

QCX  
Avro  
CF105  
R-7-0400-34  
Iss-9

FILE IN VAULT

C-105 MK 2

Report # 7-0400-34  
Iss. 9

UNCLASSIFIED

SECRET SUMMARY & C.C. POSITION

N.E.A.

July 1/57

NON CLASSIFIED

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UNCLASSIFIED



C-105 MK 2 Production Aircraft

I N D E X

| <u>Sheet #</u> | <u>Content</u>                                                                                                                                                                                   |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-1 to 1-4     | Introductory notes and explanations of weight changes.                                                                                                                                           |
| 2-1 to 2-3     | Weight and C.G. Summaries.                                                                                                                                                                       |
| 3-1            | Horizontal C.G. Envelope for Aircraft Flight Conditions using fuel sequencing, C.G. controlled to approximately 31% M.A.C. until Damping System requirements are proven (ref. Avro Spec. E-503). |
| 3-2            | Horizontal C.G. Envelope for Aircraft Flight Conditions using fuel sequencing to achieve approximately 34% M.A.C. at Combat Weight (Alternate Sequencing Spec. E-503).                           |
| 4-1 to 4-      | I.B.M. Detail Sheets of Weights and C.G.'s.                                                                                                                                                      |

SECRET

Classification cancelled / changed to: UNCLASSIFIED

By authority of: DRDA 7/DARFT 5-8/DAS Eng 6-4-5

Date: 5 Nov 1992

Signature: \_\_\_\_\_

Unit / Rank / Appointment: DSIS/3, Secretary CRAD HQ DRP

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~~SECRET~~  
~~NOT RECLASSIFIED~~



47894



Aircraft: C-105 MK 2  
Production Aircraft

Report # 7-0400-34 Issue 9  
Sheet # 1-1  
Date: July, 1st 1957

### INTRODUCTION & WEIGHT CHANGES

The following is a Weight and C.G. Summary of the C-105 MK 2 Production Aircraft based on the latest weight estimates available.

Where no details, of minor changes between MK 1 Aircraft and MK 2 Aircraft, are available allowances have been retained as in MK 1. Some MK 2 estimates are to production drawings some to schemes and some allowances of a very preliminary nature e.g. Structure Aft. of Sta. 803 ins.

All weight & C.G. changes are relative to Issue 8 of June 1st 1957.

#### GENERAL

- a) Orenda PS 13 Engines comprise the Power Plant (4,500 lb each).
- b) A package containing 4 "semi-submerged" Sparrow 11 Missiles (432 lb each) forms the current armament.
- c) The R.C.A. Radar Astra 1 System is installed - Weight & C.G. Location being to the latest breakdown received from them, dated January 11th 1957. However, the Sparrow 111 Auxiliaries and the Infra-red Tracker System, included in the breakdown, have been deleted and some Avro installed Antennae added (Total weight 2,614.5 lb).
- d) A considerable number of MK 1 parts and assemblies have now been weighed. There have only been very insignificant weight deviations between calculated and Actual weights of Structural items, however, bought out equipment has been fairly consistently in the order of 11% above the manufacturers estimates or Avro specification weight requirements. Where these weights apply to the MK 2 Aircraft they have been incorporated into the MK 2 records.

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

N.B. It should be noted that the first MK 2 Aircraft will probably not be as this summary designates, but will be a Flight Test version, with instrumentation replacing the Missile Package etc.

#### 1. STRUCTURE

WEIGHT (lb)

##### a) Wing

NO WEIGHT CHANGE

##### b) Fin and Rudder

NO WEIGHT CHANGE

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INTRODUCTION & WEIGHT CHANGES

1. STRUCTURE

WEIGHT (lb)

c) Structure Fwd. Sta 255"

|                                                                                                                     |        |
|---------------------------------------------------------------------------------------------------------------------|--------|
| Navigator's Canopy - redesigned for MK 2 Aircraft<br>with larger windows                                            | +13.33 |
| Radome - Revision of the weights of the light<br>sandwich type radome and initial est.<br>of aft. attach. ring etc. | + 4.25 |
| Radar Nose Structure - only an allowance previously,<br>now est. to scheme & production drawings.                   | - 5.56 |
| <u>TOTAL INCREASE FWD. FUSELAGE</u>                                                                                 | +12.02 |

d) Centre Fuselage Sta 255" to 485"

|                                                                               |        |
|-------------------------------------------------------------------------------|--------|
| Dorsal Fairing Sta 268" - 317" - redesigned for MK 2<br>Aircraft in titanium. | + 6.66 |
| <u>TOTAL INCREASE CENTRE FUSELAGE</u>                                         | + 6.66 |

e) Duct Bay Sta 485" - 591.65"

|                                                                                                                                                                                                                                                          |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Side Formers - some redesigned for MK 2 Aircraft                                                                                                                                                                                                         | - 1.26 |
| Bottom Formers - some redesigned for MK 2 Aircraft                                                                                                                                                                                                       | - 1.90 |
| Floating Duct - This has been extensively redesigned<br>with an articulated adaptor between the<br>floating Duct and Engine, including gills.<br>Drawings are not yet released but a<br>preliminary estimate indicates an increase<br>in the duct Wt. of | +96.00 |
| (N.B. Wt. Change 1st Aircraft = 48.41 due to the<br>deletion of -59.59 from the Engine Group<br>for the adaptor and addition of joint clamp,<br>see Engine Bay + 12.00 )                                                                                 |        |
| <u>TOTAL WEIGHT INCREASE DUCT BAY</u>                                                                                                                                                                                                                    | +92.84 |

f) Engine Bay Sta. 591.65" - 742.5"

|                                                                                   |        |
|-----------------------------------------------------------------------------------|--------|
| Heavy Formers - miscellaneous minor changes, some<br>production drawing estimates | + 2.07 |
| Engine Service Doors - deletion of intercostals at # 4 door                       | - 1.58 |
| Engine Tunnel - lower shroud splice                                               | + 7.00 |
| Doublers at shroud beams, (titanium were AP)<br>alt. to hinges, seals added etc.  | +21.81 |

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INTRODUCTION & WEIGHT CHANGES

1. STRUCTURE

WEIGHT (lb)

f) Engine Bay Sta. 591.65" - 742.5" (Cont'd)

|                                                     |               |
|-----------------------------------------------------|---------------|
| Titanium & steel used at access doors<br>and seals  | +20.00        |
| Joint Engine to Duct - Marmon type clamp introduced | +12.00        |
| <u>TOTAL WEIGHT INCREASE ENGINE BAY</u>             | <u>+61.30</u> |

g) Rear Fuselage Sta. 742.5" aft.

|                                                 |               |
|-------------------------------------------------|---------------|
| Tunnel Fixed RF - First est. to MK 2 schemes    | + 2.84        |
| Longerons and Centre Beam - redesigned for MK 2 | - 1.09        |
| Rudder Fairing - redesigned for MK 2            | + 0.32        |
| Engine Doors - Stress approval frame Sta. 803   | + 0.54        |
| " " " " 798                                     | - 1.22        |
| Outer Skins Fixed RF - MK 2 redesign            | + 1.01        |
| <u>TOTAL INCREASE REAR FUSELAGE</u>             | <u>+ 2.40</u> |

h) Fuselage Joints

|                                          |               |
|------------------------------------------|---------------|
| Joint Sta. 742.5 - revised MK 2 estimate | - 0.25        |
| <u>TOTAL JOINTS DECREASE</u>             | <u>- 0.25</u> |

|                                  |                |
|----------------------------------|----------------|
| <u>TOTAL STRUCTURAL INCREASE</u> | <u>+174.97</u> |
|----------------------------------|----------------|

2. LANDING GEAR

NO WEIGHT CHANGE

3. POWER PLANT & SERVICES

|                                                              |               |
|--------------------------------------------------------------|---------------|
| Engines - addition of Engine restrictor flaps                | + 2.25        |
| deletion of Adaptor ring (see Engine<br>Bay Structure Group) | -59.59        |
| <u>TOTAL POWER PLANT DECREASE</u>                            | <u>-57.34</u> |

4. FLYING CONTROLS

NO WEIGHT CHANGE

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INTRODUCTION & WEIGHT CHANGES

5. EQUIPMENT GROUP

WEIGHT (lb)

|                                                                                                             |               |
|-------------------------------------------------------------------------------------------------------------|---------------|
| MH64 Damping System - addition of Minneapolis Honeywell damping system and emergency Yaw damping            | +60.00        |
| Air Conditioning - previously an allowance only was carried, now fully estimated to initial scheme drawings | -41.00        |
| Missile Pack Air Conditioning - Ducting added for cooling                                                   | + 2.64        |
| <u>TOTAL EQUIPMENT INCREASE</u>                                                                             | <u>+21.64</u> |

SUMMARY

Weight Change - Aircraft Weight Empty

|             |                |
|-------------|----------------|
| Strucutre   | +174.97        |
| Power Plant | - 57.34        |
| Equipment   | + 21.64        |
|             | <u>+139.27</u> |

Weight Change - Operational Weight Empty (Aircraft less fuel)

|                |                |                    |
|----------------|----------------|--------------------|
| <u>Issue 8</u> | <u>Issue 9</u> |                    |
| 44,214.53      | 44,353.80      | <u>+139.27 lb.</u> |

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Aircraft: C-105 MK 2  
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WEIGHT & C.G. SUMMARY

| Description                        | WEIGHT<br>lb. | H. ARM<br>ins. | V. ARM<br>ins. |
|------------------------------------|---------------|----------------|----------------|
| STRUCTURE                          | 18,524.98     | 564.30         | 137.67         |
| Wing                               | 9,980.77      | 642.76         | 142.21         |
| Fin & Rudder                       | 1,024.00      | 754.25         | 209.28         |
| Fuselage Fwd. Sta. 255"            | 2,493.62      | 186.93         | 129.08         |
| Sta. 255"-485"                     | 1,688.44      | 378.72         | 129.61         |
| Sta. 485"-591.65"                  | 1,045.19      | 536.96         | 105.11         |
| Sta. 591.65" -742.5                | 1,541.78      | 660.67         | 110.61         |
| Sta. 742.5 Aft.                    | 698.85        | 795.80         | 129.02         |
| "Marry Up"                         | 52.33         | 467.60         | 103.84         |
| UNDERCARRIAGE - RETRACTED          | 2,551.77      | 487.22         | 134.79         |
| Main Undercarriages                | 1,901.62      | 539.31         | 141.00         |
| Main U/C Doors & Fairings          | 291.80        | 537.10         | 138.40         |
| Nose Undercarriage                 | 333.81        | 170.80         | 99.70          |
| Nose U/C Door & Fairing            | 24.54         | 162.24         | 88.23          |
| POWER PLANT & SERVICES             | 10,628.54     | 674.64         | 121.36         |
| Engines & Accessories PS 13        | 9,032.78      | 691.67         | 121.20         |
| Gear Box & Drives on Fus.          | 281.84        | 601.70         | 102.49         |
| Engine Controls                    | 32.43         | 375.76         | 118.61         |
| Gear Box, Starter & Drives on Eng. | 315.45        | 615.98         | 105.24         |
| Engine Nose Bullet (Orenda sup)    | 70.00         | 587.17         | 116.00         |
| Fire Extinguishing System          | 70.46         | 702.44         | 134.82         |
| Engine Mountings                   | 132.38        | 666.82         | 136.52         |
| Fuel System                        | 693.20        | 530.62         | 134.87         |
| FLYING CONTROLS GROUP              | 1,801.45      | 686.69         | 140.08         |
| Mechanical Flying Controls         | 946.48        | 637.84         | 148.61         |
| Hydraulic Flying Controls          | 854.97        | 685.42         | 130.63         |
| EQUIPMENT FIXED & REMOVABLE        | 7,996.30      | 326.74         | 112.38         |
| Instruments                        | 46.07         | 163.68         | 138.70         |
| Probe                              | 18.50         | -40.00         | 108.00         |
| Cockpit Pressure Sealing           | 5.00          | 186.00         | 130.00         |
| Oxygen System                      | 23.59         | 253.72         | 156.43         |
| Ejector Seats                      | 284.42        | 202.80         | 136.25         |
| Air Conditioning System            | 856.00        | 333.49         | 134.98         |
| Hydraulic Main System              | 609.09        | 500.86         | 117.57         |
| Cabin Insulation                   | 14.31         | 187.48         | 132.00         |
| Brake Parachute                    | 62.38         | 769.41         | 143.24         |
| Electrical System                  | 1,242.38      | 426.80         | 112.53         |

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WEIGHT & C.G. SUMMARY

| Description                                                | WEIGHT<br>lb. | H.ARM<br>ins. | V.Arm<br>ins. | M.A.C.<br>% |
|------------------------------------------------------------|---------------|---------------|---------------|-------------|
| Low Pressure Pneumatics                                    | 55.70         | 416.79        | 123.99        |             |
| Surface Finish                                             | 100.00        | 591.52        | 140.20        |             |
| Intake De-Icing Boots                                      | 51.84         | 197.02        | 118.00        |             |
| Radome Anti-Icing                                          | 8.88          | 51.49         | 125.00        |             |
| Canopy Actuation                                           | 62.05         | 222.11        | 154.47        |             |
| Cabin Consoles                                             | 17.45         | 174.76        | 124.34        |             |
| Radar Door Actuation                                       | 10.00         | 268.00        | 95.00         |             |
| MH64 Damping System                                        | 60.00         | 434.09        | 134.90        |             |
| Radio & Radar removable                                    | 1,850.50      | 178.50        | 104.46        |             |
| "    "    fixed                                            | 621.00        | 234.04        | 116.15        |             |
| Sparrow Pack Structure                                     | 870.70        | 389.60        | 96.00         |             |
| "    "    Mechanisms                                       | 584.76        | 377.66        | 98.93         |             |
| "    "    Hydraulics                                       | 331.94        | 373.52        | 99.00         |             |
| "    "    Electronics                                      | 143.00        | 332.00        | 100.00        |             |
| "    "    Electrics                                        | 64.10         | 362.29        | 95.00         |             |
| "    "    Air Conditioning                                 | 2.64          | 309.93        | 104.15        |             |
| AIRCRAFT BASIC WEIGHT                                      | 41,503.04     | 547.36        | 128.55        |             |
| USEFUL LOAD (LESS FUEL)                                    | 2,850.76      | 372.91        | 105.43        |             |
| Crew                                                       | 430.00        | 194.00        | 136.50        |             |
| Oil                                                        | 138.97        | 636.92        | 110.57        |             |
| Alcohol                                                    | 22.00         | 93.00         | 138.00        |             |
| Engine Fire Ext. Fluid                                     | 25.00         | 730.00        | 129.00        |             |
| Residual Fuel                                              | 218.40        | 553.98        | 134.04        |             |
| Missiles                                                   | 1,728.00      | 389.29        | 88.30         |             |
| Oxygen Charge                                              | 13.39         | 259.68        | 159.91        |             |
| Water for Air Conditioning                                 | 275.00        | 268.00        | 131.75        |             |
| U/C Up                                                     |               | 536.15        | 127.06        | 27.67       |
| Operational Weight Empty                                   | 44,353.80     |               |               |             |
| U/C Down                                                   |               | 538.31        | 123.49        | 28.26       |
| U/C Up                                                     |               | 542.10        | 128.63        | 29.31       |
| Op. Wt. Empty Less Missiles                                | 42,625.80     |               |               |             |
| U/C Down                                                   |               | 544.34        | 124.92        | 29.93       |
| Normal Combat Mission Fuel *<br>(2026 gals at 7.8 lb/gal.) | 15,800.00     | 542.05        | 142.30        |             |
| U/C Up                                                     |               | 537.70        | 131.06        | 28.10       |
| Normal Combat Weight                                       | 60,153.80     |               |               |             |
| U/C Down                                                   |               | 539.29        | 128.43        | 26.53       |
| Half Combat Mission Fuel<br>(1,013 gals at 7.8 lb/gal)     | 7,900.00      | 543.20        | 139.55        |             |

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WEIGHT & C.G. SUMMARY

| Description                                                                                                                                                                                       | WEIGHT<br>lb. | H.ARM<br>ins.    | V.ARM<br>ins.    | M.A.C.<br>% |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|------------------|-------------|
| U/C Up<br>Combat Weight (half mission<br>fuel)                                                                                                                                                    | 52,253.80     | 537.22           | 128.95           | 27.96       |
| U/C Down<br>Max. Internal Fuel (2492 gals<br>at 7.8 lb/gal)                                                                                                                                       | 19,438.00     | 539.05<br>541.85 | 125.92<br>144.16 | 28.47       |
| U/C Up<br>A.U.W. Max. Int. Fuel                                                                                                                                                                   | 63,791.80     | 537.89           | 132.27           | 28.15       |
| U/C Down                                                                                                                                                                                          |               | 539.39           | 129.97           | 28.56       |
| Max. External Fuel (500 gals at<br>7.8 lb/gal + Drop Tank)                                                                                                                                        | 4,248.20      | 521.84           | 60.67            |             |
| U/C Up<br>A.U.W. Max. Int. & Ext. Fuel                                                                                                                                                            | 68,040.00     | 536.89           | 127.80           | 27.88       |
| U/C Down                                                                                                                                                                                          |               | 538.30           | 125.47           | 28.26       |
| <p>N.B. 1)* New figures are being prepared by Aerodynamics for Mission fuel<br/>in accordance with latest PS13 data.</p> <p>2) Aircraft Datum = 120" above an arbitrarily chosen ground line.</p> |               |                  |                  |             |

SECRET



REPORT NO: 7-0400-34-9

BY: Kathleen Lyffue

DATE: July 1st 1954

SHEET: 3-1

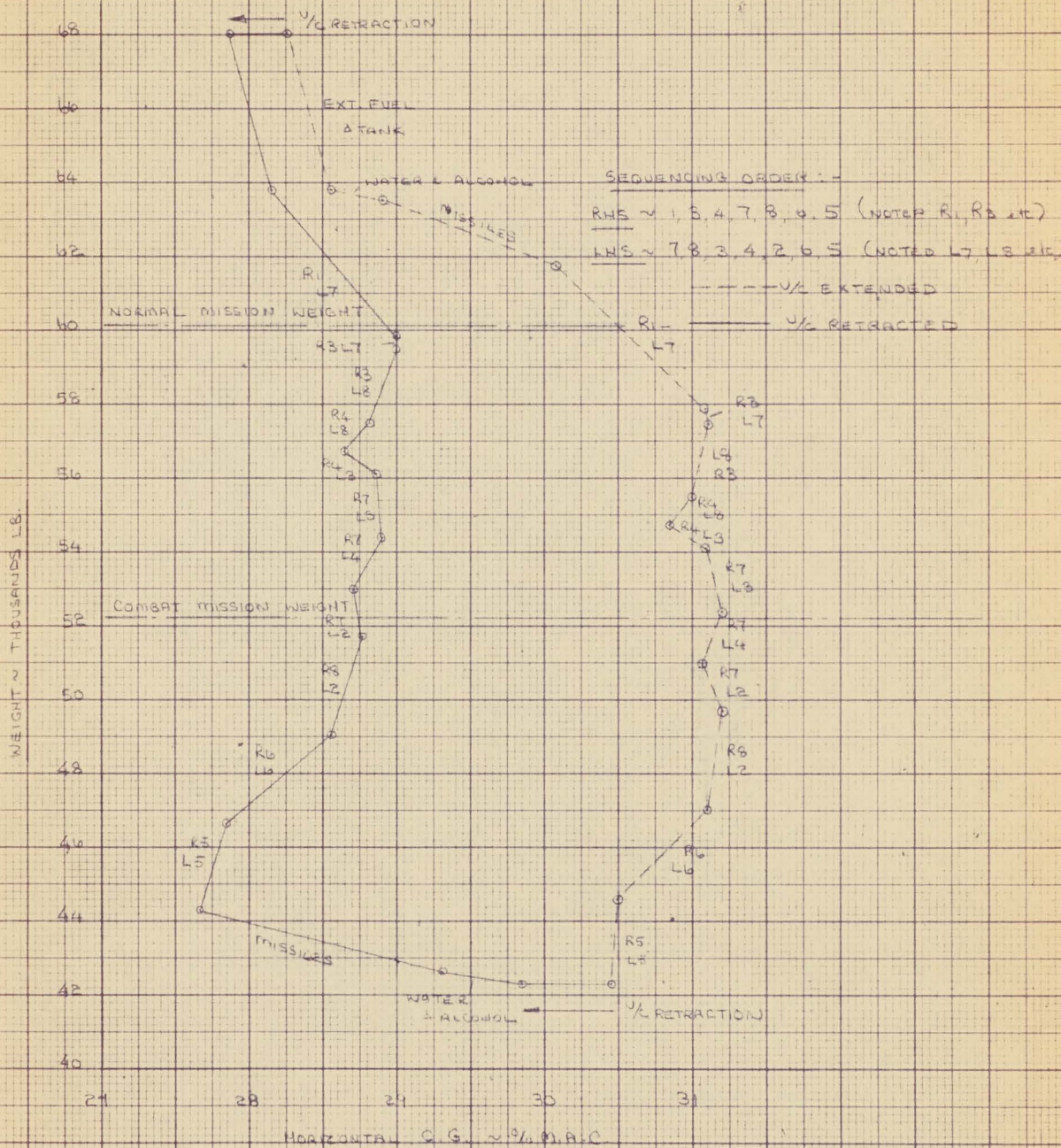
F105 MK 2 PRODUCTION AIRCRAFT  
HORIZONTAL C.G. ENVELOPE FOR A/C

FLIGHT CONDITIONS

USING FUEL SEQUENCING CONFORMING

TO A/RD (PRELIM) SPEC E 302

(FOR USE UNTIL NECESSITY OF DAMPING SYSTEM PROVEN)



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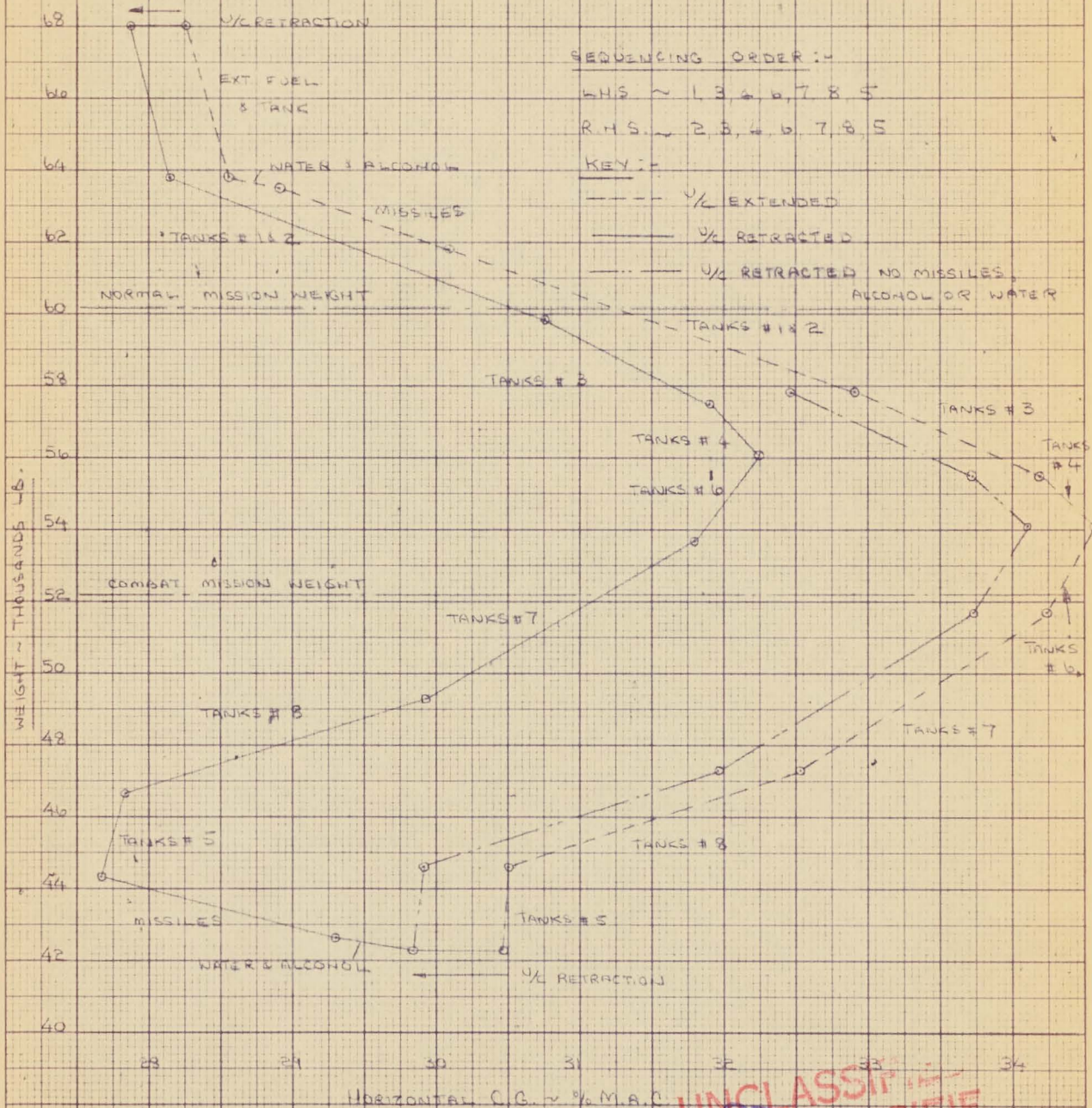
REPORT NO: 7-0400-34-9

BY: Kathleen Lyffan

DATE: July 15, 1954

SHEET: 3-2

C105 MK2 PRODUCTION AIRCRAFT  
HORIZONTAL C.G. ENVELOPE FOR A/C  
FLIGHT CONDITIONS  
USING ALTERNATE FUEL SEQUENCING  
CONFORMING TO AURO (PRELIM) SPEC. E.503  
TO ACHIEVE 34% M.A.C. AT COMBAT AS REQ<sup>D</sup> BY AERODYNAMICS



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G9-12  
 10 X 10 TO THE 1/2 INCH  
 MADE IN CANADA













## WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

[illegible]



## WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

| DESCRIPTION              |                            | REFERENCE NO. | COMP. NO. | WEIGHT |
|--------------------------|----------------------------|---------------|-----------|--------|
| TOTAL FUSELAGE GROUP     |                            | 30000000      |           |        |
| FUSELAGE BASIC STRUCTURE |                            | 30100000      |           |        |
| RADOME                   |                            | 3010000151    |           | 10265  |
| RADAR NOSE STRUCTURE     |                            | 3010000351    |           | 17444  |
| SKIN F F                 |                            | 3010000452    |           | 8094   |
| SKIN C F                 |                            | 3010000554    |           | 21048  |
| SKIN D B                 |                            | 3010000656    |           | 5880   |
| SKIN E B                 |                            | 3010000758    |           | 16489  |
| 4                        | FORMERS F F                | 3010001152    |           | 10531  |
|                          | FORMERS C F                | 3010001254    |           | 27786  |
| 6                        | FORMERS D B                | 3010001356    |           | 7331   |
|                          | LIGHT FORMERS E B          | 3010001458    |           | 10370  |
| 4                        | HEAVY FORMERS E B          | 3010001558    |           | 18865  |
|                          | LOWER LONGERONS F F        | 3010001652    |           | 6846   |
|                          | INNER LONGERON E B         | 3010001758    |           | 7184   |
|                          | LONGERON E B               | 3010001858    |           | 6905   |
|                          | TOP LONGERONS E B          | 3010001958    |           | 638    |
|                          | LOWER SHEAR PANEL          | 3010002052    |           | 2988   |
|                          | TOP WING LONGERONS D B     | 3010002156    |           | 498    |
|                          | LONGERONS C F              | 3010002252    |           | 53     |
|                          | LONGERONS C F              | 3010002354    |           | 13813  |
|                          | LONGERONS D B              | 3010002556    |           | 10569  |
| 59                       | ELECTRONICS RAY STRUCTURE  | 3010002654    |           | 4523   |
|                          | LONGITUDINAL BEAMS D B     | 3010002756    |           | 6570   |
| 72                       | RADAR ACCESS DOOR C F      | 3010002854    |           | 2108   |
|                          | MAIN FRAME AT STN 538 77   | 3010002956    |           | 5980   |
|                          | DIVE BRAKE ACCOM STRUCTURE | 3010003056    |           | 3634   |
| 20                       | TOP LONGERONS F F          | 3010003152    |           | 18571  |
| 100                      | DUCT C F                   | 3010003254    |           | 33286  |
|                          | DUCT D B                   | 3010003356    |           | 35100  |
|                          | CANOPY ARCHES              | 3010003452    |           | 8535   |
| 4                        | ACCESS PANEL STIFFNERS     | 3010003656    |           | 3865   |
| 66                       | NOSE U C SUPPORT STRUCTURE | 3010003752    |           | 3343   |
| 3                        | CREW BULKHEADS             | 3010003852    |           | 12272  |
|                          | EQUIPMENT BAY STRUCTURE    | 3010003954    |           | 7111   |
| 86                       | WINDSCREEN                 | 3010004152    |           | 13003  |
|                          | SERV ACCESS DOORS AND PNLS | 3010004258    |           | 5929   |
|                          | DORSAL FAIRING FWD         | 3010004454    |           | 2727   |
|                          | INTERMEDIATE FORMERS E B   | 3010004558    |           | 4873   |
|                          | ENGINE ACCESS DOORS E B    | 3010004658    |           | 10735  |
|                          | SEALING MISSILE BAY        | 3010004754    |           | 697    |
|                          | MISCELLANEOUS ITEMS C F    | 3010004854    |           | 392    |
|                          | ARMAMENT BAY ROOF          | 3010004954    |           | 13216  |
|                          | BULKHEAD AT STA 120        | 3010005052    |           | 3060   |
|                          | BULKHEAD AT STA 255        | 3010005152    |           | 10429  |
|                          | BULKHEAD STA 485           | 3010005254    |           | 12351  |
|                          | ENGINE TUNNEL E B          | 3010005458    |           | 59912  |
|                          | INTEGRAL FUS FUEL TANK     | 3010005554    |           | 20359  |
|                          | COCKPIT FLOOR              | 3010005652    |           | 5743   |
|                          | DORSAL OVER FUEL TANK      | 3010006154    |           | 5097   |





AVRO AIRCRAFT LTD.  
MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL  
COMPON

PROJECT

| DESCRIPTION                | REFERENCE NO. | COMP. NO. | WEIGHT |
|----------------------------|---------------|-----------|--------|
| SHIELD EXHAUST DEFLECTOR   | 301006254     |           | 1965   |
| SHEAR PANEL BELOW NAV ARCH | 301006352     |           | 2074   |
| PACK MOUNTING STRUCTURE    | 301006454     |           | 2365   |
| ENGINE ACCESS DOORS R F    | 301006559     |           | 9172   |
| TUNNEL FIXED R F           | 301006659     |           | 12072  |
| SKIN AND INTERCOSTAL R F   | 301006759     |           | 5256   |
| FAIRING UNDER RUDDER R F   | 301006859     |           | 2638   |
| FORMERS FIXED R F          | 301006959     |           | 9290   |
| LONGERONS C BEAM FIXED R F | 301007059     |           | 2690   |
| NACELLES REMOVABLE R F     | 301007159     |           | 19500  |
| CNTR STRUC STING REMOV R F | 301007259     |           | 9267   |
| MISC ITEMS STRUCTURE E B   | 301007358     |           | 912    |
| MTG BRKTS SIDE PANEL D B   | 301007556     |           | 213    |
| FORMERS LOWER PANEL D B    | 301007656     |           | 7416   |
| LOWER PANEL D B            | 301007756     |           | 5054   |
| JOINT F F TO C F           | 3010078       |           | 855    |
| JOINT AIR INTAKES TO F F   | 3010079       |           | 952    |
| JOINT C F TO D B           | 3010080       |           | 500    |
| JOINT D B TO E B           | 3010081       |           | 2508   |
| FUS JOINT AT STA 742 50    | 3010082       |           | 418    |
| DROP TANK MTG STRUCT D B   | 301008356     |           | 853    |
| STRUCT AT ENG ACCESS DOORS | 301008558     |           | 6542   |
| MISC STRUCTURE F F         | 301008652     |           | 552    |
| ENG RAILS ATTACHM TO FORM  | 301008758     |           | 3624   |
| JOINT ENG TO FLOATING DUCT | 3010088       |           | 1200   |
|                            |               |           | 624906 |
| 96 DIVE BRAKES             | 302000072     |           | 11150  |
| 96 DIVE BRAKES C A         | 3020001       |           | 406    |
|                            |               |           | 11556  |
| AIR INTAKES                | 3030000       |           |        |
|                            |               |           |        |
| AIR INTAKES                | 303010055     |           | 75828  |
|                            |               |           | 75828  |
|                            |               |           |        |
| PILOTS AND NAVIG CANOPIES  | 3040000       |           |        |
|                            |               |           |        |
| 76 PILOTS CANOPY           | 304010053     |           | 24081  |
|                            |               |           | 24081  |
| NAVIGATORS CANOPY          | 304020053     |           | 15650  |
|                            |               |           | 15650  |
|                            |               |           |        |
|                            |               |           |        |





## WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

PROJECT\_\_\_\_\_

[illegible]



AVRO AIRCRAFT LTD.

MALTON, ONT.

WEIGHT AND C. OF G BY FUNCTIONAL  
COMPONENT

PROJECT \_\_\_\_\_

| DESCRIPTION               | REFERENCE NO. | COMP. NO. | WEIGHT |
|---------------------------|---------------|-----------|--------|
| ENGINE GROUP              | 5000000       |           |        |
| PS 13 ENGINES             | 5010000       |           | 901828 |
|                           |               |           | 901828 |
| PS 13 ENGINES SERV ACCESS | 5010100       |           | 1450   |
|                           |               |           | 1450   |
| ACC GEAR BOX ON FUS D B   | 502000156     |           | 4524   |
| ACC GEAR BOX ON FUS E B   | 502000258     |           | 23660  |
|                           |               |           | 28164  |
| ENGINE CONTROLS           | 5030000       |           |        |
| ENGINE CONTROLS F F       | 503000152     |           | 1458   |
| ENGINE CONTROLS C F       | 503000254     |           | 264    |
| ENGINE CONTROLS D B       | 503000356     |           | 508    |
| ENGINE CONTROLS E B       | 503000458     |           | 1013   |
|                           |               |           | 3243   |
| STARTER AND ENG GEAR BOX  | 5040000       |           | 31545  |
|                           |               |           | 31545  |
| ENGINE ANTI ICING         | 5050000       |           | 7000   |
|                           |               |           | 7000   |
| FIRE EXT SYSTEM           | 5060000       |           |        |
| ENG FIRE EXT SYSTEM ENG   | 5060001       |           | 6900   |
| ENG FIRE EXT SYSTEM D B   | 506000256     |           | 146    |
|                           |               |           | 7046   |
| ENGINE MTGS AND BRACKETS  | 5070000       |           |        |
| ENGINE MOUNTS             | 5070001       |           | 8421   |
| ENGINE MTG ACCESSORIES    | 5070002       |           | 4817   |
|                           |               |           | 13238  |
| FUEL SYSTEM               | 5080000       |           |        |





**MALTON, ONT.**

## FUNCTIONAL COMPONENTS

PROJECT.

[illegible]





## WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

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[illegible]

# HT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-34 Iss 9

SHEET 4-9

UNCLASSIFIED  
NON CLASSIFIED

|      | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|------|---------------|-----------|--------|--------|--------|-----------|-----------|
|      | 6000000       |           |        |        |        |           |           |
|      | 6010000       |           |        |        |        |           |           |
| F    | 6010001       | 52        | 87.59  | 158.07 | 115.43 | 13845.35  | 10110.51  |
|      | 6010002       | 54        | 88.53  | 392.0  | 115.26 | 3001.93   | 10200.5   |
| B    | 6010003       | 56        | 350.48 | 699    | 118.00 | 1704.47   | 415.80    |
| N    | 6010005       | 83        | 126.88 | 787.81 | 221.76 | 9995.733  | 28136.91  |
| W    | 6010006       | 62        | 408.84 | 717.51 | 143.75 | 29334.679 | 58770.75  |
| W    | 6010007       | 64        | 304.36 | 770.75 | 135.61 | 23458.547 | 41274.26  |
| A    | 6010008       |           | 46.70  | 982    | 143.38 | 4585.44   | 9262.3    |
|      |               |           | 946.48 |        |        | 65102.677 | 140654.51 |
| LICS | 6020000       |           |        |        |        |           |           |
| D B  | 6020001       | 56        | 25.92  | 574.86 | 95.94  | 14900.37  | 2486.76   |
| E B  | 6020002       | 58        | 408.97 | 655.22 | 111.16 | 26796.532 | 45461.11  |
| R F  | 6020003       | 59        | 487.58 | 751.88 | 24     | 364.20    | 51.96     |
| I W  | 6020004       | 62        | 244.48 | 703.31 | 147.34 | 17194.523 | 36021.68  |
| O W  | 6020005       | 64        | 121.81 | 740.77 | 135.76 | 9023.319  | 16536.93  |
| FIN  | 6020006       | 83        | 53.31  | 761.65 | 208.75 | 4060.356  | 11128.46  |
|      |               |           | 854.97 |        |        | 58601.187 | 111686.90 |



AVRO AIRCRAFT LTD.  
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WEIGHT AND C. OF G BY FUNCTIONAL  
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PROJECT \_\_\_\_\_

| DESCRIPTION              |                        | REFERENCE NO. | COMP. NO. | WEIGHT |
|--------------------------|------------------------|---------------|-----------|--------|
| FIXED EQUIPMENT GROUP    |                        | 70000000      |           |        |
|                          |                        |               |           |        |
| INSTRUMENTS              |                        | 70100000      |           |        |
| INSTRUMENTS              |                        | 7010000152    |           | 4407   |
| NAVIG TABLE AND STOWAGE  |                        | 7010000452    |           | 200    |
|                          |                        |               |           | 4607   |
|                          |                        |               |           |        |
| COCKPIT PRESSURE SEALING |                        | 7020000052    |           | 500    |
|                          |                        |               |           | 500    |
|                          |                        |               |           |        |
| OXYGEN SYSTEM            |                        | 70300000      |           |        |
| OXYGEN SYSTEM            |                        | 7030000152    |           | 2359   |
|                          |                        |               |           | 2359   |
|                          |                        |               |           |        |
| AIR CONDITIONING SYSTEM  |                        | 70400000      |           |        |
| AIRCONDITIONING SYST F F |                        | 7040000152    |           | 12321  |
| AIRCONDITIONING SYST C F |                        | 7040000254    |           | 57523  |
| AIRCONDITIONING SYST D B |                        | 7040000356    |           | 2074   |
| AIRCONDITIONING SYST C A |                        | 70400005      |           | 12366  |
| AIRCONDITIONING SYST ENG |                        | 70400006      |           | 1255   |
| AIRCONDITIONING SYST I W |                        | 7040000762    |           | 61     |
|                          |                        |               |           | 85600  |
|                          |                        |               |           |        |
| HYDRAULICS MAIN SYSTEM   |                        | 70500000      |           |        |
| 14                       | UTILITY HYDRAULICS F F | 7050000152    |           | 8415   |
| 5                        | UTILITY HYDRAULICS C F | 7050000254    |           | 4162   |
| 9                        | UTILITY HYDRAULICS D B | 7050000356    |           | 24476  |
| 21                       | UTILITY HYDRAULICS E B | 7050000458    |           | 7240   |
| 23                       | UTILITY HYDRAULICS I W | 7050000562    |           | 13311  |
| 14                       | UTILITY HYDR NOSE U C  | 7050000691    |           | 325    |
| 23                       | UTILITY HYDR MAIN U C  | 7050000792    |           | 2980   |
|                          |                        |               |           | 60909  |
|                          |                        |               |           |        |
| CABIN INSULATION         |                        | 7070000052    |           | 1431   |
|                          |                        |               |           | 1431   |
|                          |                        |               |           |        |
| BRAKE PARACHUTE          |                        | 70800000      |           |        |
| BRAKE PARACHUTE F F      |                        | 7080000152    |           | 455    |
| BRAKE PARACHUTE R F      |                        | 7080000359    |           | 5659   |
|                          |                        |               |           |        |





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| DESCRIPTION             |                       | REFERENCE NO. | COMP. NO. | WEIGHT |
|-------------------------|-----------------------|---------------|-----------|--------|
| BRAKE PARACHUTE I W     |                       | 708000662     |           | 124    |
|                         |                       |               |           | 6238   |
| ELECTRICAL SYSTEM       |                       | 7090000       |           |        |
| ELECTRICAL WIRING       |                       | 7091400       |           |        |
| ELECTRICAL WIRING R N   |                       | 709140151     |           | 129    |
| ELECTRICAL WIRING F F   |                       | 709140252     |           | 2966   |
| ELECTRICAL WIRING C F   |                       | 709140354     |           | 2354   |
| ELECTRICAL WIRING A I   |                       | 709140455     |           | 1274   |
| ELECTRICAL WIRING D B   |                       | 709140556     |           | 9015   |
| ELECTRICAL WIRING E B   |                       | 709140658     |           | 64     |
| ELECTRICAL WIRING I W   |                       | 709140862     |           | 8909   |
| ELECTRICAL WIRING FIN   |                       | 709140983     |           | 352    |
| ELECTRICAL WIRING N U C |                       | 709141091     |           | 330    |
| 60                      | ELECTRICAL WIRING ENG | 7091411       |           | 2002   |
|                         | ELECTRICAL WIRING C A | 7091412       |           | 13746  |
|                         |                       |               |           | 41141  |
| 30                      | ELECTRICS F F         | 709150052     |           | 15248  |
|                         |                       |               |           | 15248  |
| ELECTRICS C F           |                       | 709160054     |           | 8709   |
|                         |                       |               |           | 8709   |
| ELECTRICS E B           |                       | 709170058     |           | 670    |
| ELECTRICS ENG           |                       | 7091701       |           | 13432  |
| ELECTRICS C A           |                       | 7091702       |           | 718    |
|                         |                       |               |           | 14820  |
| ELECTRICS FIN           |                       | 709180083     |           | 83     |
|                         |                       |               |           | 83     |
| ELECTRICS I W           |                       | 709190062     |           | 2336   |
| ELECTRICS C A           |                       | 7091901       |           | 112    |
| ELECTRICS M U C         |                       | 709190292     |           | 74     |
|                         |                       |               |           | 2522   |
| ELECTRICS A I           |                       | 709200055     |           | 5090   |
|                         |                       |               |           | 5090   |
| ELECTRICS D B           |                       | 709210056     |           | 31789  |
|                         |                       |               |           | 31789  |



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| DESCRIPTION               |  | REFERENCE NO. | COMP. NO. | WEIGHT |
|---------------------------|--|---------------|-----------|--------|
| WINDSCREEN DEMISTING      |  | 709220052     |           | 4386   |
|                           |  |               |           | 4386   |
| ELECTRICS R F             |  | 709230059     |           | 136    |
|                           |  |               |           | 136    |
| SPARROW ELECTRICS F F     |  | 709240152     |           | 254    |
| SPARROW ELECTRICS C F     |  | 709240254     |           | 60     |
|                           |  |               |           | 314    |
|                           |  |               |           |        |
| L P PNEUMATICS            |  | 7100000       |           |        |
| 12 L P PNEUMATICS F F     |  | 710000152     |           | 2117   |
| 12 L P PNEUMATICS C F     |  | 710000254     |           | 778    |
| 12 L P PNEUMATICS D B     |  | 710000356     |           | 418    |
| 12 L P PNEUMATICS E B     |  | 710000458     |           | 1557   |
| 12 L P PNEUMATICS FIN     |  | 710000583     |           | 504    |
| 12 L P PNEUMATICS R N     |  | 710000651     |           | 136    |
| 12 L P PNEUMATICS A P     |  | 710000794     |           | 60     |
|                           |  |               |           | 5570   |
|                           |  |               |           |        |
| INTAKE DEICING            |  | 712000055     |           | 5184   |
|                           |  |               |           | 5184   |
|                           |  |               |           |        |
| RADOME ANTI ICING         |  | 713000051     |           | 888    |
|                           |  |               |           | 888    |
|                           |  |               |           |        |
| RADIO AND RADAR FIXED     |  | 7140000       |           |        |
| RADIO AND RADAR FIXED R N |  | 714000151     |           | 16500  |
| RADIO AND RADAR FIXED F F |  | 714000252     |           | 5000   |
| RADIO AND RADAR FIXED C F |  | 714000354     |           | 18000  |
| RADIO AND RADAR FIXED D B |  | 714000456     |           | 1800   |
| RADIO AND RADAR FIXED FIN |  | 714000583     |           | 3200   |
| RADIO AND RADAR FIXED C A |  | 7140006       |           | 17400  |
|                           |  |               |           | 62100  |
|                           |  |               |           |        |
| 10 CANOPY ACTUATION       |  | 716000052     |           | 6205   |
|                           |  |               |           | 6205   |
|                           |  |               |           |        |
| CABIN CONSOLES            |  | 717000052     |           | 1745   |
|                           |  |               |           | 1745   |
|                           |  |               |           |        |





## WEIGHT AND C. OF G BY FUNCTIONAL COMPONENT

PROJECT.

[illegible]





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WEIGHT AND C. OF G BY FUNCTIONAL  
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PROJECT \_\_\_\_\_

| DESCRIPTION               | REFERENCE NO. | COMP. NO. | WEIGHT |
|---------------------------|---------------|-----------|--------|
| REMOVABLE EQUIPMENT GROUP | 8000000       |           |        |
|                           |               |           |        |
| EJECTOR SEATS             | 801010052     |           | 28442  |
|                           |               |           | 28442  |
|                           |               |           |        |
| RADAR REMOV GROUP         | 8020000       |           |        |
|                           |               |           |        |
| RADAR REMOVABLE           | 8020100       |           |        |
| RADIO AND RADAR REM R N   | 802010151     |           | 98050  |
| RADIO AND RADAR REM F F   | 802010252     |           | 18900  |
| RADIO AND RADAR REM C F   | 802010354     |           | 59600  |
| RADIO AND RADAR REM D B   | 802010456     |           | 4150   |
| RADIO AND RADAR REM C A   | 8020106       |           | 4350   |
|                           |               |           | 185050 |
|                           |               |           |        |
| DAMPING SYSTEM            | 8030000       |           |        |
|                           |               |           |        |
| DAMPING SYSTEM F F        | 803010152     |           | 400    |
| DAMPING SYSTEM C F        | 803010254     |           | 2200   |
| DAMPING SYSTEM E B        | 803010358     |           | 200    |
| DAMPING SYSTEM I W        | 803010462     |           | 3000   |
| DAMPING SYSTEM O W        | 803010564     |           | 200    |
|                           |               |           | 6000   |
|                           |               |           |        |
| SPARROW PACK              | 8050000       |           |        |
|                           |               |           |        |
| SPARROW PACK STRUCTURE    | 805010094     |           | 87070  |
|                           |               |           | 87070  |
| SPARROW PACK MECHANISMS   | 805020094     |           | 58476  |
|                           |               |           | 58476  |
| SPARROW PACK HYDRAULICS   | 805030094     |           | 33194  |
|                           |               |           | 33194  |
| SPARROW PACK ELECTRONICS  | 805040094     |           | 14300  |
|                           |               |           | 14300  |
|                           |               |           |        |
|                           |               |           |        |











# HEIGHT AND C. OF G BY FUNCTIONAL GROUP COMPONENT

REPORT NO. 7-0400-34 Iss 9

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UNCLASSIFIED  
NOT CLASSIFIED

|      | REFERENCE NO. | COMP. NO. | WEIGHT | H. ARM | V. ARM | H. MOMENT | V. MOMENT |
|------|---------------|-----------|--------|--------|--------|-----------|-----------|
|      | 90000000      |           |        |        |        |           |           |
|      | 90100000      | 52        | 43000  | 19400  | 13650  | 8342000   | 5869500   |
|      |               |           | 43000  |        |        | 8342000   | 5869500   |
|      | 90200000      |           |        |        |        |           |           |
|      | 90200001      |           | 9290   | 65225  | 11390  | 6059403   | 1058131   |
|      | 90200002      |           | 1773   | 63676  | 11640  | 1128975   | 206377    |
|      | 90200003      | 56        | 1925   | 58084  | 9555   | 1118117   | 183934    |
|      | 90200004      | 58        | 909    | 59928  | 9704   | 544746    | 88209     |
|      |               |           | 13897  |        |        | 8851241   | 1536651   |
|      | 90300000      | 54        | 172800 | 38929  | 8830   | 67269312  | 15258240  |
|      |               |           | 172800 |        |        | 67269312  | 15258240  |
|      | 90400000      |           |        |        |        |           |           |
|      | 90400001      | 52        | 7220   | 4931   | 3200   | 14755     | 9504      |
|      | 90400002      | 54        | 1267   | 26280  | 16150  | 332968    | 204621    |
|      |               |           | 1339   |        |        | 347723    | 214125    |
| CING | 90500000      | 51        | 2200   | 9300   | 13800  | 204600    | 303600    |
|      |               |           | 2200   |        |        | 204600    | 303600    |
|      | 90600000      |           | 2500   | 73000  | 12900  | 1825000   | 322500    |
|      |               |           | 2500   |        |        | 1825000   | 322500    |
|      | 90700000      |           |        |        |        |           |           |
|      | 90700001      | 54        | 4480   | 39424  | 12300  | 1845043   | 575640    |
|      | 90700002      | 62        | 17160  | 59755  | 13705  | 10253958  | 2351778   |
|      |               |           | 21840  |        |        | 12099001  | 2927418   |
| NING | 91000000      | 54        | 26000  | 26800  | 13200  | 6968000   | 3432000   |
| COND | 91000001      | 54        | 1500   | 26700  | 12700  | 400500    | 190500    |
|      |               |           | 27500  |        |        | 7368500   | 3622500   |

