPAR	1040009	62	32212718	
40	ELEVATOR CONTROL BOX	1040010	62	42838724	
25	TRANSP JOINT MARRY UP	1040011		7065636	
100	INNER WING JOINTS	1040012	62	63471662	
100	INNER WING SKINS	1040013	62	219153624	
100	STRUT PICK UP FITTINGS	1040014	62	5391567	
100	RIBS 1 TO 9 INNER WING	1040016	62	51204612	
74	DORSAL FAIRING I W	1040017	62	95482	
100	RIB 10	1040018	62	10800636	
77	WING TO FUS JOINT I W	1040019	62	12628616	
65	TRANSPORT JOINT O W TO I W	1040020	62	12942630	
77	WING TO FUS JOINT C A	1040021		3818529	
BUZZ DAMP STRUC PROV I W		1040022	62	552741	
74	DORSAL FAIRING C A	1040023		6033570	
				666544	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-63

SHEET 5-1 to 5-15

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
	1000000						
	1010000						
	1010001	64	92910	70646	13597	65637199	12632973
ALS	1010002	64	2436	73207	13410	1783323	326668
	1010003	64	39258	70118	13636	27526924	5353221
	1010004	64	13456	69506	13650	9352727	1836744
	1010006	64	37530	77409	13508	29051598	5069552
	1010007	64	7626	64873	13832	4947215	1054828
TTING	1010009	64	1046	72791	13670	761394	142988
FAIRING	1010010		3293	78726	13224	2592447	435466
V O W	1010011	64	800	75828	13680	606624	109440
			198355			142259451	26961880
	1020000	74	35380	79190	13561	28017422	4797882
			35380			28017422	4797882
	1030000		15977	73810	14260	1178746	227732
	1030001	82	45336	75523	14260	34239107	6464914
			46933			35417853	6692646
	1040000						
	1040001	62	33071	57757	13983	19100817	4624318
	1040002	62	11110	48428	14260	5380351	1584286
	1040003	62	15106	56570	14280	8545464	2157137
	1040004	62	5364	60098	14415	3223657	773221
	1040005	62	3666	65492	14450	2400937	529737
	1040006	62	7667	70374	14420	5395575	1105581
D M S	1040007	62	1073	7949988	14389	53676615	15450764
	1040008	62	14979	60964	14572	9131798	2182740
AR SPAR	1040009	62	32212	71829	15020	23137557	4838242
K	1040010	62	42838	72470	14328	31044699	6137829
JP	1040011		7065	63621	13876	4494824	980339
	1040012	62	63471	66222	15046	42031766	9549847
	1040013	62	2191	5362458	14463	136878581	31696098
NGS	1040014	62	5391	56766	14330	3060255	772530
NG	1040016	62	5120	461287	14499	31381395	7424068
	1040017	62	9548	28016	150	45866	15343
	1040018	62	10800	63683	13835	6877764	1494180
W	1040019	62	12628	61681	13811	7789077	1744053
TO I W	1040020	62	12942	63071	13710	8162649	1774348
A	1040021		3818	52984	14301	2022929	546012
V I W	1040022	62	552	74150	14200	409308	78384
	1040023		6033	57025	16034	3440318	967331
			666544			407632202	96426388

WEIGHT AND C. OF G BY FUNCTIONAL GROUP 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
1050000	62	2213846841	14423		10369661	3192964
		22138			10369661	3192964
1060000	65	3087063013	13561		19452113	4186281
		30870			19452113	4186281

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

[illegible]

WEIGHT AND C. OF G BY

FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET_____

[illegible]

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT _____

	DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
	TOTAL FUSELAGE GROUP	30000000			
	FUSELAGE BASIC STRUCTURE	30100000			
	RADOME	3010000151		15958	39
	RADAR NOSE STRUCTURE C A	30100002		270	120
	RADAR NOSE STRUCTURE R N	3010000351		17032	95
	SKIN F F	3010000452		11054	190
88	SKIN C F	3010000554		21263	376
	SKIN D B	3010000656		5937	534
3	SKIN E B	3010000758		17725	669
4	FORMERS F F	3010001152		10761	182
100	FORMERS C F	3010001254		27824	374
	FORMERS D B	3010001356		7491	537
	LIGHT FORMERS E B	3010001458		13501	668
72	HEAVY FORMERS E B	3010001558		21890	662
	LOWER LONGERONS F F	3010001652		6969	184
	LONGITUDINAL MEMBERS E B	3010001758		11067	708
75	LOWER LONGERON E B	3010001858		6842	658
	TOP LONGERONS E B	3010001958		6386	666
	LOWER SHEAR PANEL F F	3010002052		2952	234
	TOP WING LONGERONS D B	3010002156		4985	538
66	LONGERONS C F	3010002354		14453	410
43	LONGERONS F D B	3010002454		1258	487
43	LONGERONS A D B	3010002556		8655	529
	ELECTRONICS BAY STRUCTURE	3010002654		4361	273
	LONGITUDINAL BEAMS D B	3010002756		7378	520
	RADAR ACCESS DOOR C F	3010002854		2479	273
72	MAIN FRAME AT STN 538 77	3010002956		5980	538
	DIVE BRAKE ACCOMMODATIONS	3010003056		3620	503
48	TOP LONGERONS F F	3010003152		19253	193
100	DUCT C F	3010003254		33475	372
97	DUCT D B	3010003356		31663	544
22	CANOPY ARCH	3010003452		8659	228
4	ACCESS PANELS D B	3010003656		3964	540
66	NOSE U C SUPPORT STRUCTURE	3010003752		3343	210
3	CREWS BULKHEADS	3010003852		13327	206
	EQUIPMENT BAY STRUCTURE	3010003954		6550	283
86	WINDSCREEN	3010004152		13057	138
33	SERVICE ACCESS DOORS	3010004258		6704	663
	TORSION BOX E B	3010004358		6046	619
	DORSAL FAIRING AIR OUTLET	3010004454		2143	292
66	INTERMEDIATE FORMERS	3010004558		5154	692
3	ENGINE ACCESS DOORS	3010004658		14739	628
	SEALING MISSILE BAY	3010004754		743	319
100	MISCELLANEOUS ITEM C F	3010004854		392	370
97	ARMAMENT BAY ROOF	3010004954		13494	384
	BULKHEAD STA 120	3010005052		3185	120
	BULKHEAD STA 255	3010005152		10548	255
100	BULKHEAD STA 485	3010005254		11254	485
	ENGINE TUNNEL	3010005458		4792	665
100	INTEGRAL FUS FUEL TANK CF	3010005554		21168	397

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	30000000						
CTURE	30100000						
	3010000151		15958	3992	11070	637043	1766551
E C A	30100002		270	12000	11200	32400	30240
E R N	3010000351		17032	9583	11325	1632177	1928874
	3010000452		11054	19058	12024	2106671	1329133
	3010000554		21263	37670	14300	8009772	3040609
	3010000656		5937	53413	11157	3171130	662391
	3010000758		17725	66945	10996	11866001	1949041
	3010001152		10761	18292	12033	1968402	1294871
	3010001254		27824	37482	13306	10428992	3702261
	3010001356		7491	53710	11316	4023416	847682
	3010001458		13501	66827	11119	9022313	1501176
	3010001558		21890	66217	10984	14494901	2404398
	3010001652		6969	18483	9044	1288080	630276
S E B	3010001758		1106	70853	9611	783634	106298
	3010001858		6842	65810	9781	4502720	669216
	3010001958		638	66605	13911	424940	88752
F	3010002052		2952	23414	8900	691181	262728
D B	3010002156		498	53899	13550	268417	67479
	3010002354		14453	41038	12144	5931222	1755172
	3010002454		1258	48717	10700	612860	134606
	3010002556		8655	52931	9759	4581178	844641
UCTURE	3010002654		4361	27376	9300	1193867	405573
D B	3010002756		7378	52041	9113	3839585	672357
F	3010002854		2479	27382	9020	678800	223606
38 77	3010002956		5980	53877	10383	3221845	620903
ATIONS	3010003056		3620	50328	9339	1821874	338072
	3010003152		19253	19308	14763	3717369	2842320
	3010003254		33475	37249	12917	12469103	4323966
	3010003356		31663	54471	11812	17247153	3740034
	3010003452		8659	22804	16053	1974598	1390029
	3010003656		3964	54013	10340	2141075	409878
RUCTURE	3010003752		3343	21049	9186	703668	307088
	3010003852		13327	20641	12274	2750826	1635756
TURE	3010003954		6550	28368	13624	1858104	892372
	3010004152		13057	13814	15006	1803694	1959333
S	3010004258		6704	66397	9189	4451255	616031
	3010004358		6046	61926	9058	3744046	547647
OUTLET	3010004454		2143	29245	16400	626720	351452
S	3010004558		5154	69289	10257	3571155	528646
	3010004658		14739	62867	8874	9265967	1307939
	3010004754		743	31991	10964	237693	81463
C F	3010004854		392	37000	12500	145040	49000
	3010004954		13494	38408	1434	5182776	193504
	3010005052		3185	12000	11430	382200	364046
	3010005152		10548	25500	12043	2689740	1270296
	3010005254		11254	48500	10530	5458190	1185046
	3010005458		47926	66524	11574	31882292	5546955
ANK CF	3010005554		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. AIR
COCKPIT FLOOR	301005652		6160	176
CENTRE BEAM 697 28 717 36	301005958		557	713
DORSAL OVER FUEL TANK	301006154		500	7414
SHIELD EXHAUST DEFLECTOR	301006254		198	1334
SHEAR PANEL BELOW NAV ARCH	301006352		211	5256
33 PACK MOUNTING STRUCTURE	301006454		211	9292
88 ENG ACCESS DOORS R F	301006559		84	57772
99 TUNNEL FIXED R F	301006659		104	03771
100 SKIN AND STIFFENERS R F	301006759		51	43771
100 FAIRING UNDER RUDDER R F	301006859		26	16781
100 FORMERS FIXED R F	301006959		90	01779
100 LONGERONS C BEAM FIXED R F	301007059		27	99771
100 TAILCONES	301007159		44	800831
CNTR STRUCT STING REM R F	301007259		88	35831
MISCELLANEOUS ITEMS E B	301007358		91	9664
MTG BRKTS SIDE PANEL D B	301007556		24	3525
FORMERS LOWER PANEL D B	301007656		76	40544
LOWER PANEL D B	301007756		53	48552
JOINT F F TO C F	3010078		8	55255
JOINT AIR INTAKES TO F F	3010079		10	92220
JOINT C F TO D B	3010080		52	0485
JOINT D B TO E B	3010081		25	21584
FUS JOINT AT STA 742 50	3010082		44	3742
MISCELLANEOUS ITEMS F F	301008652		11	96192
			64	5452
DIVE BRAKES	302000072		11	790508
DIVE BRAKES C A	3020001		40	6487
			12	196
AIR INTAKES	3030000			
7 AIR INTAKES	303010055		77	248210
			77	248
PILOTS AND NAVIG CANOPIES	3040000			
76 PILOTS CANOPY	304010053		24	208176
			24	208
100 NAVIGATORS CANOPY	304020053		15	321232
			15	321

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
	301005652		6160	17636	11561	1086378	712158
717 36	301005958		557	71367	11524	397514	64189
NK	301006154		5007	41403	14202	2073048	711094
ECTOR	301006254		1981	33428	16400	662209	324884
AV ARCH	301006352		2115	25699	15352	543534	324695
URE	301006454		2119	29285	10309	620549	218448
F	301006559		8457	77280	9910	6535570	838089
	301006659		10403	77168	13059	8027787	1358528
R F	301006759		5143	77149	13796	3967773	709528
R R F	301006859		2616	78134	15379	2043985	402315
	301006959		9001	77929	13652	7014389	1228817
KED R F	301007059		2799	77170	12570	2159988	351834
	301007159		44800	83168	12877	37259264	5768896
EM R F	301007259		8835	83155	13729	7346744	1212957
E B	301007358		9196	66400	10284	610216	94510
L D B	301007556		2435	2514	13145	127609	31942
D B	301007656		7640	54472	9006	4161661	688058
	301007756		5348	55246	8800	2954556	470624
	3010078		855	25500	12000	218025	102600
D F F	3010079		1092	22000	12000	240240	131040
	3010080		520	48500	9800	252200	50960
	3010081		2521	58475	9150	1474155	230672
2 50	3010082		443	74250	11500	328928	50945
F F	301008652		1196	19260	12189	230350	145780
			645452			308281110	76123849
	302000072		11790	50884	9049	5999224	1066877
	30200001		406	48794	9374	198104	38058
			12196			6197328	1104935
	3030000						
	303010055		77248	21079	11868	16283106	9167793
			77248			16283106	9167793
NOPIES	3040000						
	304010053		24208	17686	15915	4281427	3852703
			24208			4281427	3852703
	304020053		15321	23277	16223	3566269	2485526
			15321			3566269	2485526

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT_____

[illegible]

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. _____

SHEET_____

[illegible]

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		3803	629
			3803	
ACC GEAR BOXES ON FUS D B	5020001	56	4445	578
ACC GEAR BOXES ON FUS E B	5020002	58	23225	608
			27670	
ENGINE CONTROLS	5030000			
35 ENGINE CONTROLS F F	5030001	52	1558	166
35 ENGINE CONTROLS C F	5030002	54	1172	68
35 ENGINE CONTROLS E B	5030004	58	9466	37
35 ENGINE CONTROLS I W	5030005	62	6894	97
35 ENGINE CONTROLS ENG	5030006		2564	1
			3335	
83 GEARBOX AND STARTER ON ENG	5040000		28680	589
			28680	
91 ENGINE ANTI ICING	5050000		7561	562
			7561	
FIRE EXT SYSTEM	5060000			
FIRE EXTING SYSTEM D B	5060002	56	1465	53
FIRE EXTING SYSTEM E B	5060003	58	6407	703
			6553	
ENGINE MTGS AND BRACKETS	5070000			
64 ENG MOUNTING AND BRKTS	5070001		14653	625
ENGINE MTGS ACCESSORIES	5070002		5202	662
ENGINE MTGS ACCESSORIES CA	5070003		766	642
			20621	

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
	5000000						
	5010000		1187578	66543	11983	790250029	142307472
			1187578			790250029	142307472
ESS	5010100		3803	62941	10354	2393646	393763
			3803			2393646	393763
S D B	5020001	56	4445	57866	9765	2572144	434054
S E B	5020002	58	23225	60850	10431	14132413	2422600
			27670			16704557	2856654
	5030000						
	5030001	52	1558	16668	12431	259687	193675
	5030002	54	117	26800	11800	31356	13806
	5030004	58	946	63787	10081	603425	95366
	5030005	62	689	49745	13137	342743	90514
	5030006		25	64137	10000	16034	2500
			3335			1253245	395861
ON ENG	5040000		28680	58918	10554	16897682	3026887
			28680			16897682	3026887
	5050000		7561	56269	11511	4254499	870347
			7561			4254499	870347
	5060000						
B	5060002	56	146	55318	13749	80764	20074
B	5060003	58	640	77038	113414	4509311	859435
			6553			4590075	879509
KETS	5070000						
TS	5070001		146	5362504	12935	9158711	1895366
IES	5070002		520	266213	12248	3444400	637141
IES CA	5070003		766	64236	13192	492048	101051
			20621			13095159	2633558

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. _____

SHEET_____

REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
5080000						
5080001	54	13483	40781	14085	5498502	1899081
5080002	56	17382	53418	11311	9285117	1966078
5080003	58	4025	66918	12500	2693450	503125
5080004	62	54349	55715	14413	30280545	7833321
5080005		1648	68563	8916	1129918	146936
5080006		754	61525	9658	463899	72821
		91641			49351431	12421362

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
FLYING CONTROLS GROUP		6000000			
MECHANICAL CONTROLS		6010000			
59	MECHANICAL CONTROLS F F	6010001	52	10992	162
	MECHANICAL CONTROLS C F	6010002	54	1213	400
70	MECHANICAL CONTROLS F IN	6010005	83	12528	787
74	MECHANICAL CONTROLS I W	6010006	62	39689	718
85	MECHANICAL CONTROLS O W	6010007	64	30260	770
	MECHANICAL CONTROLS C A	6010008		663	709
				95345	
FLYING CONTROLS HYDRAULICS		6020000			
	FLYING CONT HYDRAULICS D B	6020001	56	3618	563
	FLYING CONT HYDRAULICS E B	6020002	58	45384	651
	FLYING CONT HYDRAULICS R F	6020003	59	487	58
77	FLYING CONT HYDRAULICS I W	6020004	62	27475	703
66	FLYING CONT HYDRAULICS O W	6020005	64	13086	740
63	FLYING CONT HYDRAULICS F IN	6020006	83	5564	760
	FLYING CONT HYDRAULICS R N	6020008	51	3500	113
	FLYING CONT HYDRAULICS F F	6020009	52	18423	203
	FLYING CONT HYDRAULICS C F	6020010	54	2882	356
				119980	

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REPORT NO. _____

SHEET_____

	REFERENCE NO.	COMP. NO.	WEIGHT	H. ARM	V. ARM	H. MOMENT	V. MOMENT
UP	6000000						
F F	6010000						
C F	6010001	52	10992	16269	11434	1788288	1256825
FIN	6010002	54	12134	0097	11790	486377	143013
I W	6010005	83	12528	78782	22159	9869809	2776080
O W	6010006	62	39689	71859	14385	28520119	5709263
C A	6010007	64	30260	77061	13563	23318659	4104164
	6010008		663	70984	14338	470624	95061
			95345			64453876	14084406
RAULICS	6020000						
CS D B	6020001	56	3618	56342	10468	2038454	378732
CS E B	6020002	58	45384	65157	11020	29570853	5001317
CS R F	6020003	59	48	75875	10824	36420	5196
CS I W	6020004	62	27475	70357	14721	19330586	4044595
CS O W	6020005	64	13086	74031	13587	9687697	1777995
CS FIN	6020006	83	5564	76036	20808	4230643	1157757
CS R N	6020008	51	3500	11309	10513	395815	367955
CS F F	6020009	52	18423	20376	10200	3753870	1879146
CS C F	6020010	54	2882	35670	11132	1028009	320824
			119980			70072347	14933517

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WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT _____

DESCRIPTION		REFERENCE NO.	COMP. NO.	WEIGHT	H. A.
FIXED EQUIPMENT GROUP		7000000			
INSTRUMENTS		7010000			
INSTRUMENTS F F		7010001	52	4709156	
NAVIG TABLE AND STOWAGE		7010004	52	200220	
				4909	
COCKPIT PRESSURE SEALING		7020000	52	500186	
				500	
OXYGEN SYSTEM		7030000			
58	OXYGEN SYSTEM	7030001	52	2240252	
				2240	
AIR CONDITIONING SYSTEM		7040000			
AIR CONDITIONING F F		7040001	52	4558182	
AIR CONDITIONING C F		7040002	54	47599294	
AIR CONDITIONING D B		7040003	56	2159516	
AIR CONDITIONING C A		7040005		28069394	
AIR CONDITIONING ENG		7040006		2855640	
AIR CONDITIONING I W		7040007	62	80515	
				85320	
HYDRAULICS MAIN SYSTEM		7050000			
32	UTILITY HYDRAULICS F F	7050001	52	8981200	
29	UTILITY HYDRAULICS C F	7050002	54	4578440	
20	UTILITY HYDRAULICS D B	7050003	56	27338556	
74	UTILITY HYDRAULICS E B	7050004	58	7892605	
24	UTILITY HYDRAULICS I W	7050005	62	13511553	
32	UTILITY HYDR NOSE U C	7050006	91	213188	
24	UTILITY HYDR MAIN U C	7050007	92	2980543	
NUC AND MUC DOOR SEQ MECH		7050010		6689345	
				72182	
CABIN INSULATION		7070000	52	1431187	
				1431	
BRAKE PARACHUTE		7080000			
BRAKE PARACHUTE F F		7080001	52	462168	

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	7000000						
	7010000						
	7010001	52	470915651	13637		737006	642166
AGE	7010004	52	20022000	13000		44000	26000
			4909			781006	668166
LING	7020000	52	50018600	13000		93000	65000
			500			93000	65000
	7030000						
	7030001	52	224025282	15603		566317	349507
			2240			566317	349507
TEM	7040000						
	7040001	52	455818260	10634		832291	484698
	7040002	54	4759929442	13499		14014098	6425389
	7040003	56	215951690	12474		1115987	269314
	7040005		2806939471	13687		11079115	3841804
	7040006		285564017	13900		1827685	396845
	7040007	62	8051500	15950		41200	12760
			85320			28910376	11430810
EM	7050000						
F	7050001	52	898120071	10926		1802577	981264
F	7050002	54	457844016	10399		2015052	476066
B	7050003	56	2733855692	11077		15225079	3028230
B	7050004	58	789260587	10861		4781526	857150
W	7050005	62	1351155304	14234		7472123	1923156
C	7050006	91	21318863	9318		40178	19847
C	7050007	92	298054325	14100		1618885	420180
MECH	7050010		668934566	11636		2312120	778332
			72182			35267540	8484225
	7070000	52	143118748	13200		268284	188892
			1431			268284	188892
	7080000						
	7080001	52	46216895	12875		78055	59483

AVRO AIRCRAFT LTD.
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**WEIGHT AND C. OF G BY FUNCTIONAL GROUP
COMPONENT**

PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
BRAKE PARACHUTE R F	7080000559		8513822	
BRAKE PARACHUTE I W	7080000662		124620	
			9099	
ELECTRICAL SYSTEM	70900000			
33 ELECTRICAL WIRING R N	7090000151		12992	
33 ELECTRICAL WIRING F F	7090000252		2966199	
33 ELECTRICAL WIRING C F	7090000354		1304418	
33 ELECTRICAL WIRING A I	7090000455		1274219	
33 ELECTRICAL WIRING D B	7090000556		6515533	
33 ELECTRICAL WIRING E B	7090000658		64595	
33 ELECTRICAL WIRING I W	7090000862		8909541	
33 ELECTRICAL WIRING FIN	7090000983		352797	
33 ELECTRICAL WIRING NUC	7090001091		330186	
33 ELECTRICAL WIRING ENG	70900011		2002585	
33 ELECTRICAL WIRING C A	70900012		13746334	
65 ELECTRICS F F	7090001352		16771155	
26 ELECTRICS C F	7090001454		7596448	
85 ELECTRICS E B	7090001558		670679	
85 ELECTRICS ENG	70900016		11632562	
85 ELECTRICS C A	70900017		718613	
ELECTRICS FIN	7090001883		83895	
ELECTRICS I W	7090001962		2336620	
ELECTRICS CAW	70900020		112629	
ELECTRICS MUC	7090002192		74516	
19 ELECTRICS A I	7090002255		5303220	
93 ELECTRICS D B	7090002356		27132518	
ELECTRICS R F	7090002459		136802	
62 WINDSCREEN DEMISTING	7090002552		2964198	
			113118	
L P PNEUMATICS	71000000			
L P PNEUMATICS F F	7100000152		1836194	
L P PNEUMATICS C F	7100000254		421292	
L P PNEUMATICS D B	7100000356		257559	
L P PNEUMATICS E B	7100000458		1526656	
L P PNEUMATICS FIN	7100000583		640758	
L P PNEUMATICS R N	7100000651		20070	
L P PNEUMATICS C A	71000007		751343	
			5631	
INTAKE DE ICING	7120000055		8800195	
			8800	
RADAR FIXED GROUP	71400000			
RADIO AND RADAR FIXED R N	7140000151		2416090	

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	
	708000	05	59			8513	82210	14392		6998537		1225191	
	708000	06	62			1246	2022	14500		76907		17980	
						9099				7153499		1302654	
	709000	00											
N	709000	01	51			129	9285	12000		11978		15480	
F	709000	02	52			2966	19977	11200		592518		332192	
F	709000	03	54			1304	41878	11000		546089		143440	
I	709000	04	55			1274	21984	12000		280076		152880	
B	709000	05	56			6515	53375	9200		3477381		599380	
B	709000	06	58			6459	5500	9200		38080		5888	
W	709000	08	62			8909	54111	13900		4820749		1238351	
N	709000	09	83			352	79754	30000		280734		105600	
J	709000	10	91			330	18600	9800		61380		32340	
G	709000	11				2002	58583	10000		1172832		200200	
A	709000	12				13746	33473	11234		4601199		1544226	
	709000	13	52			16771	15582	11097		2613257		1861078	
	709000	14	54			7596	44897	10870		3410376		825685	
	709000	15	58			670	67944	11597		455225		77700	
	709000	16				11632	56207	11472		6537998		1334423	
	709000	17				718	61350	12000		440493		86160	
	709000	18	83			8389	5500	28840		74327		23937	
	709000	19	62			2336	62053	14500		1449558		338720	
	709000	20				112	62946	13561		70500		15188	
	709000	21	92			745	1600	13700		38184		10138	
	709000	22	55			5303	22076	13833		1170690		733564	
	709000	23	56			27132	51861	10254		14070927		2782115	
	709000	24	59			1368	0200	11360		109072		15450	
	709000	25	52			2964	19896	9981		589717		295837	
						113118				46913340		12769972	
	710000	00											
	710000	01	52			1836	19487	12684		357781		232878	
	710000	02	54			4212	29264	10316		123201		43430	
	710000	03	56			2575	55930	8965		143740		23040	
	710000	04	58			1526	65650	9737		1001819		148587	
	710000	05	83			6407	5818	25515		485235		163296	
	710000	06	51			200	7067	9261		14134		18522	
	710000	07				751	34320	11797		257743		88595	
						5631				2383653		718348	
	712000	00	55			8800	19582	11800		1723216		1038400	
						8800				1723216		1038400	
	714000	00											
D R N	714000	01	51			24160	9040	10000		2184064		2416000	

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

[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
D F F	714000252		22901	18696	11224	4281571	2570408
D C F	714000354		15255	27593	9885	4209312	1507957
D D B	714000456		19315	3205	14000	1027389	270340
D F IN	714000583		3200	76180	24600	2437760	787200
D C A	7140006		19540	22161	12000	4330259	2344800
D I W	714000762		2228	54570	16000	1215820	356480
			89215			19686175	10253185
	716000052		6586	22201	15436	1462158	1016615
			6586			1462158	1016615
	717000052		2362	18023	12505	425703	295368
			2362			425703	295368
	719000152		363	18744	12200	68041	44286
Y	719000253		64	20218	15900	12940	10176
	719000354		1400	37197	12455	520758	174370
ES	719000455		408	22798	12020	93016	49042
	719000556		377	53828	11200	202932	42224
	719000658		443	66701	11200	295485	49616
	719000759		648	80362	13175	520746	85374
	719000862		315	160144	14400	1895137	453744
	719000964		106	770650	13590	753836	145005
EDGE	719001065		319	63948	13526	203994	43148
ON	719001174		353	79190	13556	279541	47853
TOR	719001282		566	75523	14260	427460	80712
	719001383		639	74663	20837	477097	133148
R	719001484		202	81279	21431	164184	43291
			10000			5915167	1401989
TIONS	7200000		886	784681	211821	41511945	10482626
			886	78		41511945	10482626

AVRO AIRCRAFT LTD.
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**WEIGHT AND C. OF G BY FUNCTIONAL GROUP
COMPONENT**

PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. A.P.
REMOVABLE EQUIPMENT GROUP	8000000			
94 EJECTOR SEATS	8010100	52	34294	204
			34294	
RADAR REMOV GROUP	8020000			
RADIO AND RADAR REMOV R N	8020101	51	101895	90
RADIO AND RADAR REMOV F F	8020102	52	20905	186
RADIO AND RADAR REMOV C F	8020103	54	67695	279
RADIO AND RADAR REMOV D B	8020104	56	1410	497
RADIO AND RADAR REMOV F I N	8020105	83	3700	747
RADIO AND RADAR REMOV C A	8020106		3833	552
RADIO AND RADAR REMOV E B	8020107	58	6400	730
RADIO AND RADAR REMOV I W	8020108	62	920	478
			206758	
DAMPING SYSTEM	8030000			
DAMPING SYSTEM F F	8030101	52	784	172
DAMPING SYSTEM C F	8030102	54	2303	322
DAMPING SYSTEM E B	8030103	58	369	632
DAMPING SYSTEM I W	8030104	62	6070	537
DAMPING SYSTEM O W	8030105	64	95	748
DAMPING SYSTEM R N	8030106	51	287	73
DAMPING SYSTEM C A	8030107		8564	479
			18472	
98 INSTRUMENT PACK	8050800	94	68680	385
			68680	
INSTRUMENTATION	8050900	94	200000	394
			200000	
MISSILE SEEKER AND INST	8060000		16700	519
			16700	

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
GROUP	8000000						
	8010100	52	34294	20450	13411	7013123	4599168
			34294			7013123	4599168
	8020000						
V R N	8020101	51	101895	9017	10100	9187872	10291395
V F F	8020102	52	20905	18663	12438	3901500	2600164
V C F	8020103	54	67695	27954	10484	18923460	7097144
V D B	8020104	56	1410	49718	10000	701024	141000
V F I N	8020105	83	3700	74757	25900	2766009	958300
V C A	8020106		3833	55288	16000	2119189	613280
V E B	8020107	58	6400	73050	12500	4675200	8000000
V I W	8020108	62	920	47802	15933	439778	146584
			206758			42714032	22647867
	8030000						
	8030101	52	784	17201	12047	134856	94448
	8030102	54	2303	32213	10949	741865	252155
	8030103	58	369	63242	13432	233363	49564
	8030104	62	6070	53781	15720	3264507	954204
	8030105	64	95	74855	14000	71112	13300
	8030106	51	287	7350	9340	21095	26806
	8030107		8564	47972	12893	4108322	1104157
			18472			8575120	2494634
	8050800	94	68680	38581	9468	26497431	6502622
			68680			26497431	6502622
	8050900	94	200000	39400	9500	78800000	19000000
			200000			78800000	19000000
NST	8060000		16700	51929	5064	8672143	845688
			16700			8672143	845688

AVRO AIRCRAFT LTD.
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

PROJECT _____

DESCRIPTION	REFERENCE NO.	COMP. NO.	WEIGHT	H. AR
OPERATIONAL LOAD	9000000			
CREW MEMBERS	9010000	52	39000	194
			39000	
ENGINE OIL	9020000			
ENGINE OIL USABLE	9020001		8816	612
ENGINE OIL TRAPPED ENG	9020002		1773	626
ENGINE OIL TRAPPED D B	9020003	56	1925	580
ENGINE OIL TRAPPED E B	9020004	58	909	599
			13423	
OXYGEN CHARGE	9040000			
OXYGEN CHARGE F F	9040001	52	7220	4
OXYGEN CHARGE C F	9040002	54	1267	262
			1339	
100 ENGINE FIRE EXT FLUID	9060000		2500	7300
			2500	
RESIDUAL FUEL	9070000			
RESIDUAL FUEL C F	9070001	54	5700	392
RESIDUAL FUEL D B	9070002	62	23000	536
			28700	
TRAPPED FUEL	9080000			
TRAPPED FUEL C F	9080001	54	2430	414
TRAPPED FUEL D B	9080002	56	690	494
TRAPPED FUEL I W	9080003	62	20700	572
			23820	
WATER FOR AIRCONDITIONING	9100000			
WATER FOR AIRCOND C F	9100001	54	12500	2680
WATER FOR AIRCOND APF	9100002	94	12500	3620
UNUSABLE WATER AIRCOND C F	9100003	54	1500	2680
UNUSABLE WATER AIRCOND APF	9100004	94	1500	3620
			28000	

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
	90000000						
	90100000	52	39000	19400	13650	7566000	5323500
			39000			7566000	5323500
	90200000						
	90200001		88166	1246	12186	5399447	1074318
ENG	90200002		17736	2676	11640	1111245	206377
D B	90200003	56	19255	5808	9555	1118117	183934
E B	90200004	58	90959	928	9704	544746	88209
			13423			8173555	1552838
	90400000						
	90400001	52	72204	93	13200	14755	9504
	90400002	54	12672	6280	16150	332968	204621
			1339			347723	214125
ID	90600000		25007	3000	12900	1825000	322500
			2500			1825000	322500
	90700000						
	90700001	54	57003	9263	12360	2237991	704520
	90700002	62	23000	5367	60344	12345480	13879120
			28700			14583471	14583640
	90800000						
	90800001	54	24304	1426	13106	1006652	318476
	90800002	56	69049	400	13350	340860	92115
	90800003	62	20700	5720	114290	11840607	2958030
			23820			13188119	3368621
IONING	91000000						
F	91000001	54	12500	26800	13200	3350000	1650000
PF	91000002	94	12500	36200	10100	4525000	1262500
OND C F	91000003	54	1500	26800	12700	402000	190500
OND APF	91000004	94	1500	36200	10100	543000	151500
			28000			8820000	3254500

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