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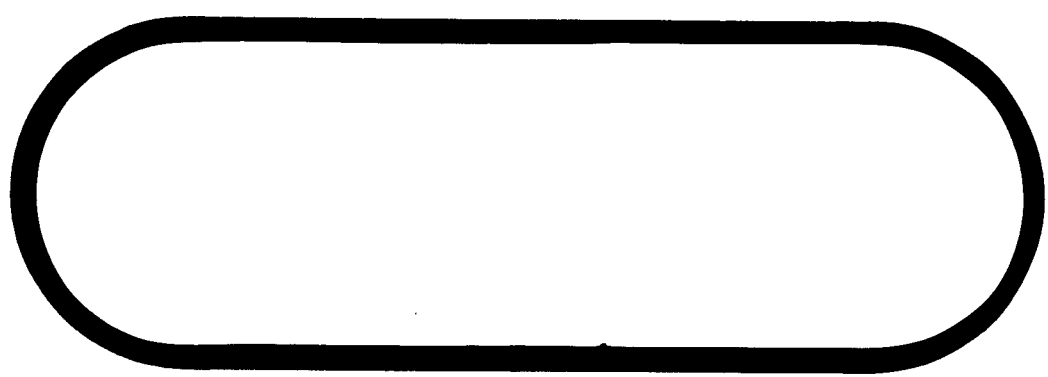
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JUN 10 1963  
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**SEATTLE, WASHINGTON**

THE **BOEING** COMPANY

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NUMBER D2-13956-2

TITLE STATISTICAL MEANS AND DISPERSIONS FOR THE MASS PROPERTIES  
OF BOEING COMPONENTS FOR THE WING II OPERATIONAL MINUTEMAN  
MISSILE -- June 1, 1963

MODEL NO. WS-133 CONTRACT NO. AF04(694)-46

ISSUE NO. 17 ISSUED TO ADJG

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## SUMMARY

This report presents statistical means and dispersions for the mass properties of the Boeing components of the Operational Minuteman missile. The data are based upon a statistical analysis of the hardware being produced for the Wing II Operational missiles.

1.0 INTRODUCTION

1.1 REFERENCES

- 1.1.1 BSD Exhibit 62-45, "Mass Properties Control Data for WS-133A Operational Guided Missiles/Systems," Dated 3 August 1962.
- 1.1.2 CCN 258, (BSD-63MSN-2597) to AFO4(647)-580 dated 5 October 1962.
- 1.1.3 Boeing Document D2-13946-xxx, "Flight Article Mass Properties Report for Missile xxx Components."
- 1.1.4 Boeing Document D2-13943-2 "Flight Article Mass Properties Report for Wing II CTLI Installations."
- 1.1.5 Boeing Document D2-13957-4 "Statistical Means and Dispersions for the Mass Properties of Boeing Components for the Wing I Operational Minuteman Missile - June 1, 1963.

1.2 DISCUSSION

This report of statistical means and dispersions for the mass properties of the Boeing components of the Operational Wing II Minuteman missiles is presented in accordance with Reference 1.1.1 as authorized by Reference 1.1.2. The data are based upon the mass properties found in the document of References 1.1.3 and 1.1.4. For a similar report on the Wing I missiles, see Reference 1.1.5.

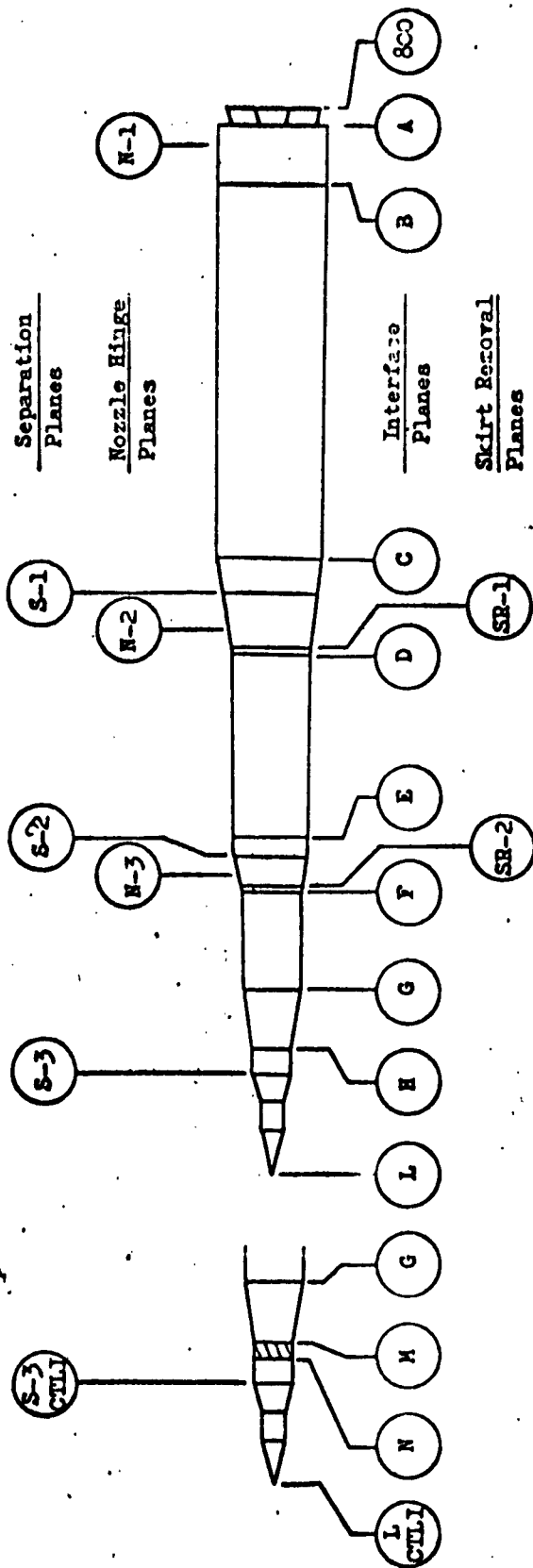
The statistical analysis contained in this report is based upon data available to May 1, 1963 for the Operational Wing II missiles. The data are presented in four sections; (1) flight sequential summaries, (2) statistical means and dispersions data calculations (3) CTLI installation means and dispersions data, and (4) data samples for the interstages, aft skirt, base heat deflectors, raceway covers and caps, and miscellaneous minor components.

All dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with directions received from STL on 30 January 1963.

1.3 MISSILE STATION DIAGRAM

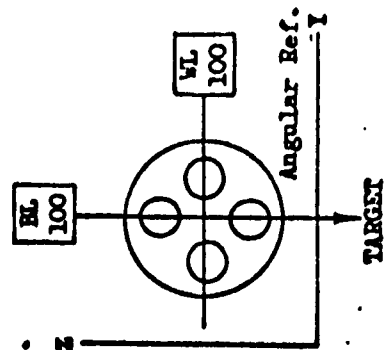
See page 7 for a station diagram showing both missile and section stations.

**WING II  
OPERATIONAL AND CTLI MISSILE STATION DIAGRAM**



▷ These Missile Stations become 50.000 when converted to Boeing Section Stations.

| SEPARATION PLANES    | MISSILE STA | INTERFACE PLANES | MISSILE STA |
|----------------------|-------------|------------------|-------------|
| S-1                  | 501.66      | A                | 784.24      |
| S-2                  | 342.93      | B                | 748.24      |
| S-3                  | 210.55      | C                | 525.60      |
| S-3 CTLI             | 200.53      | D                | 466.52      |
|                      |             | E                | 357.58      |
|                      |             | F                | 319.23      |
| SKIRT REMOVAL PLANES |             | G                | 257.45      |
| SR-1                 | 466.97      | H                | 225.95      |
| SR-2                 | 319.74      | L                | 129.48      |
| NOZZLE HINGE PLANES  |             |                  |             |
| N-1                  | 770.03      | M                | 225.95      |
| N-2                  | 477.32      | N                | 215.95      |
| N-3                  | 327.33      | L CTLI           | 119.46      |



Reference  
STL Release 9862.6-513  
(17 December 1962)

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FLIGHT SEQUENTIAL MASS DATA SUMMARY

The following page presents a flight sequential data summary of all Boeing airborne components excluding the CTII installation which is presented in Section 4.0. Sequential summaries by production section are also included as additional reference data.

The data are in sequential form showing mean values for weight, three plane balance, and moments of inertia. Dispersions about these means are included for weight and three plane balance. However, the dispersions given for sequential conditions other than "Prelaunch" are based upon calculations since actual data to verify these points are not available. The ablation amounts are those which STL has directed to be used and are identical to the ablation amounts found in D2-3940-25 "Monthly Status Report, 23 February 1963" as revised in March 1963. The skirt jettison times are separation plus 20 seconds + 4 seconds (Stage II) and separation plus 500 milliseconds + 200 milliseconds (Stage III).

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| MISSILE WING II OPERATIONAL                         |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        | SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |  |  |  |  |  |  |  |  |  |  |  |  |  |  | COMPONENT TOTAL BOEING RESPONSIBILITY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------|-----|-------------------------------|----------------|--------|-------|-------------------|------|----------|------|-----------|------|---------------------------------------------|--------|--------|---------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| S<br>T<br>A<br>G<br>E                               |     | FLIGHT SEQUENCE               | %<br>EXP<br>WT | WEIGHT |       | CENTER OF GRAVITY |      |          |      |           |      | MOMENT OF INERTIA<br>SLUG FEET <sup>2</sup> |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                     |     |                               |                | NOM.   | DISP. | LONG. (X)         |      | LAT. (Y) |      | VERT. (Z) |      | ROLL                                        | PITCH  | YAW    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1                                                   | I   | Pre-Launch                    | 0              | 952.17 | 8.86  | 552.73            | 1.82 | 101.17   | 0.19 | 102.61    | 0.21 | 149.1                                       | 584.7  | 5846.5 |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2                                                   |     |                               | 25             | 903.31 | 9.13  | 547.25            | 2.01 | 101.13   | 0.20 | 102.59    | 0.23 | 139.3                                       | 5462.4 | 5454.8 |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3                                                   |     |                               | 50             | 886.66 | 9.30  | 544.70            | 2.12 | 101.12   | 0.20 | 102.58    | 0.23 | 136.6                                       | 5316.6 | 5309.7 |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4                                                   |     |                               | 75             | 869.98 | 9.59  | 542.05            | 2.26 | 101.11   | 0.21 | 102.58    | 0.24 | 133.9                                       | 5170.9 | 5164.5 |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5                                                   |     | End Action Time               | 100            | 853.32 | 10.01 | 539.30            | 2.46 | 101.10   | 0.21 | 102.59    | 0.25 | 131.2                                       | 5025.1 | 5019.4 |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6                                                   |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7                                                   | II  | Start Action Time             | 0              | 457.53 | 11.13 | 418.04            | 2.19 | 100.31   | 0.54 | 102.49    | 0.57 | 48.6                                        | 587.5  | 586.5  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8                                                   |     |                               | 25             | 452.38 | 11.14 | 417.29            | 2.23 | 100.30   | 0.55 | 102.47    | 0.57 | 48.0                                        | 580.5  | 579.5  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9                                                   |     | Skirt Jettison                | 33.6           | 251.68 | 3.71  | 362.69            | 1.56 | 101.56   | 0.24 | 103.62    | 0.28 | 19.6                                        | 201.6  | 200.5  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10                                                  |     |                               | 50             | 251.03 | 3.71  | 362.49            | 1.57 | 101.55   | 0.24 | 103.61    | 0.28 | 19.6                                        | 198.8  | 197.7  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11                                                  |     |                               | 75             | 249.83 | 3.64  | 361.90            | 1.52 | 101.52   | 0.23 | 103.58    | 0.27 | 19.5                                        | 194.6  | 193.5  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12                                                  |     | End Action Time               | 100            | 248.58 | 3.73  | 361.27            | 1.59 | 101.49   | 0.24 | 103.55    | 0.28 | 19.5                                        | 190.3  | 189.2  |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13                                                  |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14                                                  | III | Start Action Time             | 0              | 133.13 | 4.73  | 325.39            | 0.71 | 100.89   | 0.50 | 102.67    | 0.54 | 10.2                                        | 12.2   | 11.8   |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15                                                  |     | Skirt Jettison                | 1              | 45.69  | 2.18  | 314.63            | 2.22 | 104.45   | 0.67 | 106.39    | 0.84 | 2.1                                         | 5.5    | 5.2    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16                                                  |     |                               | 25             | 44.97  | 1.93  | 314.43            | 1.31 | 104.42   | 0.62 | 106.36    | 0.80 | 2.1                                         | 5.5    | 5.2    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17                                                  |     |                               | 50             | 44.22  | 1.93  | 314.21            | 1.33 | 104.37   | 0.63 | 106.33    | 0.82 | 2.0                                         | 5.4    | 5.2    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18                                                  |     |                               | 75             | 43.47  | 1.94  | 313.98            | 1.36 | 104.33   | 0.65 | 106.30    | 0.83 | 1.9                                         | 5.4    | 5.1    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 19                                                  |     | End Action Time               | 100            | 42.71  | 1.96  | 313.74            | 1.39 | 104.28   | 0.66 | 106.27    | 0.86 | 1.8                                         | 5.3    | 5.1    |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20                                                  |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 21                                                  | I   | Silo Heat Protection          |                | 32.2   |       | 639.3             |      | 101.8    |      | 103.1     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22                                                  |     | Base Heat Protection          |                | 45.4   |       | 769.2             |      | 101.5    |      | 102.5     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 23                                                  |     | Aero Heat Protection          |                | 21.2   |       | 498.5             |      | 102.2    |      | 103.8     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 24                                                  | II  | Aft Interstage 1-2            |                | 122.59 |       | 513.1             |      | 100.78   |      | 99.69     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 25                                                  |     | Jettisoned Fwd Interstage 1-2 |                | 199.05 |       | 69.10             |      | 98.62    |      | 101.49    |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 26                                                  |     | Base Heat Protection          |                | 10.3   |       | 485.0             |      | 103.9    |      | 105.1     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 27                                                  |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 28                                                  | III | Aft Interstage 2-3            |                | 61.04  |       | 349.81            |      | 99.27    |      | 101.43    |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 29                                                  |     | Jettisoned Fwd Interstage 2-3 |                | 87.44  |       | 331.02            |      | 99.02    |      | 100.72    |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30                                                  |     | Base Heat Protection          |                | 3.0    |       | 827.4             |      | 107.0    |      | 108.1     |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31                                                  |     |                               |                |        |       |                   |      |          |      |           |      |                                             |        |        |                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| 2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
|-------------------------------------------------------------|-------|-------------------------------|-------|--------|-------|-------------------|-------|----------|-------|-----------------------------------------|-------|-------------------|-------|------|-------|------|-------|------|-------|
| MISSILE WING II OPERATIONAL                                 |       |                               |       |        |       |                   |       |          |       | COMPONENT SECTION 42 (GUIDANCE SECTION) |       |                   |       |      |       |      |       |      |       |
| FLIGHT SEQUENCE                                             |       |                               | % EXP | WEIGHT |       | CENTER OF GRAVITY |       |          |       |                                         |       | MOMENT OF INERTIA |       |      |       |      |       |      |       |
|                                                             |       |                               |       | NOM.   | DISP. | LONG. (X)         |       | LAT. (Y) |       | VERT. (Z)                               |       | ROLL              | PITCH | YAW  |       |      |       |      |       |
| LINE                                                        | STAGE |                               | WT    | NOM.   | DISP. | NOM.              | DISP. | NOM.     | DISP. | NOM.                                    | DISP. | NOM.              | DISP. | NOM. | DISP. | NOM. | DISP. | NOM. | DISP. |
| 1                                                           | I     | Pre-Launch                    | 0     | 1.02   | .1    | 80.9              | 0     | 100.0    | 0     | 100.0                                   | 0     | 100.0             | 0     | .1   | 0     | 0    | 0     | 0    | 0     |
| 2                                                           |       |                               | 25    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 3                                                           |       |                               | 50    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 4                                                           |       |                               | 75    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 5                                                           |       | End Action Time               | 100   |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 6                                                           |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 7                                                           | II    | Start Action Time             | 0     |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 8                                                           |       |                               | 25    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 9                                                           |       | Skirt Jettison                |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 10                                                          |       |                               | 50    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 11                                                          |       |                               | 75    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 12                                                          |       | End Action Time               | 100   |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 13                                                          |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 14                                                          | III   | Start Action Time             | 0     |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 15                                                          |       | Skirt Jettison                |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 16                                                          |       |                               | 25    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 17                                                          |       |                               | 50    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 18                                                          |       |                               | 75    |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 19                                                          |       | End Action Time               | 100   | 1.20   | .1    | 80.9              | 0     | 100.0    | 0     | 100.0                                   | 0     | 100.0             | 0     | .1   | 0     | 0    | 0     | 0    | 0     |
| 20                                                          |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME         |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 21                                                          | I     | Silo Heat Protection          |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 22                                                          |       | Base Heat Protection          |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 23                                                          |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 24                                                          | II    | Aft Interstage 1-2            |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 25                                                          |       | Jettisoned Fwd Interstage 1-2 |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 26                                                          |       | Base Heat Protection          |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 27                                                          |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 28                                                          | III   | Aft Interstage 2-3            |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 29                                                          |       | Jettisoned Fwd Interstage 2-3 |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 30                                                          |       | Base Heat Protection          |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |
| 31                                                          |       |                               |       |        |       |                   |       |          |       |                                         |       |                   |       |      |       |      |       |      |       |

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| SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
|---------------------------------------------------------|-------|-------------------------------|-------|--------|-------|-------------------|-------|----------|-------|--------------------------------------|-------|------------------------------------------|-------|-----|--|--|--|--|--|
| MISSILE WING II OPERATIONAL                             |       |                               |       |        |       |                   |       |          |       | COMPONENT SECTION 44 (STAGE 3 MOTOR) |       |                                          |       |     |  |  |  |  |  |
| LINE                                                    | STAGE | FLIGHT SEQUENCE               | % EXP | WEIGHT |       | CENTER OF GRAVITY |       |          |       |                                      |       | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |       |     |  |  |  |  |  |
|                                                         |       |                               |       | NOM.   | DISP. | LONG. (X)         |       | LAT. (Y) |       | VERT. (Z)                            |       | ROLL                                     | PITCH | YAW |  |  |  |  |  |
|                                                         |       |                               |       |        |       | NOM.              | DISP. | NOM.     | DISP. | NOM.                                 | DISP. |                                          |       |     |  |  |  |  |  |
| 1                                                       | I     | Pre-Launch                    | 0     | 18.64  | 1.13  | 97.86             | 1.64  | 106.04   | .39   | 110.67                               | .76   | .3                                       | 3.3   | 3.2 |  |  |  |  |  |
| 2                                                       |       |                               | 25    | 18.01  | 1.13  | 97.96             | 1.69  | 105.89   | .41   | 110.43                               | .80   |                                          | 3.2   | 3.1 |  |  |  |  |  |
| 3                                                       |       |                               | 50    | 17.81  | 1.13  | 97.99             | 1.71  | 105.84   | .42   | 110.35                               | .81   |                                          | 3.2   | 3.1 |  |  |  |  |  |
| 4                                                       |       |                               | 75    | 17.61  | 1.14  | 98.03             | 1.73  | 105.79   | .43   | 110.26                               | .83   |                                          | 3.2   | 3.1 |  |  |  |  |  |
| 5                                                       |       | End Action Time               | 100   | 17.41  | 1     | 98.06             | 1.75  | 105.74   | 1     | 110.18                               | .84   |                                          | 3.1   | 3.0 |  |  |  |  |  |
| 6                                                       |       |                               |       | 1      |       | 1                 | 1     | 1        | 1     | 1                                    |       |                                          |       |     |  |  |  |  |  |
| 7                                                       | II    | Start Action Time             | 0     |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 8                                                       |       |                               | 25    |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 9                                                       |       | Skirt Jettison                |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 10                                                      |       |                               | 50    |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 11                                                      |       |                               | 75    |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 12                                                      |       | End Action Time               | 100   |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 13                                                      |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 14                                                      | III   | Start Action Time             | 0     | 1      |       | 98.06             | 1.75  | 105.74   | 1     | 110.18                               | .84   |                                          |       |     |  |  |  |  |  |
| 15                                                      |       | Skirt Jettison                |       | 17.41  |       | 97.97             | 1.76  | 105.76   | 1     | 110.21                               | .85   |                                          |       |     |  |  |  |  |  |
| 16                                                      |       |                               | 25    | 17.36  |       | 97.87             | 1.76  | 105.77   | .43   | 110.24                               | .85   |                                          |       |     |  |  |  |  |  |
| 17                                                      |       |                               | 50    | 17.31  |       | 97.78             | 1.77  | 105.79   | .44   | 110.27                               | .85   |                                          |       |     |  |  |  |  |  |
| 18                                                      |       |                               | 75    | 17.26  | 1     | 97.68             | 1.77  | 105.81   | .44   | 110.30                               | .85   | .3                                       | 3.1   | 3.0 |  |  |  |  |  |
| 19                                                      |       | End Action Time               | 100   | 17.21  | 1.14  |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 20                                                      |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME     |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 21                                                      | I     | Silo Heat Protection          |       | .40    | 0     | 95.00             | 0     | 110.30   | 0     | 117.70                               | 0     |                                          |       |     |  |  |  |  |  |
| 22                                                      |       | Base Heat Protection          |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 23                                                      |       | Aero Heat Protection          |       | .80    | .10   | 95.00             | 0     | 110.30   | 0     | 117.70                               | 0     |                                          |       |     |  |  |  |  |  |
| 24                                                      | II    | Aft Interstage 1-2            |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 25                                                      |       | Jettisoned Fwd Interstage 1-2 |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 26                                                      |       | Base Heat Protection          |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 27                                                      |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 28                                                      | III   | Aft Interstage 2-3            |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 29                                                      |       | Jettisoned Fwd Interstage 2-3 |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |
| 30                                                      |       | Base Heat Protection          |       | .20    | 0     | 131.00            | 0     | 100.00   | 0     | 100.00                               | 0     |                                          |       |     |  |  |  |  |  |
| 31                                                      |       |                               |       |        |       |                   |       |          |       |                                      |       |                                          |       |     |  |  |  |  |  |

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**COMPONENT** SECTION 45 (INTERSTAGE 2-3)

## MISSILE WING II OPERATIONAL

**COMPONENT** SECTION 45 (INTERSTAGE 2-3)

[illegible]

### EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

[illegible]

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## 2-5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

## MISSILE WING II OPERATIONAL COMPONENT SECTION 46 (STAGE 2 MOTOR)

| LINE                                                | STAGE | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |          |           |      |        |      | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |  |  |  |
|-----------------------------------------------------|-------|-------------------------------|----------|--------|-------|-------------------|----------|-----------|------|--------|------|------------------------------------------|--|--|--|
|                                                     |       |                               |          | NOM.   | DISP. | LONG. (X)         | LAT. (Y) | VERT. (Z) | ROLL | PITCH  | YAW  |                                          |  |  |  |
| 1                                                   | I     | Pre-Launch                    | 0        | 32.90  | 1.92  | 146.61            | 105.98   | 110.42    | .77  | 1.0    | 18.7 | 18.3                                     |  |  |  |
| 2                                                   |       |                               | 25       | 32.14  |       | 147.72            | 105.83   | 110.17    | .80  |        | 18.4 | 18.0                                     |  |  |  |
| 3                                                   |       |                               | 50       | 32.01  |       | 147.92            | 105.81   | 110.12    | .81  |        | 18.3 | 17.9                                     |  |  |  |
| 4                                                   |       |                               | 75       | 31.87  |       | 148.13            | 105.76   | 110.07    | .81  |        | 18.2 | 17.8                                     |  |  |  |
| 5                                                   |       | End Action Time               | 100      | 31.74  |       | 148.33            | 105.75   | 110.03    | .82  |        | 18.1 | 17.7                                     |  |  |  |
| 6                                                   |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 7                                                   | II    | Start Action Time             | 0        | 31.74  |       | 148.33            | 105.75   | 110.03    | .82  |        | 18.1 | 17.7                                     |  |  |  |
| 8                                                   |       |                               | 25       | 31.29  |       | 147.74            | 105.83   | 110.17    | .83  |        | 17.9 | 17.4                                     |  |  |  |
| 9                                                   |       | Skirt Jettison                |          | 31.14  | 1.92  | 147.54            | 105.86   | 110.22    | .83  | 1.0    | 17.8 | 17.3                                     |  |  |  |
| 10                                                  |       |                               | 50       | 30.84  | 1.93  | 147.14            | 105.92   | 110.32    | .83  | .9     | 17.6 | 17.2                                     |  |  |  |
| 11                                                  |       |                               | 75       | 30.39  | 1.93  | 146.51            | 106.01   | 110.47    | .84  | .9     | 17.3 | 17.0                                     |  |  |  |
| 12                                                  |       | End Action Time               | 100      | 29.94  | 1.94  | 145.87            | 106.10   | 110.63    | .85  | .9     | 17.0 | 16.7                                     |  |  |  |
| 13                                                  |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 14                                                  | III   | Start Action Time             | 0        |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 15                                                  |       | Skirt Jettison                |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 16                                                  |       |                               | 25       |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 17                                                  |       |                               | 50       |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 18                                                  |       |                               | 75       |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 19                                                  |       | End Action Time               | 100      |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 20                                                  |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 21                                                  | I     | Silo Heat Protection          |          | .60    | .10   | 99.60             | 0        | 112.30    | 0    | 121.20 | 0    |                                          |  |  |  |
| 22                                                  |       | Base Heat Protection          |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 23                                                  |       | Aero Heat Protection          |          | .50    | .10   | 99.60             | 0        | 112.30    | 0    | 121.20 | 0    |                                          |  |  |  |
| 24                                                  | II    | Aft Interstage 1-2            |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 25                                                  |       | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 26                                                  |       | Base Heat Protection          |          | 1.80   | .20   | 189.20            | 0        | 100.00    | 0    | 100.00 | 0    |                                          |  |  |  |
| 27                                                  |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 28                                                  | III   | Aft Interstage 2-3            |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 29                                                  |       | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 30                                                  |       | Base Heat Protection          |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |
| 31                                                  |       |                               |          |        |       |                   |          |           |      |        |      |                                          |  |  |  |

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# SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

## MISSILE WING II OPERATIONAL COMPONENT SECTION 47 (INTERSTAGE 1-2)

| LINE                                                | S T A G E | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |       |          |       |           |       | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |       |      |
|-----------------------------------------------------|-----------|-------------------------------|----------|--------|-------|-------------------|-------|----------|-------|-----------|-------|------------------------------------------|-------|------|
|                                                     |           |                               |          | NOM.   | DISP. | LONG. (X)         |       | LAT. (Y) |       | VERT. (Z) |       | ROLL                                     | PITCH | YAW  |
|                                                     |           |                               |          |        |       | NOM.              | DISP. | NOM.     | DISP. | NOM.      | DISP. |                                          |       |      |
| 1                                                   | I         | Pre-Launch                    | 0        | 372.76 | 6.02  | 77.62             | .39   | 99.98    | .29   | 100.94    | .29   | 57.8                                     | 51.7  | 51.2 |
| 2                                                   |           |                               | 25       | 362.44 | 6.05  | 77.58             | .41   | 99.97    | .28   | 100.95    | .30   | 56.2                                     | 50.3  | 49.8 |
| 3                                                   |           |                               | 50       | 359.70 | 6.06  | 77.59             | .41   | 99.96    | .30   | 100.94    | .30   | 55.8                                     | 49.9  | 49.4 |
| 4                                                   |           |                               | 75       | 356.95 | 6.08  | 77.60             | .41   | 99.96    | .30   | 100.94    | .31   | 55.3                                     | 49.5  | 49.0 |
| 5                                                   |           | End Action Time               | 100      | 354.21 | 6.10  | 77.61             | .42   | 99.95    | .30   | 100.94    | .31   | 54.9                                     | 49.1  | 48.6 |
| 7                                                   | II        | Start Action Time             | 0        | 231.62 | 10.63 | 67.57             | .98   | 99.51    | .99   | 101.60    | 1.01  | 30.9                                     | 20.9  | 21.0 |
| 8                                                   |           |                               | 25       | 226.92 | 10.64 | 67.59             | 1.00  | 99.46    | 1.01  | 101.57    | 1.03  | 30.3                                     | 20.5  | 20.6 |
| 9                                                   |           | Skirt Jettison                |          | 26.37  | 1.70  | 56.35             | .83   | 105.21   | .74   | 105.71    | .74   | 1.9                                      | 1.3   | 1.2  |
| 10                                                  |           |                               | 50       | 26.02  | 1.70  | 56.25             | .85   | 105.11   | .76   | 105.58    | .76   | 1.9                                      | 1.3   | 1.2  |
| 11                                                  |           |                               | 75       | 25.27  | 1.54  | 56.01             | .73   | 104.90   | .56   | 105.28    | .56   | 1.8                                      | 1.3   | 1.2  |
| 12                                                  |           | End Action Time               | 100      | 24.47  | 1.72  | 55.75             | .93   | 104.65   | .84   | 104.95    | .85   | 1.8                                      | 1.2   | 1.2  |
| 14                                                  | III       | Start Action Time             | 0        |        |       |                   |       |          |       |           |       |                                          |       |      |
| 15                                                  |           | Skirt Jettison                |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 16                                                  |           |                               | 25       |        |       |                   |       |          |       |           |       |                                          |       |      |
| 17                                                  |           |                               | 50       |        |       |                   |       |          |       |           |       |                                          |       |      |
| 18                                                  |           |                               | 75       |        |       |                   |       |          |       |           |       |                                          |       |      |
| 19                                                  |           | End Action Time               | 100      |        |       |                   |       |          |       |           |       |                                          |       |      |
| 20                                                  |           |                               |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME |           |                               |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 21                                                  | I         | Silo Heat Protection          |          | 7.6    | .8    | 80.0              | 0     | 100.3    | 0     | 100.6     | 0     |                                          |       |      |
| 22                                                  |           | Base Heat Protection          |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 23                                                  |           | Aero Heat Protection          |          | 11.00  | 1.10  | 76.50             | 0     | 100.70   | 0     | 101.20    | 0     |                                          |       |      |
| 24                                                  | II        | Aft Interstage 1-2            |          | 122.59 | 6.13  | 96.58             |       | 100.78   |       | 99.69     |       |                                          |       |      |
| 25                                                  |           | Jettisoned Fwd Interstage 1-2 |          | 199.05 | 9.95  | 69.10             |       | 98.62    |       | 101.49    |       |                                          |       |      |
| 26                                                  |           | Base Heat Protection          |          | 8.50   | .90   | 66.00             | 0     | 104.70   | 0     | 106.10    | 0     |                                          |       |      |
| 27                                                  |           |                               |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 28                                                  | III       | Aft Interstage 2-3            |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 29                                                  |           | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 30                                                  |           | Base Heat Protection          |          |        |       |                   |       |          |       |           |       |                                          |       |      |
| 31                                                  |           |                               |          |        |       |                   |       |          |       |           |       |                                          |       |      |

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| 2.7                                                 |           | SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |          |        |       |                   |       |          |       |       |        |           |      |       |                                          | COMPONENT SECTION 48 (STAGE 1 MOTOR) |     |      |  |
|-----------------------------------------------------|-----------|---------------------------------------------------------|----------|--------|-------|-------------------|-------|----------|-------|-------|--------|-----------|------|-------|------------------------------------------|--------------------------------------|-----|------|--|
| MISSILE WING II OPERATIONAL                         |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| L I N E                                             | S T A G E | FLIGHT SEQUENCE                                         | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |       |          |       |       |        | VERT. (Z) |      |       | MOMENT OF INERTIA SLOG FEET <sup>2</sup> |                                      |     |      |  |
|                                                     |           |                                                         |          | NOM.   | DISP. | LONG. (X)         |       | LAT. (Y) |       | DISP. | NOM.   | DISP.     | NOM. | DISP. | ROLL                                     | PITCH                                | YAW | NOM. |  |
|                                                     |           |                                                         |          |        |       | NOM.              | DISP. | NOM.     | DISP. |       |        |           |      |       |                                          |                                      |     |      |  |
| 1                                                   | I         | Pre-Launch                                              | 0        | 60.86  | 2.62  | 228.91            | 5.45  | 109.86   | .57   |       | 116.66 | .97       |      |       |                                          |                                      |     |      |  |
| 2                                                   |           |                                                         | 25       | 56.51  | 2.64  | 229.60            | 5.90  | 109.94   | .61   |       | 116.76 | 1.05      |      |       |                                          |                                      |     |      |  |
| 3                                                   |           |                                                         | 50       | 55.05  | 2.65  | 228.30            | 6.04  | 110.12   | .63   |       | 117.06 | 1.07      |      |       |                                          |                                      |     |      |  |
| 4                                                   |           |                                                         | 75       | 53.59  | 2.67  | 226.93            | 6.23  | 110.31   | .65   |       | 117.38 | 1.11      |      |       |                                          |                                      |     |      |  |
| 5                                                   |           | End Action Time                                         | 100      | 52.13  | 2.69  | 225.48            | 6.42  | 110.51   | .68   |       | 117.72 | 1.15      |      |       |                                          |                                      |     |      |  |
| 6                                                   |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 7                                                   | II        | Start Action Time                                       | 0        |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 8                                                   |           |                                                         | 25       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 9                                                   |           | Skirt Jettison                                          |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 10                                                  |           |                                                         | 50       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 11                                                  |           |                                                         | 75       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 12                                                  |           | End Action Time                                         | 100      |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 13                                                  |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 14                                                  | III       | Start Action Time                                       | 0        |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 15                                                  |           | Skirt Jettison                                          |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 16                                                  |           |                                                         | 25       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 17                                                  |           |                                                         | 50       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 18                                                  |           |                                                         | 75       |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 19                                                  |           | End Action Time                                         | 100      |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 20                                                  |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 21                                                  | I         | Silo Heat Protection                                    |          | 2.90   | .30   | 190.40            | 0     | 111.80   | 0     |       | 120.40 | 0         |      |       |                                          |                                      |     |      |  |
| 22                                                  |           | Base Heat Protection                                    |          | 4.80   | .50   | 309.40            | 0     | 100.00   | 0     |       | 100.00 |           |      |       |                                          |                                      |     |      |  |
| 23                                                  |           |                                                         |          | 1.00   | .10   | 136.60            | 0     | 117.20   |       |       | 129.70 |           |      |       |                                          |                                      |     |      |  |
| 24                                                  | II        | Aft Interstage 1-2                                      |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 25                                                  |           | Jettisoned Fwd Interstage 1-2                           |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 26                                                  |           | Base Heat Protection                                    |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 27                                                  |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 28                                                  | III       | Aft Interstage 2-3                                      |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 29                                                  |           | Jettisoned Fwd Interstage 2-3                           |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 30                                                  |           | Base Heat Protection                                    |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |
| 31                                                  |           |                                                         |          |        |       |                   |       |          |       |       |        |           |      |       |                                          |                                      |     |      |  |

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| 2.8 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)  |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
|--------------------------------------------------------------|-----------|-------------------------------|----------|--------|-------|-------------------|----------|--------|-----------|------------------------------------------|------|-------|-----|--|--|--|
| MISSILE WING II OPERATIONAL COMPONENT SECTION 49 (AFT SKIRT) |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| L I N E                                                      | S T A G E | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |          |        |           | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |      |       |     |  |  |  |
|                                                              |           |                               |          | NOM.   | DISP. | LONG. (X)         | LAT. (Y) |        | VERT. (Z) |                                          | ROLL | PITCH | YAW |  |  |  |
| 1                                                            | I         | Pre-Launch                    | 0        | 282.57 | 4.97  | 68.48             | .27      | 100.82 | .33       | 101.09                                   | .32  |       |     |  |  |  |
| 2                                                            |           |                               | 25       | 254.02 | 5.38  | 68.49             | .30      | 100.81 | .37       | 101.05                                   | .36  |       |     |  |  |  |
| 3                                                            |           |                               | 50       | 243.04 | 5.66  | 68.46             | .31      | 100.78 | .39       | 100.98                                   | .37  |       |     |  |  |  |
| 4                                                            |           |                               | 75       | 232.05 | 6.09  | 68.44             | .33      | 100.74 | .40       | 100.90                                   | .39  |       |     |  |  |  |
| 5                                                            |           | End Action Time               | 100      | 221.07 | 6.70  | 68.41             | .34      | 100.69 | .43       | 100.82                                   | .42  |       |     |  |  |  |
| 6                                                            |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 7                                                            | II        | Start Action Time             | 0        |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 8                                                            |           |                               | 25       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 9                                                            |           | Skirt Jettison                |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 10                                                           |           |                               | 50       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 11                                                           |           |                               | 75       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 12                                                           |           | End Action Time               | 100      |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 13                                                           |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 14                                                           | III       | Start Action Time             | 0        |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 15                                                           |           | Skirt Jettison                |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 16                                                           |           |                               | 25       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 17                                                           |           |                               | 50       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 18                                                           |           |                               | 75       |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 19                                                           |           | End Action Time               | 100      |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 20                                                           |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME          |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 21                                                           | I         | Silo Heat Protection          |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 22                                                           |           | Base Heat Protection          |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 23                                                           |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 24                                                           | II        | Aft Interstage 1-2            |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 25                                                           |           | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 26                                                           |           | Base Heat Protection          |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 27                                                           |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 28                                                           | III       | Aft Interstage 2-3            |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 29                                                           |           | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 30                                                           |           | Base Heat Protection          |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |
| 31                                                           |           |                               |          |        |       |                   |          |        |           |                                          |      |       |     |  |  |  |

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MEANS AND DISPERSIONS DATA CALCULATIONS

The data summarized on the following pages were accumulated during the manufacture of components for the Wing II Operational missiles to May 1, 1963. The data are calculated for all flight sequential conditions by total missile and by individual production sections. However, in order to reduce the size of this report, only selected conditions have been included in the following section. The conditions are as follows:

- (1) Start action, stage one - total missile
- (2) Start action, stage two - total missile
- (3) Skirt jettison, stage two - total missile
- (4) Start action, stage three - total missile
- (5) Skirt jettison, stage three - total missile
- (6) Prelaunch, stage one - each production section

In order to complete some of the sequential conditions, calculated means and dispersions have been included for some components whose changes from the prelaunch condition could not be determined by actual measurement.

Detailed derivation of the mean and dispersion values for inter-stage structure, aft skirt structure, base heat deflectors, and raceway covers and caps will be found in section 5 of this report. Summary totals for the remaining components are also included in section 5 but their details have been omitted for reasons of brevity.

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| T 42 | PRELAUNCH   | 1.02   | 0.10       | 256.85 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| T 44 | PRELAUNCH   | 18.64  | 1.13       | 305.31 | 1.64      | 106.04 | 0.39      | 110.67 | 0.76      |    |    |    |
| T 45 | PRELAUNCH   | 183.42 | 2.39       | 336.26 | 0.29      | 99.88  | 0.22      | 101.49 | 0.22      |    |    |    |
| T 46 | PRELAUNCH   | 32.90  | 1.92       | 454.19 | 3.03      | 105.98 | 0.44      | 110.42 | 0.77      |    |    |    |
| T 47 | PRELAUNCH   | 372.76 | 6.02       | 494.14 | 0.39      | 99.98  | 0.29      | 100.94 | 0.29      |    |    |    |
| T 48 | PRELAUNCH   | 60.86  | 2.62       | 704.51 | 5.45      | 109.86 | 0.57      | 116.66 | 0.97      |    |    |    |
| T 49 | PRELAUNCH   | 282.57 | 4.97       | 766.72 | 0.27      | 100.82 | 0.33      | 101.09 | 0.32      |    |    |    |

## SUMMARY

|                           |                           |                           |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| W DELTA X<br>0.150673E 06 | W DELTA Y<br>0.234750E 05 | W DELTA Z<br>0.258177E 05 | DELTA W X<br>0.179612E 07 | DELTA W Y<br>0.697934E 03 | DELTA W Z<br>0.182809E 04 |
| WDX/W<br>0.408            | WDY/W<br>0.161            | WDZ/W<br>0.169            | DWDX/W<br>1.408           | DWDY/W<br>0.028           | DWDZ/W<br>0.045           |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| MISSILE PRELAUNCH | 952.17 | 8.86       | 552.73 | 1.82      | 101.17 | 0.19      | 102.61 | 0.21      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| T 42 | S A STG 2   | 1.02   | 0.10       | 256.85 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| T 44 | S A STG 2   | 17.41  | 1.14       | 305.51 | 1.75      | 105.74 | 0.43      | 110.18 | 0.84      |    |    |    |
| T 45 | S A STG 2   | 175.74 | 2.42       | 336.24 | 0.30      | 99.85  | 0.23      | 101.51 | 0.23      |    |    |    |
| T 46 | S A STG 2   | 31.74  | 1.92       | 455.91 | 3.22      | 105.75 | 0.47      | 110.30 | 0.82      |    |    |    |
| T 47 | S A STG 2   | 231.62 | 10.63      | 484.09 | 0.98      | 99.51  | 0.99      | 101.60 | 1.01      |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.656767E 05 | 0.544926E 05 | 0.572512E 05 | 0.554108E 06 | 0.221187E 03 | 0.397156E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.560        | 0.510        | 0.523        | 1.627        | 0.033        | 0.044        |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| MISSILE S A STG 2 | 457.53 | 11.13      | 418.04 | 2.19      | 100.31 | 0.54      | 102.49 | 0.57      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| T 42 | SKIRT JETT  | 1.02   | 0.10       | 256.85 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| T 44 | SKIRT JETT  | 17.41  | 1.14       | 305.51 | 1.75      | 105.74 | 0.43      | 110.18 | 0.84      |    |    |    |
| T 45 | SKIRT JETT  | 175.74 | 2.42       | 336.24 | 0.30      | 99.85  | 0.23      | 101.51 | 0.23      |    |    |    |
| T 46 | SKIRT JETT  | 31.14  | 1.92       | 454.12 | 3.25      | 105.86 | 0.47      | 110.22 | 0.83      |    |    |    |
| T 47 | SKIRT JETT  | 26.37  | 1.70       | 472.87 | 0.83      | 105.21 | 0.74      | 105.71 | 0.74      |    |    |    |

## SUMMARY

|                           |                           |                           |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| W DELTA X<br>0.144294E 05 | W DELTA Y<br>0.228483E 04 | W DELTA Z<br>0.289648E 04 | DELTA W X<br>0.743554E 05 | DELTA W Y<br>0.145378E 03 | DELTA W Z<br>0.255262E 03 |
| WDX/W<br>0.477            | WDY/W<br>0.190            | WDZ/W<br>0.214            | DWDX/W<br>1.083           | DWDY/W<br>0.048           | DWDZ/W<br>0.063           |

## TOTALS

| DESCRIPTION        | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|--------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| MISSILE SKIRT JETT | 251.68 | 3.71       | 362.69 | 1.56      | 101.56 | 0.24      | 103.62 | 0.28      |    |    |    |

(STAGE 2)

BOEING

D2-13956-2

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| T 42 | S A STG 3   | 1.02   | 0.10       | 256.85 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| T 44 | S A STG 3   | 17.41  | 1.14       | 305.51 | 1.75      | 105.74 | 0.43      | 110.18 | 0.84      |    |    |    |
| T 45 | S A STG 3   | 114.70 | 4.59       | 329.02 | 0.51      | 100.16 | 0.52      | 101.55 | 0.53      |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.435017E 04 | 0.361345E 04 | 0.390942E 04 | 0.837956E 03 | 0.417776E 02 | 0.997056E 02 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.495        | 0.452        | 0.470        | 0.217        | 0.049        | 0.075        |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| MISSILE S A STG 3 | 133.13 | 4.73       | 325.39 | 0.71      | 100.89 | 0.50      | 102.67 | 0.54      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| T 42 | SKIRT JETT  | 1.02  | 0.10       | 259.62 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| T 44 | SKIRT JETT  | 17.41 | 1.14       | 305.51 | 1.75      | 105.74 | 0.43      | 110.18 | 0.84      |    |    |    |
| T 45 | SKIRT JETT  | 27.26 | 1.56       | 322.62 | 1.03      | 103.80 | 0.90      | 104.21 | 0.96      |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.171663E 04 | 0.657962E 03 | 0.898721E 03 | 0.292832E 03 | 0.338852E 01 | 0.306421E 02 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.907        | 0.561        | 0.656        | 0.375        | 0.040        | 0.121        |

## TOTALS

| DESCRIPTION        | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|--------------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| MISSILE SKIRT JETT | 45.69 | 1.93       | 314.69 | 1.28      | 104.45 | 0.60      | 106.39 | 0.78      |    |    |    |

(STAGE 3)

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT   | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6009 | ATTACH 42   | 1.02 | 3.10       | 256.85 | -0.       | 100.00 | 0.        | 100.00 | 0.        |    |    |    |

## SUMMARY

|           |           |           |              |              |              |
|-----------|-----------|-----------|--------------|--------------|--------------|
| W DELTA X | W DELTA Y | W DELTA Z | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.        | 0.        | 0.        | 0.145519E-12 | 0.909495E-14 | 0.909495E-14 |
| WDX/W     | WDY/W     | WDZ/W     | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.        | 0.        | 0.        | 0.000        | 0.000        | 0.000        |

## TOTALS

| DESCRIPTION                                 | WT   | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|---------------------------------------------|------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| <del>ATTACHMENTS</del><br>SECT 42 PRELAUNCH | 1.02 | 3.10       | 256.85 | 0.00      | 100.00 | 0.00      | 100.00 | 0.00      |    |    |    |

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# WEIGHT AND BALANCE

| MRCN | DESCRIPTION   | WT   | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|---------------|------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6006 | BASE HEAT DFL | 5.94 | 0.23       | 133.32 | 0.68      | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| 6011 | SUPPORT COMP  | 2.31 | 0.11       | 77.44  | 0.90      | 109.49 | 0.03      | 116.22 | 0.03      |    |    |    |
| 6005 | RACEWAY COMP  | 7.62 | 0.30       | 80.91  | 1.24      | 110.36 | 0.49      | 118.07 | 0.39      |    |    |    |
| 6009 | ATTACHMENTS   | 1.83 | -0.        | 78.41  | -0.       | 102.18 | 0.        | 105.20 | 0.        |    |    |    |
| 6009 | BMS 5-62      | 0.94 | 1.06       | 99.20  | 18.77     | 106.24 | 2.12      | 115.20 | 8.29      |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.421221E 03 | 0.179173E 02 | 0.695610E 02 | 0.994425E 02 | 0.918772E 01 | 0.343377E 02 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 1.101        | 0.227        | 0.447        | 0.535        | 0.163        | 0.314        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 44 PRELAUNCH | 18.64 | 1.13       | 97.86 | 1.64      | 106.04 | 0.39      | 110.67 | 0.76      |    |    |    |

# WEIGHT AND BALANCE

| MRCN | DESCRIPTION   | WT     | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|---------------|--------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6501 | 2-3 INSTG     | 156.83 | 1.73       | 67.33 | 0.25      | 99.36  | 0.15      | 100.95 | 0.14      |    |    |    |
| 6005 | RACEWAY COMP2 | 1.25   | 0.08       | 54.92 | 0.23      | 110.46 | 0.50      | 118.14 | 0.50      |    |    |    |
| 6005 | RACEWAY COMP3 | 1.09   | 0.08       | 83.32 | 0.30      | 111.00 | 0.50      | 119.00 | 0.50      |    |    |    |
| 6020 | ARM DISARM 3  | 2.84   | 0.02       | 78.10 | 0.        | 90.50  | 0.        | 81.50  | 0.        |    |    |    |
| 6011 | SUPPORT COMP1 | 2.88   | 0.20       | 56.96 | 0.28      | 110.85 | 0.07      | 114.86 | 0.06      |    |    |    |
| 6011 | SUPPORT COMP3 | 0.01   | -0.        | 87.80 | -0.       | 109.90 | 0.        | 115.80 | 0.        |    |    |    |
| 6503 | ORD ASSY 2    | 3.35   | 0.06       | 61.82 | 0.17      | 90.86  | 0.07      | 97.14  | 0.01      |    |    |    |
| 6503 | ORD ASSY      | 1.21   | 0.06       | 74.00 | 0.        | 99.14  | 0.        | 98.78  | 0.        |    |    |    |
| 6507 | DISC. BRKT 1  | 5.08   | 0.48       | 61.21 | 0.36      | 110.64 | 0.19      | 110.64 | 0.19      |    |    |    |
| 6507 | DISC BRKT 2   | 1.05   | 0.15       | 70.80 | -0.       | 112.86 | 0.20      | 112.94 | 0.20      |    |    |    |
| 6010 | INSUL COMP    | 0.56   | 0.         | 55.01 | 0.        | 97.06  | 0.        | 95.81  | 0.        |    |    |    |
| 6009 | ATTACHMENTS 1 | 2.13   | -0.        | 51.64 | -0.       | 101.99 | 0.        | 102.00 | 0.        |    |    |    |
| 6009 | ATTACHMENTS 2 | 0.09   | -0.        | 54.43 | -0.       | 109.20 | 0.        | 116.00 | 0.        |    |    |    |
| 6009 | ATTACHMENTS 3 | 1.87   | -0.        | 86.32 | -0.       | 100.28 | 0.        | 102.62 | 0.        |    |    |    |
| 6009 | BMS 5-62 1    | 0.77   | 1.22       | 60.76 | 8.96      | 109.22 | 1.45      | 110.86 | 3.24      |    |    |    |
| 6009 | BMS 5-62 2    | 1.99   | 0.80       | 60.14 | 2.05      | 99.30  | 5.24      | 106.48 | 6.34      |    |    |    |
| 6009 | BMS 5-62 3    | 0.42   | 0.54       | 80.20 | 6.24      | 105.34 | 11.44     | 108.78 | 20.76     |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.161285E 04 | 0.688229E 03 | 0.725196E 03 | 0.154896E 03 | 0.176841E 03 | 0.196528E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.219        | 0.143        | 0.147        | 0.068        | 0.073        | 0.076        |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X     | X<br>DISP | Y     | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|-------|-----------|-------|-----------|--------|-----------|----|----|----|
| SECT 45 PRELAUNCH | 183.42 | 2.39       | 67.03 | 0.29      | 99.88 | 0.22      | 101.49 | 0.22      |    |    |    |

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# WEIGHT AND BALANCE

| MRCN | DESCRIPTION   | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|---------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6008 | BASE HEAT DFL | 15.55 | 0.58       | 192.65 | 0.56      | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| 6005 | RACEWAY COMP  | 13.50 | 0.53       | 104.53 | 1.56      | 111.75 | 0.32      | 120.36 | 0.32      |    |    |    |
| 6011 | SUPPORT COMP  | 0.79  | 0.07       | 92.42  | 4.90      | 111.20 | 0.        | 119.52 | 0.01      |    |    |    |
| 6009 | ATTACHMENTS   | 0.72  | 0.         | 92.98  | 0.        | 108.50 | 0.        | 115.37 | 0.        |    |    |    |
| 6009 | BMS 5-62      | 2.34  | 1.75       | 118.26 | 13.35     | 109.92 | 1.93      | 117.76 | 3.98      |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.151021E 04 | 0.390585E 02 | 0.105398E 03 | 0.368665E 04 | 0.690110E 02 | 0.229563E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 1.181        | 0.190        | 0.312        | 1.846        | 0.253        | 0.461        |

| DESCRIPTION       | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 46 PRELAUNCH | 32.90 | 1.92       | 146.61 | 3.03      | 105.98 | 0.44      | 110.42 | 0.77      |    |    |    |
| TOTALS            |       |            |        |           |        |           |        |           |    |    |    |

# WEIGHT AND BALANCE

| MRCN | DESCRIPTION   | WT     | WT   | X      | DISP  | INPUT | Y      | DISP  | Z      | IX | IY | IZ |
|------|---------------|--------|------|--------|-------|-------|--------|-------|--------|----|----|----|
|      |               |        |      |        |       | X     | Y      |       |        |    |    |    |
| 6701 | 1-2 INTSTG    | 342.03 | 5.34 | 78.01  | 0.30  | DISP  | 99.61  | 0.23  | 100.28 |    |    |    |
| 6005 | RACEWAY COMP2 | 0.75   | 0.05 | 53.00  | 0.22  |       | 113.60 | 0.50  | 124.00 |    |    |    |
| 6005 | RACEWAY COMP3 | 1.61   | 0.14 | 105.52 | 0.52  |       | 116.50 | 0.50  | 128.50 |    |    |    |
| 6011 | SUPPORT COMP1 | 2.08   | 0.12 | 57.65  | 0.40  |       | 112.38 | 0.09  | 117.94 |    |    |    |
| 6011 | SUPPORT COMP3 | 0.09   | 0.01 | 98.50  | 0.01  |       | 113.60 | 0.01  | 126.10 |    |    |    |
| 6020 | ARM DISARM    | 3      | 2.84 | 89.40  | 0.01  |       | 92.00  | 0.01  | 73.00  |    |    |    |
| 6703 | ORD ASSY      | 2      | 4.49 | 68.43  | 0.29  |       | 84.27  | 0.11  | 107.88 |    |    |    |
| 6703 | ORD ASSY      | 3      | 1.55 | 85.15  | 0.01  |       | 99.59  | 0.01  | 98.61  |    |    |    |
| 6706 | DISC BRKT     | 1      | 8.23 | 63.88  | 0.68  |       | 113.42 | 0.25  | 113.42 |    |    |    |
| 6706 | DISC BRKT     | 2      | 1.88 | 80.00  | 0.01  |       | 117.23 | 0.13  | 117.27 |    |    |    |
| 6010 | INSUL CGMP    | 0.57   | 0.10 | 60.98  | 1.54  |       | 95.42  | 0.80  | 97.49  |    |    |    |
| 6009 | ATTACHMENTS   | 1      | 1.62 | 76.39  | 0.01  |       | 104.16 | 0.01  | 103.94 |    |    |    |
| 6009 | ATTACHMENTS   | 2      | 0.09 | 53.50  | 0.01  |       | 110.20 | 0.01  | 119.50 |    |    |    |
| 6009 | ATTACHMENTS   | 3      | 1.78 | 83.68  | 0.01  |       | 99.95  | 0.01  | 103.71 |    |    |    |
| 6009 | BMS 5-62      | 1      | 0.83 | 60.70  | 5.61  |       | 109.10 | 1.01  | 111.52 |    |    |    |
| 6009 | BMS 5-62      | 2      | 1.53 | 68.68  | 4.84  |       | 96.26  | 9.08  | 111.90 |    |    |    |
| 6009 | BMS 5-62      | 3      | 0.79 | 96.60  | 23.18 |       | 109.16 | 19.14 | 113.52 |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.109757E 05 | 0.661638E 04 | 0.570795E 04 | 0.172048E 04 | 0.651268E 03 | 0.112221E 04 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.281        | 0.218        | 0.203        | 0.111        | 0.068        | 0.090        |

## TOTALS

| DESCRIPTION       | WT     | WT   | X     | DISP | Y     | DISP | Z      | IX | IY | IZ |
|-------------------|--------|------|-------|------|-------|------|--------|----|----|----|
|                   |        |      |       |      |       |      |        |    |    |    |
| SECT 47 PRELAUNCH | 372.76 | 6.02 | 77.62 | 0.39 | 99.98 | 0.29 | 100.94 |    |    |    |

# WEIGHT AND BALANCE

| MRCN | DESCRIPTION   | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|---------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6007 | BASE HEAT DFL | 25.36 | 0.90       | 318.61 | 0.78      | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| 6005 | RACEWAY COMP  | 30.62 | 0.98       | 162.14 | 3.13      | 117.43 | 0.22      | 129.66 | 0.23      |    |    |    |
| 6010 | INSUL COMP    | 0.79  | 0.         | 156.59 | 0.        | 116.50 | 0.        | 129.00 | 0.        |    |    |    |
| 6009 | ATTACHMENTS   | 1.32  | 0.         | 171.12 | 0.        | 114.24 | 0.        | 116.95 | 0.        |    |    |    |
| 6009 | BMS 5-62      | 2.77  | 2.26       | 194.04 | 63.42     | 112.50 | 7.42      | 121.76 | 12.92     |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.404378E 05 | 0.467821E 03 | 0.133041E 04 | 0.170110E 05 | 0.169346E 03 | 0.520124E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 3.304        | 0.355        | 0.599        | 2.143        | 0.214        | 0.375        |

| DESCRIPTION       | WT    | WT<br>DISP | TOTALS |        |        | IX | IY | IZ |
|-------------------|-------|------------|--------|--------|--------|----|----|----|
|                   |       |            | X      | Y      | Z      |    |    |    |
| SECT 48 PRELAUNCH | 60.86 | 2.62       | 228.91 | 109.86 | 116.66 |    |    |    |

# WEIGHT AND BALANCE

| MRCN | DESCRIPTION  | WT     | WT<br>DISP | INPUT |        |        | IX | IY | IZ |
|------|--------------|--------|------------|-------|--------|--------|----|----|----|
|      |              |        |            | X     | Y      | Z      |    |    |    |
|      |              |        |            | DISP  | DISP   | DISP   |    |    |    |
| 6901 | AFT SKIRT    | 274.58 | 4.77       | 68.74 | 100.49 | 100.59 |    |    |    |
| 6005 | RACEWAY COMP | 2.42   | 0.29       | 57.26 | 117.80 | 129.80 |    |    |    |
| 6011 | SUPPORT COMP | 1.33   | 0.         | 63.04 | 119.63 | 131.00 |    |    |    |
| 6009 | ATTACHMENTS  | 2.18   | 0.         | 56.05 | 106.29 | 106.04 |    |    |    |
| 6009 | BMS 5-62     | 2.06   | 1.37       | 63.16 | 106.46 | 108.98 |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | W DELTA X    | W DELTA Y    | W DELTA Z    |
| 0.454377E 04 | 0.706925E 04 | 0.586123E 04 | 0.652090E 02 | 0.864598E 02 | 0.191891E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.239        | 0.298        | 0.271        | 0.029        | 0.033        | 0.049        |

|                   |        |            |       |        |        |
|-------------------|--------|------------|-------|--------|--------|
| TOTALS            |        |            |       |        |        |
| DESCRIPTION       | WT     | WT<br>DISP | X     | Y      | Z      |
| SECT 49 PRELAUNCH | 282.57 | 4.97       | 68.48 | 100.82 | 101.09 |
|                   |        |            | DISP  | DISP   | DISP   |
|                   |        |            | 0.27  | 0.33   | 0.32   |

CTLI DATA SUMMARY

The data appearing in this section are based upon the CTLI mass properties found in Reference 1.1.4. The data are for a complete CTLI installation consisting of both Boeing and other Associate Contractor components. The Aerojet downstage kit weights are based upon data transmitted to Boeing by Aerojet document 0162-OLDR-NMPO-1, "Nominal Mass Properties and Dispersions for Minuteman CTLI/AODS," dated January 28, 1963. All data reflect the use of a linear shaped charge destruct system on the first stage engine. The total mass properties include the deletion of certain hardware which is removed when the CTLI kit is installed. The check lists found in Reference 1.1.4 give a more detailed summary of the changes.

The statistical sample for the CTLI Section consists of two actual weights. Since these sections are nearly identical to the Wing I sections, the statistical data from Wing I was used to help derive the Wing II dispersions. Details of this derivation can be found in section 5 of this report. Other CTLI components were given mass properties and dispersions based upon the data available.

The dispersion computations found in this report are based upon a population of .990 and a confidence of 90% in accordance with directions received from STL on 30 January 1963.

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| 4.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
|-------------------------------------------------------------|-----------|-------------------------------|----------|--------|-------|--------|-------------------|--------|----------|--------|-----------|-------|------------------------------------------|--------|-----|------|-------|------|
| MISSILE CTLI INSTALLATION                                   |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| COMPONENT TOTAL MISSILE                                     |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| L I N E                                                     | S T A G E | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       |        | CENTER OF GRAVITY |        |          |        |           |       | MOMENT OF INERTIA SLDG FEET <sup>2</sup> |        |     |      |       |      |
|                                                             |           |                               |          | NOM.   | DISP. | 3.26   | LONG. (X)         |        | LAT. (Y) |        | VERT. (Z) |       | ROLL                                     | PITCH  | YAW | NOM. | DISP. | 3.33 |
|                                                             |           |                               |          |        |       |        | NOM.              | DISP.  | NOM.     | DISP.  | NOM.      | DISP. |                                          |        |     |      |       |      |
| 1                                                           | I         | Pre-Launch                    | 0        | 273.18 | 3.26  | 326.70 | 2.73              | 106.09 | .44      | 110.84 | .33       | 16.3  | 1370.9                                   | 1364.8 |     |      |       |      |
| 2                                                           |           |                               | 25       | 272.48 | 3.26  | 326.33 | 2.74              | 106.06 | .44      | 110.80 | .33       |       |                                          |        |     |      |       |      |
| 3                                                           |           |                               | 50       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 4                                                           |           |                               | 75       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 5                                                           |           | End Action Time               | 100      | 272.48 | 3.26  | 326.33 | 2.74              | 106.06 | .44      | 110.80 | .33       | 16.3  | 1370.9                                   | 1364.8 |     |      |       |      |
| 6                                                           |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 7                                                           | II        | Start Action Time             | 0        | 213.50 | 2.62  | 257.94 | 1.88              | 103.20 | .52      | 106.06 | .35       | 9.2   | 200.5                                    | 197.9  |     |      |       |      |
| 8                                                           |           |                               | 25       | 213.50 | 2.62  | 257.94 | 1.88              | 103.20 | .52      | 106.06 | .35       |       |                                          |        |     |      |       |      |
| 9                                                           |           | Skirt Jettison                | 35       | 214.60 | 2.62  | 259.07 | 1.86              | 103.25 | .52      | 106.15 | .35       |       |                                          |        |     |      |       |      |
| 10                                                          |           |                               | 50       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 11                                                          |           |                               | 75       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 12                                                          |           | End Action Time               | 100      | 214.60 | 2.62  | 259.07 | 1.86              | 103.25 | .52      | 106.15 | .35       | 9.2   | 200.5                                    | 197.9  |     |      |       |      |
| 13                                                          |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 14                                                          | III       | Start Action Time             | 0        | 169.50 | 1.95  | 227.76 | 1.25              | 100.85 | .59      | 102.18 | .35       | 5.6   | 15.3                                     | 14.3   |     |      |       |      |
| 15                                                          |           | Skirt Jettison                | 1        | 170.80 | 1.95  | 228.50 | 1.24              | 100.92 | .59      | 102.30 | .35       |       |                                          |        |     |      |       |      |
| 16                                                          |           |                               | 25       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 17                                                          |           |                               | 50       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 18                                                          |           |                               | 75       |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 19                                                          |           | End Action Time               | 100      | 170.80 | 1.95  | 228.50 | 1.24              | 100.92 | .59      | 102.30 | .35       | 5.6   | 15.3                                     | 14.3   |     |      |       |      |
| 20                                                          |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME         |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 21                                                          | I         | Silo Heat Protection          |          | .7     |       | 476.3  |                   | 114.4  |          | 126.1  |           |       |                                          |        |     |      |       |      |
| 22                                                          |           | Base Heat Protection          |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 23                                                          |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 24                                                          | II        | Aft Interstage 1-2            |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 25                                                          |           | Jettisoned Fwd Interstage 1-2 |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 26                                                          |           | Base Heat Protection          |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 27                                                          |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 28                                                          | III       | Aft Interstage 2-3            |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 29                                                          |           | Jettisoned Fwd Interstage 2-3 |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 30                                                          |           | Base Heat Protection          |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |
| 31                                                          |           |                               |          |        |       |        |                   |        |          |        |           |       |                                          |        |     |      |       |      |

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| 4.2.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
|---------------------------------------------------------------|-------|-------------------------------|----------|--------|-------|-------------------|------|-------|-----------|-------------------------------------|-------|------|-------|------|-------|------|-------|------|-------|
| MISSILE CTLI INSTALLATION                                     |       |                               |          |        |       |                   |      |       |           | COMPONENT SECTION 39 (CTLI SECTION) |       |      |       |      |       |      |       |      |       |
| LINE                                                          | STAGE | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |      |       | VERT. (Z) |                                     |       | ROLL |       |      | PITCH |      |       | YAW  |       |
|                                                               |       |                               |          | NOM.   | DISP. | LONG. (X)         | NOM. | DISP. | LAT. (Y)  | NOM.                                | DISP. | NOM. | DISP. | NOM. | DISP. | NOM. | DISP. | NOM. | DISP. |
| 1                                                             | I     | Pre-Launch                    | 0        | 148.45 | 1.69  | 54.77             | 1.01 | 99.66 | .62       | 100.18                              | .30   | 4    |       |      | 2     |      |       | 2    |       |
| 2                                                             |       |                               | 25       | ▲      | ▲     | ▲                 | ▲    | ▲     | ▲         | ▲                                   | ▲     | ▲    | ▲     | ▲    | ▲     | ▲    | ▲     | ▲    | ▲     |
| 3                                                             |       |                               | 50       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 4                                                             |       |                               | 75       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 5                                                             |       | End Action Time               | 100      |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 6                                                             |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 7                                                             | II    | Start Action Time             | 0        |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 8                                                             |       |                               | 25       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 9                                                             |       | Skirt Jettison                |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 10                                                            |       |                               | 50       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 11                                                            |       |                               | 75       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 12                                                            |       | End Action Time               | 100      |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 13                                                            |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 14                                                            | III   | Start Action Time             | 0        |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 15                                                            |       | Skirt Jettison                |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 16                                                            |       |                               | 25       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 17                                                            |       |                               | 50       | ▼      | ▼     | ▼                 | ▼    | ▼     | ▼         | ▼                                   | ▼     | ▼    | ▼     | ▼    | ▼     | ▼    | ▼     | ▼    | ▼     |
| 18                                                            |       |                               | 75       |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 19                                                            |       | End Action Time               | 100      | 148.45 | 1.69  | 54.77             | 1.01 | 99.66 | .62       | 100.18                              | .30   | 4    |       |      | 2     |      |       | 2    |       |
| 20                                                            |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 21                                                            | I     | Silo Heat Protection          |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 22                                                            |       | Base Heat Protection          |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 23                                                            |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 24                                                            | II    | Aft Interstage 1-2            |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 25                                                            |       | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 26                                                            |       | Base Heat Protection          |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 27                                                            |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 28                                                            | III   | Aft Interstage 2-3            |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 29                                                            |       | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 30                                                            |       | Base Heat Protection          |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |
| 31                                                            |       |                               |          |        |       |                   |      |       |           |                                     |       |      |       |      |       |      |       |      |       |

| 4.2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
|---------------------------------------------------------------|-----|-------------------------------|-----|-----------------|-----|----------|--------|--------|-------------------|-----------------------------------------|----------|---|-----------|---|------------------------------------------|-------|-----|---|---|
| MISSILE CTLL INSTALLATION                                     |     |                               |     |                 |     |          |        |        |                   | COMPONENT SECTION 42 (GUIDANCE SECTION) |          |   |           |   |                                          |       |     |   |   |
| LINE                                                          |     | STAGE                         |     | FLIGHT SEQUENCE |     | % EXP WT | WEIGHT |        | CENTER OF GRAVITY |                                         |          |   |           |   | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |       |     |   |   |
|                                                               |     |                               |     |                 |     |          | NOM.   | DISP.  | LONG. (X)         |                                         | LAT. (Y) |   | VERT. (Z) |   | ROLL                                     | PITCH | YAW |   |   |
| 1                                                             | I   | Pre-Launch                    | 0   | 5.57            | .47 | 68.22    | .58    | 111.66 | .26               | 114.73                                  | .32      | 0 | 0         | 0 | 0                                        | 0     | 0   | 0 | 0 |
| 2                                                             |     |                               | 25  | ↑               | ↑   | ↑        | ↑      | ↑      | ↑                 | ↑                                       | ↑        | ↑ | ↑         | ↑ | ↑                                        | ↑     | ↑   | ↑ | ↑ |
| 3                                                             |     |                               | 50  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 4                                                             |     |                               | 75  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 5                                                             |     | End Action Time               | 100 |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 6                                                             |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 7                                                             | II  | Start Action Time             | 0   |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 8                                                             |     |                               | 25  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 9                                                             |     | Skirt Jettison                |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 10                                                            |     |                               | 50  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 11                                                            |     |                               | 75  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 12                                                            |     | End Action Time               | 100 |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 13                                                            |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 14                                                            | III | Start Action Time             | 0   |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 15                                                            |     | Skirt Jettison                |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 16                                                            |     |                               | 25  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 17                                                            |     |                               | 50  | ↓               | ↓   | ↓        | ↓      | ↓      | ↓                 | ↓                                       | ↓        | ↓ | ↓         | ↓ | ↓                                        | ↓     | ↓   | ↓ | ↓ |
| 18                                                            |     |                               | 75  |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 19                                                            |     | End Action Time               | 100 | 5.57            | .47 | 68.22    | .58    | 111.66 | .26               | 114.73                                  | .32      | 0 | 0         | 0 | 0                                        | 0     | 0   | 0 | 0 |
| 20                                                            |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 21                                                            | I   | Silo Heat Protection          |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 22                                                            |     | Base Heat Protection          |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 23                                                            |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 24                                                            | II  | Aft Interstage 1-2            |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 25                                                            |     | Jettisoned Fwd Interstage 1-2 |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 26                                                            |     | Base Heat Protection          |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 27                                                            |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 28                                                            | III | Aft Interstage 2-3            |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 29                                                            |     | Jettisoned Fwd Interstage 2-3 |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 30                                                            |     | Base Heat Protection          |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |
| 31                                                            |     |                               |     |                 |     |          |        |        |                   |                                         |          |   |           |   |                                          |       |     |   |   |

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MISSILE CFI INSTALLATION  
4.2.3

**COMPONENT**      **SECTION 44 (STAGE 3 MOTOR)**

[illegible]

## EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

[illegible]

| 4.2.4 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
|---------------------------------------------------------------|-------|-------------------------------|----------|--------|-------|-------------------|------|----------|-----|---------------------------------------|-----|------------------------------------------|-------|-----|--|--|--|--|--|
| MISSILE CTLL INSTALLATION                                     |       |                               |          |        |       |                   |      |          |     | COMPONENT SECTION 45 (INTERSTAGE 2-3) |     |                                          |       |     |  |  |  |  |  |
| LINE                                                          | STAGE | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |      |          |     |                                       |     | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |       |     |  |  |  |  |  |
|                                                               |       |                               |          | NOM.   | DISP. | LONG. (X)         |      | LAT. (Y) |     | VERT. (Z)                             |     | ROLL                                     | PITCH | YAW |  |  |  |  |  |
| 1                                                             | I     | Pre-Launch                    | 0        | 17.51  | .97   | 65.54             | 1.22 | 111.89   | .14 | 120.22                                | .15 | 0                                        | 1     | 1   |  |  |  |  |  |
| 2                                                             |       |                               | 25       | 17.41  | .97   | 65.52             | 1.23 | 111.90   | .14 | 120.23                                | .15 |                                          |       |     |  |  |  |  |  |
| 3                                                             |       |                               | 50       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 4                                                             |       |                               | 75       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 5                                                             |       | End Action Time               | 100      |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 6                                                             |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 7                                                             | II    | Start Action Time             | 0        |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 8                                                             |       |                               | 25       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 9                                                             |       | Skirt Jettison                |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 10                                                            |       |                               | 50       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 11                                                            |       |                               | 75       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 12                                                            |       | End Action Time               | 100      | 17.41  | .97   | 65.52             | 1.23 | 111.90   | .14 | 120.23                                | .15 |                                          |       |     |  |  |  |  |  |
| 13                                                            |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 14                                                            | III   | Start Action Time             | 0        | -1.30  | 0     | 56.25             | 0    | 109.76   | 0   | 117.74                                | 0   | 0                                        | 0     | 0   |  |  |  |  |  |
| 15                                                            |       | Skirt Jettison                |          | 0      | 0     | 0                 | 0    | 0        | 0   | 0                                     | 0   |                                          |       |     |  |  |  |  |  |
| 16                                                            |       |                               | 25       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 17                                                            |       |                               | 50       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 18                                                            |       |                               | 75       |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 19                                                            |       | End Action Time               | 100      |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 20                                                            |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 21                                                            | I     | Silo Heat Protection          |          | .10    | 0     | 69.20             | 0    | 110.90   | 0   | 118.70                                |     |                                          |       |     |  |  |  |  |  |
| 22                                                            |       | Base Heat Protection          |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 23                                                            |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 24                                                            | II    | Aft Interstage 1-2            |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 25                                                            |       | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 26                                                            |       | Base Heat Protection          |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 27                                                            |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 28                                                            | III   | Aft Interstage 2-3            |          | 18.71  | .97   | 64.88             | 1.22 | 111.75   | .14 | 120.06                                |     |                                          |       |     |  |  |  |  |  |
| 29                                                            |       | Jettisoned Fwd Interstage 2-3 |          | 1.30   | 0     | 56.25             | 0    | 109.76   | 0   | 117.74                                | 0   |                                          |       |     |  |  |  |  |  |
| 30                                                            |       | Base Heat Protection          |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |
| 31                                                            |       |                               |          |        |       |                   |      |          |     |                                       |     |                                          |       |     |  |  |  |  |  |

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| 4.2.5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
|---------------------------------------------------------------|-----------|-------------------------------|----------|--------|-------|-------------------|-------|--------|----------|--------|-----------|------------------------------------------|------|------|-------|-----|
| MISSILE CTI INSTALLATION                                      |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| COMPONENT SECTION 46 (STAGE 2 MOTOR)                          |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| L I N E                                                       | S T A G E | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |       |        |          |        |           | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |      |      |       |     |
|                                                               |           |                               |          | NOM.   | DISP. | LONG. (X)         | DISP. | NOM.   | LAT. (Y) | DISP.  | VERT. (Z) | DISP.                                    | NOM. | ROLL | PITCH | YAW |
| 1                                                             | I         | Pre-Launch                    | 0        | 26.39  | 1.46  | 99.43             | 1.41  | 112.63 | .22      | 121.75 | .23       | 0                                        | 5    | 5    |       |     |
| 2                                                             |           |                               | 25       | ✓      | ✓     | ✓                 | ✓     | ✓      | ✓        | ✓      | ✓         | ✓                                        | ✓    | ✓    | ✓     |     |
| 3                                                             |           |                               | 50       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 4                                                             |           |                               | 75       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 5                                                             |           | End Action Time               | 100      |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 6                                                             |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 7                                                             | II        | Start Action Time             | 0        |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 8                                                             |           |                               | 25       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 9                                                             |           | Skirt Jettison                |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 10                                                            |           |                               | 50       | ✓      | ✓     | ✓                 | ✓     | ✓      | ✓        | ✓      | ✓         | ✓                                        | ✓    | ✓    | ✓     |     |
| 11                                                            |           |                               | 75       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 12                                                            |           | End Action Time               | 100      | 26.39  | 1.46  | 99.43             | 1.41  | 112.63 | .22      | 121.75 | .23       | 0                                        | 5    | 5    |       |     |
| 13                                                            |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 14                                                            | III       | Start Action Time             | 0        |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 15                                                            |           | Skirt Jettison                |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 16                                                            |           |                               | 25       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 17                                                            |           |                               | 50       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 18                                                            |           |                               | 75       |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 19                                                            |           | End Action Time               | 100      |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 20                                                            |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 21                                                            | I         | Silo Heat Protection          |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 22                                                            |           | Base Heat Protection          |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 23                                                            |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 24                                                            | II        | Aft Interstage 1-2            |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 25                                                            |           | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 26                                                            |           | Base Heat Protection          |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 27                                                            |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 28                                                            | III       | Aft Interstage 2-3            |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 29                                                            |           | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 30                                                            |           | Base Heat Protection          |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |
| 31                                                            |           |                               |          |        |       |                   |       |        |          |        |           |                                          |      |      |       |     |

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| 4.2.7 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
|---------------------------------------------------------------|-----|-------------------------------|----------------|--------|-------|-------------------|----------|--------|-----------|--------|-------|---------------------------------------------|-------|------|-------|------|-------|------|-------|
| MISSILE CULI INSTALLATION                                     |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| COMPONENT SECTION 48 (STAGE 1 MOTOR)                          |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| S<br>L<br>I<br>N<br>E                                         |     | FLIGHT SEQUENCE               | %<br>EXP<br>WT | WEIGHT |       | CENTER OF GRAVITY |          |        |           |        |       | MOMENT OF INERTIA<br>SLUG FEET <sup>2</sup> |       |      |       |      |       |      |       |
|                                                               |     |                               |                | NOM.   | DISP. | LONG. (X)         | LAT. (Y) |        | VERT. (Z) |        | ROLL  | PITCH                                       | YAW   |      |       |      |       |      |       |
| 1                                                             | I   | Pre-launch                    | 0              | 26.76  | 1.46  | NOM.              | DISP.    | NOM.   | DISP.     | NOM.   | DISP. | NOM.                                        | DISP. | NOM. | DISP. | NOM. | DISP. | NOM. | DISP. |
| 2                                                             |     |                               | 25             | ↓      | ↓     | 116.72            | 2.73     | 117.61 | .28       | 130.14 | .27   | 2                                           | 50    | 50   | ↓     | ↓    | ↓     | ↓    | ↓     |
| 3                                                             |     |                               | 50             | ↓      | ↓     |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 4                                                             |     |                               | 75             | ↓      | ↓     |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 5                                                             |     | End Action Time               | 100            | 26.76  | 1.46  | 116.72            | 2.73     | 117.61 | .28       | 130.14 | .27   | 2                                           | 50    | 50   |       |      |       |      |       |
| 6                                                             |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 7                                                             | II  | Start Action Time             | 0              |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 8                                                             |     |                               | 25             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 9                                                             |     | Skirt Jettison                |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 10                                                            |     |                               | 50             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 11                                                            |     |                               | 75             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 12                                                            |     | End Action Time               | 100            |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 13                                                            |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 14                                                            | III | Start Action Time             | 0              |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 15                                                            |     | Skirt Jettison                |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 16                                                            |     |                               | 25             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 17                                                            |     |                               | 50             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 18                                                            |     |                               | 75             |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 19                                                            |     | End Action Time               | 100            |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 20                                                            |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 21                                                            | I   | Silo Heat Protection          |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 22                                                            |     | Base Heat Protection          |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 23                                                            |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 24                                                            | II  | Aft Interstage 1-2            |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 25                                                            |     | Jettisoned Fwd Interstage 1-2 |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 26                                                            |     | Base Heat Protection          |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 27                                                            |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 28                                                            | III | Aft Interstage 2-3            |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 29                                                            |     | Jettisoned Fwd Interstage 2-3 |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 30                                                            |     | Base Heat Protection          |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |
| 31                                                            |     |                               |                |        |       |                   |          |        |           |        |       |                                             |       |      |       |      |       |      |       |

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| 4.2.8 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS) |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
|---------------------------------------------------------------|-------|-------------------------------|----------|--------|-------|-------------------|--------|----------|--------|-----------|-------|------------------------------------------|-------|-----|---|---|---|---|---|
| MISSILE CTEI INSTALLATION                                     |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| COMPONENT SECTION 49 (AFT SKIRT)                              |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| LINE                                                          | STAGE | FLIGHT SEQUENCE               | % EXP WT | WEIGHT |       | CENTER OF GRAVITY |        |          |        |           |       | MOMENT OF INERTIA SLUG FEET <sup>2</sup> |       |     |   |   |   |   |   |
|                                                               |       |                               |          | NOM.   | DISP. | LONG. (X)         |        | LAT. (Y) |        | VERT. (Z) |       | ROLL                                     | PITCH | YAW |   |   |   |   |   |
|                                                               |       |                               |          |        |       | NOM.              | DISP.  | NOM.     | DISP.  | NOM.      | DISP. |                                          |       |     |   |   |   |   |   |
| 1                                                             | I     | Pre-Launch                    | 0        | 7.77   | .66   | 74.54             | 118.14 | .43      | 129.61 | .50       | 0     | 0                                        | 0     | 0   | 0 | 0 | 0 | 0 | 0 |
| 2                                                             |       |                               | 25       | ↑      | ↑     | ↑                 | ↑      | ↑        | ↑      | ↑         | ↑     | ↑                                        | ↑     | ↑   | ↑ | ↑ | ↑ | ↑ | ↑ |
| 3                                                             |       |                               | 50       | ↓      | ↓     | ↓                 | ↓      | ↓        | ↓      | ↓         | ↓     | ↓                                        | ↓     | ↓   | ↓ | ↓ | ↓ | ↓ | ↓ |
| 4                                                             |       |                               | 75       | ↓      | ↓     | ↓                 | ↓      | ↓        | ↓      | ↓         | ↓     | ↓                                        | ↓     | ↓   | ↓ | ↓ | ↓ | ↓ | ↓ |
| 5                                                             |       | End Action Time               | 100      | 7.77   | .66   | 74.54             | 118.14 | .43      | 129.61 | .50       | 0     | 0                                        | 0     | 0   | 0 | 0 | 0 | 0 | 0 |
| 6                                                             |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 7                                                             | II    | Start Action Time             | 0        |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 8                                                             |       |                               | 25       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 9                                                             |       | Skirt Jettison                | 50       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 10                                                            |       |                               | 75       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 11                                                            |       |                               | 100      |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 12                                                            |       | End Action Time               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 13                                                            |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 14                                                            | III   | Start Action Time             | 0        |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 15                                                            |       | Skirt Jettison                | 25       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 16                                                            |       |                               | 50       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 17                                                            |       |                               | 75       |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 18                                                            |       |                               | 100      |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 19                                                            |       | End Action Time               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 20                                                            |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME           |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 21                                                            | I     | Silo Heat Protection          |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 22                                                            |       | Base Heat Protection          |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 23                                                            |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 24                                                            | II    | Aft Interstage 1-2            |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 25                                                            |       | Jettisoned Fwd Interstage 1-2 |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 26                                                            |       | Base Heat Protection          |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 27                                                            |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 28                                                            | III   | Aft Interstage 2-3            |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 29                                                            |       | Jettisoned Fwd Interstage 2-3 |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 30                                                            |       | Base Heat Protection          |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |
| 31                                                            |       |                               |          |        |       |                   |        |          |        |           |       |                                          |       |     |   |   |   |   |   |

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## WEIGHT AND BALANCE

## INPUT

| MRCN    | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|---------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 39 | PRE-LAUNCH  | 148.45 | 1.69       | 220.69 | 1.01      | 99.66  | 0.62      | 100.18 | 0.30      |    |    |    |
| SECT 42 | PRE-LAUNCH  | 5.57   | 0.47       | 244.14 | 0.58      | 111.66 | 0.26      | 114.73 | 0.32      |    |    |    |
| SECT 44 | PRE-LAUNCH  | 16.78  | 0.86       | 292.41 | 2.26      | 108.50 | 0.32      | 116.95 | 0.25      |    |    |    |
| SECT 45 | PRE-LAUNCH  | 17.51  | 0.97       | 334.74 | 1.22      | 111.89 | 0.14      | 120.22 | 0.15      |    |    |    |
| SECT 46 | PRE-LAUNCH  | 26.39  | 1.46       | 406.98 | 1.41      | 112.63 | 0.22      | 121.75 | 0.23      |    |    |    |
| SECT 47 | PRE-LAUNCH  | 23.95  | 1.07       | 491.27 | 1.93      | 114.68 | 0.15      | 125.19 | 0.17      |    |    |    |
| SECT 48 | PRE-LAUNCH  | 26.76  | 1.46       | 592.28 | 2.73      | 117.61 | 0.28      | 130.14 | 0.27      |    |    |    |
| SECT 49 | PRE-LAUNCH  | 7.77   | 0.66       | 772.74 | 0.99      | 118.14 | 0.43      | 129.61 | 0.50      |    |    |    |

## SUMMARY

|           |              |           |              |           |              |           |              |           |              |           |              |
|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|
| W DELTA X | 0.333026E 05 | W DELTA Y | 0.862203E 04 | W DELTA Z | 0.213175E 04 | DELTA W X | 0.316284E 06 | DELTA W Y | 0.683085E 03 | DELTA W Z | 0.187531E 04 |
|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|

# WEIGHT AND BALANCE

## INPUT

| MRCN    | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|---------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 39 | PRE-LAUNCH  | 148.45 | 1.69       | 220.69 | 1.01      | 99.66  | 0.62      | 100.18 | 0.30      |    |    |    |
| SECT 42 | PRE-LAUNCH  | 5.57   | 0.47       | 244.14 | 0.58      | 111.66 | 0.26      | 114.73 | 0.32      |    |    |    |
| SECT 44 | PRE-LAUNCH  | 16.78  | 0.86       | 292.41 | 2.26      | 108.50 | 0.32      | 116.95 | 0.25      |    |    |    |
| SECT 45 | 25( 80 ST1  | 17.41  | 0.97       | 334.72 | 1.23      | 111.90 | 0.14      | 120.23 | 0.15      |    |    |    |
| SECT 46 | PRE-LAUNCH  | 26.39  | 1.46       | 406.98 | 1.41      | 112.63 | 0.22      | 121.75 | 0.23      |    |    |    |
| SECT 47 | SA ST 2     | -1.10  | 0.         | 477.38 | 0.        | 113.70 | 0.        | 123.80 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.257721E 05 | 0.854176E 04 | 0.204780E 04 | 0.577788E 05 | 0.333299E 03 | 0.916965E 03 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.752        | 0.433        | 0.212        | 1.126        | 3.086        | 0.142        |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| START ACTION ST 2 | 213.50 | 2.62       | 257.94 | 1.88      | 103.20 | 0.52      | 106.06 | 0.35      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN    | DESCRIPTION | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|---------|-------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 39 | PRE-LAUNCH  | 148.45 | 1.69       | 220.69 | 1.01      | 99.66  | 0.62      | 100.18 | 0.30      |    |    |    |
| SECT 42 | PRE-LAUNCH  | 5.57   | 0.47       | 244.14 | 0.58      | 111.66 | 0.26      | 114.73 | 0.32      |    |    |    |
| SECT 44 | PRE-LAUNCH  | 16.78  | 0.86       | 292.41 | 2.26      | 108.50 | 0.32      | 116.95 | 0.25      |    |    |    |
| SECT 45 | SA ST 3     | -1.30  | 0.         | 325.45 | 0.        | 109.76 | 0.        | 117.74 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.239289E 05 | 0.850211E 04 | 0.200414E 04 | 0.329345E 04 | 0.731227E 02 | 0.207505E 03 |
| WDY/W        | WDZ/W        | WDX/W        | DWDY/W       | DWDZ/W       |              |
| 0.913        | 0.544        | 0.264        | 0.050        | 0.085        |              |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| START ACTION ST 3 | 169.50 | 1.95       | 227.76 | 1.25      | 100.85 | 0.59      | 102.18 | 0.35      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN      | DESCRIPTION | WT     | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-----------|-------------|--------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6301CTLI  | WAFER       | 144.83 | 1.67       | 54.72 | 1.03      | 99.44  | 0.62      | 99.88  | 0.28      |    |    |    |
| 6302CABLE | ASSY SET    | 2.21   | 0.22       | 56.50 | 1.00      | 109.80 | 0.50      | 116.00 | 0.50      |    |    |    |
| 6304CCND  | SUPT SET    | 0.54   | 0.08       | 56.30 | 0.38      | 111.60 | 0.        | 111.60 | 0.        |    |    |    |
| 6306INSTL | KIT         | 0.67   | 0.         | 58.90 | 0.        | 101.20 | 0.        | 101.20 | 0.        |    |    |    |
| 6312BMS   | 5 62        | 0.20   | 0.02       | 54.50 | 0.        | 111.50 | 0.        | 111.50 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.222581E 05 | 0.806429E 04 | 0.164572E 04 | 0.166917E-00 | 0.608017E 01 | 0.132501E 02 |
| WDY/W        | WDY/W        | WDZ/W        | DWDY/W       | DWDY/W       | DWDZ/W       |
| 1.005        | 0.605        | 0.273        | 0.003        | 0.017        | 0.025        |

## TOTALS

| DESCRIPTION       | WT     | WT<br>DISP | X     | X<br>DISP | Y     | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|--------|------------|-------|-----------|-------|-----------|--------|-----------|----|----|----|
| SECT 39PRE-LAUNCH | 148.45 | 1.69       | 54.77 | 1.01      | 99.66 | 0.62      | 100.18 | 0.30      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN      | DESCRIPTION | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-----------|-------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302CABLE | ASSY SET    | 1.98  | 0.20       | 65.80 | 1.00      | 110.50 | 0.50      | 117.20 | 0.50      |    |    |    |
| 6304CCNC  | SUPT SET    | 3.02  | 0.42       | 69.80 | 0.45      | 112.60 | 0.        | 113.30 | 0.        |    |    |    |
| 6009PART  | REMOVAL     | -0.20 | 0.         | 66.60 | 0.        | 111.00 | 0.        | 109.80 | 0.        |    |    |    |
| 6306INSTL | KIT         | 0.37  | 0.         | 70.50 | 0.        | 111.10 | 0.        | 111.90 | 0.        |    |    |    |
| 6312BMS   | 5 62        | 0.40  | 0.04       | 65.40 | 0.        | 110.50 | 0.        | 113.50 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.576728E 01 | 0.980100E 00 | 0.980100E 00 | 0.686099E 00 | 0.211726E-00 | 0.608234E 00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.431        | 0.178        | 0.178        | 0.149        | 0.083        | 0.140        |

## TOTALS

| DESCRIPTION       | WT   | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 42PRE-LAUNCH | 5.57 | 0.47       | 68.22 | 0.58      | 111.66 | 0.26      | 114.73 | 0.32      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION    | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|----------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302 | CABLE ASSY SET | 6.47  | 0.65       | 92.90 | 1.00      | 111.20 | 0.50      | 118.40 | 0.50      |    |    |    |
| 6304 | CCND SUPT SET  | 13.33 | 0.56       | 87.60 | 2.39      | 110.80 | 0.        | 117.70 | 0.        |    |    |    |
| 6306 | INSTL KIT      | 1.13  | 0.         | 77.40 | 0.        | 110.20 | 0.        | 117.50 | 0.        |    |    |    |
| 6312 | BMS 5 62       | 0.20  | 0.02       | 80.90 | 0.        | 109.30 | 0.        | 116.20 | 0.        |    |    |    |
| 6604 | DESTRUCT SYS   | 4.03  | 0.04       | 58.10 | 0.        | 99.80  | 0.        | 114.00 | 0.        |    |    |    |
| 6009 | PART REMOVAL   | -8.38 | 0.         | 81.20 | 0.        | 110.30 | 0.        | 117.90 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.105684E 04 | 0.104652E 02 | 0.104652E 02 | 0.297507E 02 | 0.484625E 01 | 0.107875E 01 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 1.937        | 0.193        | 0.193        | 0.325        | 0.131        | 0.062        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 44PRE-LAUNCH | 16.78 | 0.86       | 84.99 | 2.26      | 108.50 | 0.32      | 116.95 | 0.25      |    |    |    |

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D2-13956-2

# WEIGHT AND BALANCE

## INPUT

| MACH | DESCRIPTION        | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|--------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
|      | 6302CABLL ASSY SET | 4.36  | 0.44       | 64.90 | 1.00      | 112.00 | 0.50      | 119.90 | 0.50      |    |    |    |
|      | 6304CCND SUPT SET  | 15.55 | 0.86       | 66.63 | 1.28      | 111.70 | 0.        | 120.20 | 0.        |    |    |    |
|      | 6306INSTL KIT      | 1.26  | 0.         | 75.00 | 0.        | 111.30 | 0.        | 119.70 | 0.        |    |    |    |
|      | 6312BMS 5 62 FOR 2 | 0.20  | 0.02       | 53.60 | 0.        | 110.80 | 0.        | 116.70 | 0.        |    |    |    |
|      | 6312BMS 5 62 POR 3 | 0.20  | 0.02       | 85.00 | 0.        | 103.00 | 0.        | 101.80 | 0.        |    |    |    |
|      | 6CC9PART REMOVAL 2 | -1.50 | 0.         | 55.90 | 0.        | 109.90 | 0.        | 117.60 | 0.        |    |    |    |
|      | 6CC9PART REMOVAL 3 | -2.56 | 0.         | 81.80 | 0.        | 111.00 | 0.        | 119.10 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.415179E 03 | 0.475240E 01 | 0.475240E 01 | 0.112257E 01 | 0.618282E-01 | 0.161269E-00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 1.164        | 0.125        | 0.125        | 0.061        | 0.014        | 0.023        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 45PRE-LAUNCH | 17.51 | 0.97       | 65.54 | 1.22      | 111.89 | 0.14      | 120.22 | 0.15      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION    | WT     | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|----------------|--------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302 | CABLE ASSY SET | 10.75  | 1.08       | 111.10 | 1.00      | 112.80 | 0.50      | 121.20 | 0.50      |    |    |    |
| 6304 | CCND SUPT SET  | 20.92  | 0.95       | 108.60 | 0.82      | 112.20 | 0.        | 121.20 | 0.        |    |    |    |
| 6306 | INSTL KIT      | 1.93   | 0.         | 81.40  | 0.        | 111.50 | 0.        | 119.90 | 0.        |    |    |    |
| 6303 | INTERVAL TIMER | 1.50   | 0.15       | 67.10  | 0.        | 112.50 | 0.        | 121.80 | 0.        |    |    |    |
| 6310 | BATTERY        | 1.40   | 0.16       | 63.90  | 0.        | 112.50 | 0.        | 121.80 | 0.        |    |    |    |
| 6604 | DESTRUCT SYS   | 4.19   | 0.03       | 74.80  | 0.        | 111.80 | 0.        | 121.80 | 0.        |    |    |    |
| 6009 | PART REMOVAL   | -14.30 | 0.         | 105.10 | 0.        | 111.70 | 0.        | 120.30 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.409836E 03 | 0.288906E 02 | 0.288906E 02 | 0.291162E 03 | 0.203462E-00 | 0.634648E 00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.767        | 0.204        | 0.204        | 0.647        | 0.017        | 0.030        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 46PRE-LAUNCH | 26.39 | 1.46       | 99.43 | 1.41      | 112.63 | 0.22      | 121.75 | 0.23      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRGN | DESCRIPTION    | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|----------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302 | CABLE ASSY SET | 2.40  | 0.55       | 71.20  | 1.00      | 115.80 | 0.50      | 126.40 | 0.50      |    |    |    |
| 6304 | CNCL SUPT SET  | 21.13 | 0.92       | 77.80  | 2.00      | 114.80 | 0.        | 125.60 | 0.        |    |    |    |
| 6306 | INSTL KIT      | 1.21  | 0.         | 86.50  | 0.        | 115.20 | 0.        | 126.00 | 0.        |    |    |    |
| 6312 | BFS 5 62 POR 3 | 0.50  | 0.05       | 74.70  | 0.        | 102.00 | 0.        | 103.40 | 0.        |    |    |    |
| 6009 | PART REMOVAL 2 | -1.10 | 0.         | 60.90  | 0.        | 113.70 | 0.        | 123.80 | 0.        |    |    |    |
| 6009 | PART REMOVAL 3 | -3.27 | 0.         | 100.30 | 0.        | 115.90 | 0.        | 127.30 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.181554E 04 | 0.750760E 01 | 0.750760E 01 | 0.125691E 02 | 0.791865E 00 | 0.177172E 01 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 1.779        | 0.114        | 0.114        | 0.148        | 0.037        | 0.056        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 47PRE-LAUNCH | 23.95 | 1.07       | 74.79 | 1.93      | 114.68 | 0.15      | 125.19 | 0.17      |    |    |    |

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# WEIGHT AND BALANCE

## INPUT

| M/R  | DESCRIPTION    | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|----------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302 | CABLE ASSY SET | 13.12 | 1.31       | 156.40 | 1.00      | 118.20 | 0.50      | 130.50 | 0.50      |    |    |    |
| 6304 | CCND SUPT SET  | 9.68  | 0.59       | 78.70  | 0.84      | 117.20 | 0.        | 129.90 | 0.        |    |    |    |
| 6306 | INSTL KIT      | 2.56  | 0.         | 92.40  | 0.        | 117.20 | 0.        | 130.00 | 0.        |    |    |    |
| 6303 | INTERVAL TIMER | 1.50  | 0.15       | 70.60  | 0.        | 117.70 | 0.        | 130.50 | 0.        |    |    |    |
| 6310 | BATTERY        | 1.40  | 0.16       | 66.70  | 0.        | 117.70 | 0.        | 130.50 | 0.        |    |    |    |
| 6312 | MS 5 62        | 0.80  | 0.08       | 161.30 | 0.        | 116.20 | 0.        | 128.00 | 0.        |    |    |    |
| 6604 | DESTRUCT SYS   | 6.19  | 0.04       | 78.10  | 0.        | 116.90 | 0.        | 129.30 | 0.        |    |    |    |
| 6009 | PART REMOVAL   | -8.49 | 0.         | 87.00  | 0.        | 117.30 | 0.        | 129.70 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELTA Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.238251E 03 | 0.430336E 02 | 0.430336E 02 | 0.333209E 04 | 0.663869E 00 | 0.282779E-00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.577        | 0.245        | 0.245        | 2.157        | 0.030        | 0.020        |

## TOTALS

| DESCRIPTION       | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 48PRE-LAUNCH | 26.76 | 1.46       | 116.72 | 2.73      | 117.61 | 0.28      | 130.14 | 0.27      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| PRC. DESCRIPTION   | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|--------------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 2302CABLE ASSY SET | 6.63  | 0.66       | 73.20  | 1.00      | 118.20 | 0.50      | 130.50 | 0.50      |    |    |    |
| 6306INSTL KIT      | 1.56  | 0.         | 74.10  | 0.        | 117.80 | 0.        | 124.50 | 0.        |    |    |    |
| 6312BAS 5 62       | 0.20  | 0.02       | 101.30 | 0.        | 119.20 | 0.        | 133.90 | 0.        |    |    |    |
| 6009PART REMOVAL   | -0.62 | 0.         | 67.70  | 0.        | 118.30 | 0.        | 127.60 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELT. Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.439569E 02 | 0.109892E 02 | 0.109892E 02 | 0.107188E 01 | 0.215587E-02 | 0.349072E-00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.853        | 0.427        | 0.427        | 0.133        | 0.006        | 0.076        |

## TOTALS

| DESCRIPTION              | WT   | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|--------------------------|------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| <u>SECT 49PRE-LAUNCH</u> | 7.77 | 0.66       | 74.54 | 0.99      | 118.14 | 0.43      | 129.61 | 0.50      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| PART DESCRIPTION   | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IV | IZ |
|--------------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6302CABLE ASSY SET | 6.63  | 0.66       | 73.20  | 1.00      | 118.20 | 0.50      | 130.50 | 0.50      |    |    |    |
| 6306INSTL KIT      | 1.56  | 0.         | 74.10  | 0.        | 117.80 | 0.        | 124.50 | 0.        |    |    |    |
| 6312BBS 5 62       | 0.20  | 0.02       | 101.30 | 0.        | 119.20 | 0.        | 133.90 | 0.        |    |    |    |
| 6009PART REMOVAL   | -0.62 | 0.         | 67.70  | 0.        | 118.30 | 0.        | 127.60 | 0.        |    |    |    |

## SUMMARY

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| W DELTA X    | W DELT. Y    | W DELTA Z    | DELTA W X    | DELTA W Y    | DELTA W Z    |
| 0.439569E 02 | 0.109892E 02 | 0.109892E 02 | 0.107188E 01 | 0.215587E-02 | 0.349072E-00 |
| WDX/W        | WDY/W        | WDZ/W        | DWDX/W       | DWDY/W       | DWDZ/W       |
| 0.853        | 0.427        | 0.427        | 0.133        | 0.006        | 0.076        |

## TOTALS

| DESCRIPTION       | WT   | WT<br>DISP | X     | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IV | IZ |
|-------------------|------|------------|-------|-----------|--------|-----------|--------|-----------|----|----|----|
| SECT 49PRE-LAUNCH | 7.77 | 0.66       | 74.54 | 0.99      | 118.14 | 0.43      | 129.61 | 0.50      |    |    |    |

DATA SAMPLES FOR MAJOR COMPONENTS

The following pages summarize by major components the data samples used to derive the means and dispersion values used in the preceding sections of this document. The components include the CTLI section, both interstages, the aft skirt, the three base heat deflectors, and raceway covers and caps. Sample data for components other than these are not listed in detail, but are summarized by part number under the applicable figure A. Details are on file and can be supplied upon request.

The CTLI statistical sample for this report consists of two actual weights of Wing II CTLI Section which were nearly identical to the Wing I sections reported in Reference 1.1.5. Since the sample size was so small, the method of statistical analysis used for these components varies from that used in the remainder of this report. In this instance a two sided tolerance factor,  $K_{ru}$  was derived with the assistance of the statistical data obtained during Wing I production of CTLI sections. Factors for  $r(N,P)$  and  $u(f,\gamma)$  were taken from Tables of Tolerance-Limit Factors for Normal Distribution by Alfred Weissberg and Glenn Beatty as published in Technometrics, November 1960 (Volume 2, No. 4).

The "K" factors used for components with larger sample sizes were taken from tables in Techniques of Statistical Analysis edited by Eisenhart, Hastay, and Wallis.

The dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with STL directions received on 30 January 1963.

NOMENCLATURE EXPLANATION FOR FOLLOWING PAGES

- AW = Average Weight.
  - (KS)W = Weight Dispersion.
  - W = Summation of individual weight samples.
  - WSQ = Summation of squares of individual weight samples.
  - WN = Quantity of weight samples used.
  - KW = "K" factor from tables.
  - SW = Standard deviation for weight samples
- (Nomenclature for x,y, and z is similar to above)

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| MISSILE SECTION 39 |                                   |              | COMPONENT CTLLI SECTION                              |                  |                  |                  |                  |                  |                  |                  |
|--------------------|-----------------------------------|--------------|------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| CALCULATED         |                                   |              | NOMINAL & DISPERSION DERIVATION DRAWING NO. 25-37501 |                  |                  |                  |                  |                  |                  |                  |
| L I N E            | SAMPLE NO.                        | D/G DASH NO. | WEIGHT                                               |                  | LONG. C. G. (X)  |                  | LAT. C. G. (Y)   |                  | VERT. C. G. (Z)  |                  |
|                    |                                   |              | WT                                                   | WT <sup>2</sup>  | ARM              | ARM <sup>2</sup> | ARM              | ARM <sup>2</sup> | ARM              | ARM <sup>2</sup> |
| 1                  | 0000022                           | -8           | A                                                    | B                | A                | B                | A                | B                | A                | B                |
| 2                  | 0000023                           | -8           | 144.45                                               |                  | 54.74            |                  | 99.44            |                  | 99.94            |                  |
| 3                  |                                   |              | 145.21                                               |                  | 54.70            |                  | 99.43            |                  | 99.83            |                  |
| 4                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 5                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 6                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 7                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 8                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 9                  |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 10                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 11                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 12                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 13                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 14                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 15                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 16                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 17                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 18                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 19                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 20                 |                                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| DESCRIPTION        |                                   |              | PROCEDURE                                            | WEIGHT           | LONG. C. G.      |                  | LAT. C. G.       |                  | VERT. C. G.      |                  |
| 21                 | SUM OF COLUMN A                   |              |                                                      | 289.66           | 109.44           |                  | 198.87           |                  | 199.77           |                  |
| 22                 | SAMPLE SIZE, n                    |              |                                                      | 2                | 2                |                  | 2                |                  | 2                |                  |
| 23                 | NOMINAL VALUE, $\mu$              |              | (21)/(22)                                            | 144.83           | 54.72            |                  | 99.44            |                  | 99.88            |                  |
| 24                 | SUM OF COLUMN B                   |              |                                                      |                  |                  |                  |                  |                  |                  |                  |
| 25                 | (SUM OF COLUMN A) <sup>2</sup> /n |              | (21) <sup>2</sup> /(22)                              |                  |                  |                  |                  |                  |                  |                  |
| 26                 | SUM OF SQUARED DEVIATIONS         |              | (24)-(25)                                            |                  |                  |                  |                  |                  |                  |                  |
| 27                 | VARIANCE, S <sup>2</sup>          |              | (26)/[(22)-1]                                        |                  |                  |                  |                  |                  |                  |                  |
| 28                 | STANDARD DEVIATION                |              | √(27)                                                | .4099            | .2527            |                  | .1511            |                  | .0688            |                  |
| 29                 | % POPULATION, P                   |              |                                                      | .990             | .990             |                  | .990             |                  | .990             |                  |
| 30                 | % CONFIDENCE LEVEL, $\gamma$      |              |                                                      | .90              | .90              |                  | .90              |                  | .90              |                  |
| 31                 | K FACTOR FOR (22), (29) & (30)    |              |                                                      | (3.0368)(1.3406) | (3.0368)(1.3406) |                  | (3.0368)(1.3406) |                  | (3.0368)(1.3406) |                  |
| 32                 | TOLERANCE                         |              | (28)(31)                                             | 1.67             | 1.03             |                  | .62              |                  | .28              |                  |



| W      | X     | Y     | Z      | W      | X     | Y     | Z      | W      | X     | Y     | Z      |
|--------|-------|-------|--------|--------|-------|-------|--------|--------|-------|-------|--------|
| 156.35 | 67.36 | 99.40 | 100.96 | 156.85 | 67.39 | 99.33 | 100.94 | 156.80 | 67.31 | 99.40 | 100.93 |
| 156.30 | 67.40 | 99.45 | 101.02 | 156.40 | 67.44 | 99.37 | 100.91 | 156.95 | 67.28 | 99.40 | 100.92 |
| 156.95 | 67.52 | 99.37 | 100.95 | 156.75 | 67.39 | 99.38 | 100.95 | 157.30 | 67.50 | 99.30 | 100.93 |
| 157.50 | 67.29 | 99.41 | 100.96 | 158.45 | 67.34 | 99.34 | 100.96 | 157.05 | 67.41 | 99.34 | 100.96 |
| 157.05 | 67.27 | 99.37 | 100.92 | 157.30 | 67.37 | 99.36 | 101.00 | 157.45 | 67.41 | 99.46 | 100.95 |
| 156.20 | 67.29 | 99.38 | 100.98 | 156.50 | 67.40 | 99.35 | 100.98 | 156.60 | 67.40 | 99.38 | 100.94 |
| 157.30 | 67.35 | 99.29 | 101.02 | 157.00 | 67.35 | 99.44 | 100.98 | 157.85 | 67.22 | 99.29 | 100.97 |
| 156.15 | 67.37 | 99.32 | 101.06 | 157.90 | 67.29 | 99.43 | 100.94 | 156.75 | 67.32 | 99.38 | 100.96 |
| 156.55 | 67.48 | 99.39 | 100.90 | 155.80 | 67.17 | 99.38 | 100.76 | 157.00 | 67.39 | 99.41 | 101.01 |
| 156.35 | 67.31 | 99.31 | 100.98 | 157.15 | 67.27 | 99.39 | 100.97 | 158.00 | 67.38 | 99.37 | 100.97 |
| 156.65 | 67.25 | 99.38 | 100.95 | 157.15 | 67.28 | 99.30 | 100.99 | 156.30 | 67.27 | 99.39 | 100.95 |
| 156.70 | 67.35 | 99.39 | 100.99 | 156.30 | 67.23 | 99.37 | 100.97 | 156.20 | 67.40 | 99.37 | 100.93 |
| 156.55 | 67.29 | 99.36 | 100.93 | 156.95 | 67.27 | 99.39 | 100.88 | 156.55 | 67.20 | 99.35 | 100.90 |
| 157.20 | 67.32 | 99.43 | 100.97 | 155.80 | 67.46 | 99.26 | 100.99 | 156.90 | 67.31 | 99.36 | 100.95 |
| 156.65 | 67.27 | 99.27 | 100.98 | 155.75 | 67.18 | 99.28 | 100.84 | 156.65 | 67.20 | 99.24 | 100.91 |
| 156.25 | 67.21 | 99.25 | 100.95 | 157.40 | 67.25 | 99.28 | 100.98 | 156.55 | 67.35 | 99.38 | 100.88 |
| 156.40 | 67.18 | 99.38 | 100.96 | 156.75 | 67.28 | 99.37 | 100.89 | 158.15 | 67.40 | 99.36 | 100.93 |
|        |       |       |        | 156.85 | 67.41 | 99.32 | 100.97 | 156.55 | 67.36 | 99.34 | 100.97 |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 050 6501 25-36103-001 INTERSTAGE 2-3

|     |               |                |                 |     |
|-----|---------------|----------------|-----------------|-----|
| AW= | 156.83 (KS)W= | 1.73 AX=       | 67.33 (KS)X=    | .25 |
| AY= | 99.36 (KS)Y=  | .15 AZ=        | 100.95 (KS)Z=   | .14 |
| W=  | 8311.75 WSQ=  | 1303511.64 WN= | 53 KW=2.985 SW= | .58 |
| X=  | 3568.39 XSQ=  | 240253.33 XN=  | 53 KX=2.985 SX= | .08 |
| Y=  | 5266.01 YSQ=  | 523223.93 YN=  | 53 KY=2.985 SY= | .05 |
| Z=  | 5350.34 ZSQ=  | 540115.93 ZN=  | 53 KZ=2.985 SZ= | .05 |

BOEING

| W      | X     | Y     | Z      | W      | X     | Y     | Z      | W      | X     | Y     | Z      |
|--------|-------|-------|--------|--------|-------|-------|--------|--------|-------|-------|--------|
| 339.45 | 78.06 | 99.54 | 100.30 | 334.60 | 78.08 | 99.62 | 100.02 | 342.55 | 77.83 | 99.65 | 100.27 |
| 342.02 | 77.90 | 99.59 | 100.30 | 340.92 | 78.12 | 99.57 | 100.21 | 339.35 | 77.81 | 99.67 | 100.24 |
| 341.30 | 77.87 | 99.75 | 100.20 | 342.95 | 78.03 | 99.55 | 100.30 | 342.10 | 77.87 | 99.74 | 100.24 |
| 341.95 | 77.99 | 99.62 | 100.23 | 343.05 | 77.95 | 99.66 | 100.26 | 342.30 | 78.11 | 99.68 | 100.30 |
| 342.90 | 78.18 | 99.60 | 100.20 | 343.20 | 78.07 | 99.55 | 100.23 | 339.65 | 78.06 | 99.77 | 100.32 |
| 343.95 | 78.07 | 99.59 | 100.26 | 342.05 | 77.90 | 99.60 | 100.28 | 342.85 | 77.92 | 99.50 | 100.31 |
| 344.40 | 77.96 | 99.59 | 100.38 | 339.60 | 78.05 | 99.53 | 100.47 | 341.40 | 78.07 | 99.51 | 100.36 |
| 341.60 | 77.99 | 99.62 | 100.21 | 343.05 | 78.15 | 99.47 | 100.32 | 342.60 | 78.02 | 99.63 | 100.34 |
| 345.00 | 78.03 | 99.68 | 100.27 | 343.85 | 77.95 | 99.69 | 100.26 | 344.35 | 78.37 | 99.70 | 100.19 |
| 341.75 | 78.00 | 99.57 | 100.31 | 343.75 | 78.09 | 99.61 | 100.26 | 340.25 | 78.02 | 99.43 | 100.33 |
| 342.50 | 78.08 | 99.67 | 100.28 | 341.50 | 78.05 | 99.54 | 100.25 | 342.55 | 78.14 | 99.58 | 100.33 |
| 342.60 | 78.00 | 99.53 | 100.29 | 341.30 | 78.03 | 99.72 | 100.29 | 342.05 | 77.92 | 99.44 | 100.35 |
| 345.40 | 78.01 | 99.65 | 100.32 | 342.80 | 78.10 | 99.66 | 100.22 | 342.50 | 77.98 | 99.60 | 100.32 |
| 343.45 | 78.07 | 99.68 | 100.30 | 339.45 | 77.97 | 99.58 | 100.30 | 341.70 | 77.97 | 99.64 | 100.24 |
| 341.70 | 77.89 | 99.56 | 100.25 | 341.30 | 77.85 | 99.61 | 100.31 | 342.15 | 77.92 | 99.58 | 100.29 |
| 340.60 | 77.96 | 99.63 | 100.31 | 344.55 | 78.03 | 99.62 | 100.33 | 341.70 | 77.94 | 99.71 | 100.26 |
|        |       |       |        | 341.05 | 77.96 | 99.59 | 100.39 | 341.75 | 77.96 | 99.55 | 100.28 |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 070 6701 25-36101-001 INTERSTAGE 1-2  
 AW= 342.03 (KSI)W= 5.34 AX= 78.01 (KSI)X= .30  
 AY= 99.61 (KSI)Y= .23 AZ= 100.28 (KSI)Z= .20  
 W= 17101.34 WSQ= 5849271.77 WN= 50 KW=3.001 SW= 1.78  
 X= 3900.40 XSQ= 304262.88 XN= 50 KX=3.001 SX= .10  
 Y= 4980.42 YSQ= 496091.95 YN= 50 KY=3.001 SY= .08  
 Z= 5014.08 ZSQ= 502820.17 ZN= 50 KZ=3.001 SZ= .07

| W      | X     | Y     | Z      | W      | X     | Y     | Z      | W      | X     | Y     | Z      |
|--------|-------|-------|--------|--------|-------|-------|--------|--------|-------|-------|--------|
| 339.45 | 78.06 | 99.54 | 100.30 | 334.60 | 78.08 | 99.62 | 100.02 | 342.55 | 77.88 | 99.65 | 100.27 |
| 342.02 | 77.90 | 99.59 | 100.30 | 340.92 | 78.12 | 99.57 | 100.21 | 339.35 | 77.81 | 99.67 | 100.24 |
| 341.30 | 77.87 | 99.75 | 100.20 | 342.95 | 78.03 | 99.55 | 100.30 | 342.10 | 77.87 | 99.74 | 100.24 |
| 341.95 | 77.99 | 99.62 | 100.23 | 343.05 | 77.95 | 99.66 | 100.26 | 342.30 | 78.11 | 99.68 | 100.30 |
| 342.90 | 78.18 | 99.60 | 100.20 | 343.20 | 78.07 | 99.55 | 100.23 | 339.65 | 78.06 | 99.77 | 100.32 |
| 343.95 | 78.07 | 99.59 | 100.26 | 342.05 | 77.90 | 99.60 | 100.28 | 342.85 | 77.92 | 99.50 | 100.31 |
| 344.40 | 77.96 | 99.59 | 100.38 | 339.60 | 78.05 | 99.53 | 100.47 | 341.40 | 78.07 | 99.51 | 100.36 |
| 341.60 | 77.99 | 99.62 | 100.21 | 343.05 | 78.15 | 99.47 | 100.32 | 342.60 | 78.02 | 99.63 | 100.34 |
| 345.00 | 78.03 | 99.68 | 100.27 | 343.85 | 77.95 | 99.69 | 100.26 | 344.35 | 78.37 | 99.70 | 100.19 |
| 341.75 | 78.00 | 99.57 | 100.31 | 343.75 | 78.09 | 99.61 | 100.26 | 340.25 | 78.02 | 99.43 | 100.33 |
| 342.50 | 78.08 | 99.67 | 100.28 | 341.50 | 78.05 | 99.54 | 100.25 | 342.55 | 78.14 | 99.58 | 100.33 |
| 342.60 | 78.00 | 99.53 | 100.29 | 341.30 | 78.03 | 99.72 | 100.29 | 342.05 | 77.92 | 99.44 | 100.35 |
| 345.40 | 78.01 | 99.65 | 100.32 | 342.80 | 78.10 | 99.66 | 100.22 | 342.50 | 77.98 | 99.60 | 100.32 |
| 343.45 | 78.07 | 99.68 | 100.30 | 339.45 | 77.97 | 99.58 | 100.30 | 341.70 | 77.97 | 99.64 | 100.24 |
| 341.70 | 77.89 | 99.56 | 100.25 | 341.30 | 77.85 | 99.61 | 100.31 | 342.15 | 77.92 | 99.58 | 100.29 |
| 340.60 | 77.96 | 99.63 | 100.31 | 344.55 | 78.03 | 99.62 | 100.33 | 341.70 | 77.94 | 99.71 | 100.26 |
|        |       |       |        | 341.05 | 77.96 | 99.59 | 100.39 | 341.75 | 77.96 | 99.55 | 100.28 |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 070 6701 25-36101-001 INTERSTAGE 1-2  
 AW= 342.03 (KS)W= 5.34 AX= 78.01 (KS)X= .30  
 AY= 99.61 (KS)Y= .23 AZ= 100.28 (KS)Z= .20  
 W= 17101.34 WSQ= 5849271.77 WN= 50 KW=3.001 SW= 1.78  
 X= 3900.40 XSQ= 304262.88 XN= 50 KX=3.001 SX= .10  
 Y= 4980.42 YSQ= 496091.95 YN= 50 KY=3.001 SY= .08  
 Z= 5014.08 ZSQ= 502820.17 ZN= 50 KZ=3.001 SZ= .07

| W      | X     | Y      | Z      | W      | X     | Y      | Z      | W      | X     | Y      | Z      |
|--------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--------|--------|
| 275.15 | 68.78 | 100.46 | 100.69 | 273.45 | 68.81 | 100.56 | 100.63 | 276.30 | 68.69 | 100.57 | 100.51 |
| 275.05 | 68.69 | 100.51 | 100.53 | 274.73 | 68.66 | 100.41 | 100.65 | 272.65 | 68.77 | 100.36 | 100.72 |
| 276.45 | 68.72 | 100.43 | 100.58 | 273.30 | 68.70 | 100.45 | 100.42 | 277.00 | 68.69 | 100.53 | 100.64 |
| 275.50 | 68.77 | 100.48 | 100.50 | 274.00 | 68.68 | 100.53 | 100.56 | 275.80 | 68.75 | 100.42 | 100.57 |
| 276.10 | 68.50 | 100.48 | 100.55 | 276.65 | 68.78 | 100.65 | 100.47 | 270.65 | 68.69 | 100.25 | 100.66 |
| 275.65 | 68.77 | 100.38 | 100.61 | 274.25 | 68.77 | 100.38 | 100.66 | 276.85 | 68.87 | 100.42 | 100.66 |
| 276.15 | 68.60 | 100.50 | 100.80 | 273.50 | 68.75 | 100.33 | 100.59 | 274.70 | 68.67 | 100.52 | 100.50 |
| 277.75 | 68.72 | 100.53 | 100.55 | 273.95 | 68.66 | 100.38 | 100.57 | 275.00 | 68.87 | 100.58 | 100.47 |
| 274.00 | 68.84 | 100.43 | 100.64 | 276.20 | 68.75 | 100.37 | 100.65 | 272.75 | 68.63 | 100.42 | 100.60 |
| 276.35 | 68.69 | 100.56 | 100.54 | 272.50 | 68.85 | 100.46 | 100.59 | 274.70 | 68.71 | 100.31 | 100.75 |
| 276.00 | 68.70 | 100.42 | 100.49 | 277.00 | 68.75 | 100.49 | 100.57 | 274.40 | 68.71 | 100.29 | 100.74 |
| 275.90 | 68.79 | 100.62 | 100.52 | 274.70 | 68.75 | 100.48 | 100.64 | 274.70 | 68.89 | 100.52 | 100.63 |
| 272.50 | 68.75 | 100.46 | 100.63 | 274.55 | 68.83 | 100.50 | 100.61 | 275.75 | 68.80 | 100.65 | 100.55 |
| 273.35 | 68.90 | 100.49 | 100.48 | 271.95 | 68.69 | 100.50 | 100.59 | 273.15 | 68.65 | 100.55 | 100.51 |
| 275.05 | 68.81 | 100.68 | 100.48 | 275.20 | 68.73 | 100.66 | 100.54 | 275.55 | 68.78 | 100.73 | 100.50 |
| 274.80 | 68.73 | 100.41 | 100.67 | 271.55 | 68.81 | 100.52 | 100.64 | 271.85 | 68.65 | 100.50 | 100.66 |
| 275.60 | 68.78 | 100.62 | 100.43 | 274.70 | 68.82 | 100.43 | 100.79 | 272.45 | 68.68 | 100.48 | 100.76 |
| 272.90 | 68.77 | 100.48 | 100.61 | 272.55 | 68.72 | 100.53 | 100.55 | 274.10 | 68.79 | 100.52 | 100.56 |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT

190 6901 25-36080-001 AFT SKIRT  
 AW= 274.58 (KS)W= 4.77 AX= 68.74 (KS)X= .22  
 AY= 100.49 (KS)Y= .29 AZ=100.59 (KS)Z= .26  
 W= 14827.33 WSQ= 4071426.55 WN= 54 KW=2.981 SW= 1.60  
 X= 3712.11 XSQ= 255181.06 XN= 54 KX=2.981 SX= .08  
 Y= 5426.19 YSQ= 545251.22 YN= 54 KY=2.981 SY= .10  
 Z= 5432.01 ZSQ= 546421.39 ZN= 54 KZ=2.981 SZ= .09

BOEING

| W    | X      | W    | X      | W    | X      | W    | X      | W    | X      | W    | X      |
|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| 5.95 | 132.94 | 6.05 | 133.36 | 6.01 | 133.45 | 6.01 | 132.94 | 6.01 | 132.94 | 6.11 | 133.44 |
| 6.11 | 133.41 | 6.03 | 133.42 | 6.01 | 133.14 | 6.01 | 133.42 | 6.01 | 133.42 | 6.02 | 133.44 |
| 5.81 | 133.42 | 5.94 | 133.41 | 5.82 | 133.41 | 5.82 | 133.42 | 5.93 | 133.42 | 5.93 | 133.44 |
| 5.98 | 133.42 | 5.86 | 133.41 | 5.89 | 133.41 | 5.89 | 133.42 | 5.90 | 133.42 | 5.90 | 133.44 |
| 5.93 | 133.42 | 5.98 | 133.41 | 5.76 | 133.41 | 5.76 | 133.42 | 5.91 | 133.42 | 5.91 | 133.44 |
| 5.83 | 133.42 | 5.99 | 133.41 | 5.89 | 133.41 | 5.89 | 133.42 | 5.90 | 133.42 | 5.90 | 133.44 |
| 5.98 | 133.42 | 5.89 | 133.41 | 5.84 | 133.41 | 5.84 | 133.42 | 5.89 | 133.42 | 5.89 | 133.44 |
| 5.82 | 133.42 | 6.02 | 133.41 | 5.84 | 133.41 | 5.84 | 133.42 | 5.94 | 133.42 | 5.94 | 133.44 |
| 5.89 | 133.42 | 5.96 | 133.41 | 5.89 | 133.41 | 5.89 | 133.42 | 5.87 | 133.42 | 5.87 | 133.44 |

340 6006 25-36379-001 BASE HEAT DEFLECTOR  
 W= 302.72 WSQ=  
 X= 1733.13 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 5.94 (KS)W= 5.23 AX=133.32 (KS)X= .68  
 1797.15 WN= 51 KW=2.995 SW= .08  
 231057.30 XN= 13 KX=3.682 SX= .18  
 BOEING

| W     | X      | W     | X      | W     | X      | W     | X      | W     | X      | W     | X      | W     | X      |
|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| 15.06 | 193.08 | 15.49 | 192.58 | 15.78 | 192.83 | 15.84 | 192.53 | 15.53 | 192.58 | 15.18 | 192.63 | 15.53 | 192.58 |
| 15.54 | 192.33 | 15.27 | 192.63 | 15.31 | 192.94 | 15.38 | 192.53 | 15.12 | 192.80 | 15.68 | 192.28 | 15.12 | 192.80 |
| 15.45 | 192.73 | 15.63 | 192.61 | 15.49 | 192.98 | 15.38 | 192.53 | 15.63 | 192.48 | 15.39 | 192.66 | 15.63 | 192.48 |
| 15.68 | 192.53 | 15.71 | 192.68 | 15.66 | 192.63 | 15.40 | 192.30 | 15.50 | 192.53 | 15.64 | 192.53 | 15.50 | 192.53 |
| 15.27 | 192.58 | 15.75 | 192.68 | 15.51 | 192.68 | 15.36 | 192.78 | 15.56 | 192.58 | 15.79 | 192.58 | 15.56 | 192.58 |
| 15.63 | 192.68 | 15.55 | 192.68 | 15.60 | 192.68 | 15.84 | 192.78 | 15.67 | 192.63 | 15.69 | 192.63 | 15.67 | 192.63 |
| 15.56 | 192.68 | 15.72 | 192.68 | 15.55 | 192.68 | 15.77 | 192.78 | 15.61 | 192.63 | 15.58 | 192.63 | 15.61 | 192.63 |
| 15.61 | 192.55 | 15.81 | 192.55 | 15.70 | 192.55 | 15.64 | 192.55 | 15.47 | 192.55 | 14.96 | 192.55 | 15.47 | 192.55 |
| 15.50 | 192.55 | 15.60 | 192.55 | 15.60 | 192.55 | 15.60 | 192.55 | 15.78 | 192.55 | 15.42 | 192.55 | 15.78 | 192.55 |
| 15.64 | 192.83 |       |        |       |        |       |        |       |        |       |        |       |        |

BOEING

D2-13956-2

260 6008 25-36378-001 BASE HEAT DEFLECTOR

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT

W= 839.70 WSO= 13059.33 WN= 54 KW=2.981 SW= .19

X= 6357.32 XSQ= 1224713.67 XN= 33 KX=3.133 SX= .18

BOEING

AW= 15.55 (KS)W= .58 AX=192.65 (KS)X= .56



|   |      |       |       |   |      |       |   |   |      |       |   |   |      |   |   |   |      |   |       |
|---|------|-------|-------|---|------|-------|---|---|------|-------|---|---|------|---|---|---|------|---|-------|
| W | 6.10 | X     | 79.20 | W | 6.42 | X     | . | W | 6.15 | X     | . | W | 6.32 | X | . | W | 6.55 | X | 79.20 |
|   | 6.14 | .     | .     |   | 6.27 | .     | . |   | 6.03 | .     | . |   | 6.44 | . | . |   | 6.03 | . | 79.81 |
|   | 5.98 | 78.96 |       |   | 6.13 | 79.70 |   |   | 6.29 | .     | . |   | 6.09 | . | . |   | 6.18 | . | .     |
|   | 6.08 | .     | .     |   | 6.26 | .     | . |   | 5.94 | 79.20 |   |   | 6.32 | . | . |   | 6.19 | . | .     |
|   | 6.10 | .     | .     |   | 5.80 | .     | . |   | 6.16 | .     | . |   | 6.24 | . | . |   | 6.20 | . | .     |
|   | 5.72 | .     | .     |   | 6.18 | .     | . |   | 6.40 | .     | . |   | 6.30 | . | . |   | 5.73 | . | .     |
|   | 6.28 | .     | .     |   | 6.27 | .     | . |   | 6.35 | .     | . |   | 6.41 | . | . |   | 6.26 | . | .     |
|   | 6.33 | .     | .     |   | 6.42 | .     | . |   | 6.32 | .     | . |   | 6.71 | . | . |   | 6.15 | . | .     |
|   | 6.51 | .     | .     |   | 6.63 | .     | . |   | 6.16 | .     | . |   | 6.16 | . | . |   | 6.56 | . | .     |
|   |      |       |       |   |      |       |   |   |      |       |   |   |      |   |   |   | 6.37 | . | .     |

180 6005 25-34831-001 RACEWAY COVER  
 W = 330.61 WSQ =  
 X = 555.67 XSQ =  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW = 6.24 (KS)W = .63 AX = 79.38 (KS)X = 1.44  
 2064.65 WN = 53 KW = 2.985 SW = .21  
 44110.49 XN = 7 KX = 4.521 SX = .32  
 BOEING

|      |        |      |        |      |        |      |        |      |      |      |   |      |      |      |   |      |      |      |   |      |        |      |   |
|------|--------|------|--------|------|--------|------|--------|------|------|------|---|------|------|------|---|------|------|------|---|------|--------|------|---|
| W    | 6.51   | X    | 133.50 | W    | 6.36   | X    | 133.60 | W    | 6.31 | X    | . | W    | 6.22 | X    | . | W    | 6.28 | X    | . | W    | 6.52   | X    | . |
| 6.36 | .      | 6.41 | .      | 6.28 | 134.00 | 6.56 | .      | 6.56 | .    | 6.46 | . | 6.55 | .    | 6.50 | . | 6.46 | .    | 6.55 | . | 6.55 | .      | 6.55 | . |
| 6.53 | 133.84 | 6.17 | .      | 6.57 | .      | 6.75 | .      | 6.50 | .    | 6.70 | . | 6.68 | .    | 6.81 | . | 6.66 | .    | 6.68 | . | 6.51 | 134.00 | 6.68 | . |
| 6.47 | .      | 6.63 | .      | 6.64 | .      | 6.55 | .      | 6.75 | .    | 6.66 | . | 6.67 | .    | 6.81 | . | 6.68 | .    | 6.67 | . | 6.67 | .      | 6.67 | . |
| 6.62 | .      | 6.62 | .      | 6.55 | .      | 6.80 | .      | 6.72 | .    | 6.58 | . | 6.68 | .    | 6.72 | . | 6.58 | .    | 6.68 | . | 6.67 | .      | 6.67 | . |
| 6.66 | .      | 6.72 | .      | 6.80 | .      | 6.44 | .      | 6.58 | .    | 6.44 | . | 6.44 | .    | 6.58 | . | 6.44 | .    | 6.44 | . | 6.67 | .      | 6.67 | . |
| 6.69 | .      | 6.35 | .      | 6.44 | .      | 6.55 | .      | 6.45 | .    | 6.58 | . | 6.58 | .    | 6.45 | . | 6.58 | .    | 6.58 | . | 6.56 | .      | 6.56 | . |
| 6.69 | .      | 6.61 | .      | 6.55 | .      | 6.58 | .      | 6.47 | .    | 6.47 | . | 6.65 | .    | 6.47 | . | 6.65 | .    | 6.65 | . | 6.62 | .      | 6.62 | . |
| 6.59 | .      | 6.62 | .      | 6.58 | .      | 6.64 | .      | 6.62 | .    | 6.62 | . | 6.49 | .    | 6.62 | . | 6.49 | .    | 6.49 | . | 6.59 | .      | 6.59 | . |
| 6.57 | .      | 6.46 | .      | 6.64 | .      | 6.67 | .      | 6.59 | .    | 6.59 | . | 6.29 | .    | 6.59 | . | 6.29 | .    | 6.29 | . | 6.46 | .      | 6.46 | . |
| 6.57 | .      | 6.67 | .      | 6.68 | .      | 6.53 | .      | 6.55 | .    | 6.55 | . | 6.37 | .    | 6.55 | . | 6.37 | .    | 6.37 | . | 6.46 | .      | 6.46 | . |
| 6.55 | .      | 6.53 | .      | 6.55 | .      | 6.53 | .      | 6.55 | .    | 6.55 | . | 6.37 | .    | 6.55 | . | 6.37 | .    | 6.37 | . | 6.46 | .      | 6.46 | . |

180 6005 25-34831-002 RACEWAY COVER  
 W= 465.27 WSQ=  
 X= 668.94 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 6.55 (KS)W= .41 AX=133.79 (KS)X= 1.24  
 3050.32 WN= 71 KW=2.917 SW= .14  
 89496.36 XN= 5 KX=5.423 SX= .23  
 BOEING

|   |      |        |   |      |        |   |      |        |      |   |      |        |   |      |        |   |      |        |
|---|------|--------|---|------|--------|---|------|--------|------|---|------|--------|---|------|--------|---|------|--------|
| W | 6.69 | 188.85 | X | 6.61 | 188.83 | W | 6.44 | X      | 6.52 | X | 6.48 | 188.22 | W | 6.69 | 188.20 | X | 6.79 | 188.20 |
|   | 6.82 | 188.25 |   | 6.60 | 188.16 |   | 6.75 | 188.10 | 6.57 |   | 6.72 |        |   | 6.79 |        |   | 6.74 |        |
|   | 6.87 | 188.27 |   | 6.77 |        |   | 6.77 |        | 6.82 |   | 6.72 |        |   | 6.74 |        |   | 6.72 |        |
|   | 6.66 |        |   | 6.76 |        |   | 7.00 |        | 6.62 |   | 6.79 |        |   | 6.72 |        |   | 6.64 |        |
|   | 6.68 |        |   | 6.73 |        |   | 6.83 |        | 6.83 |   | 6.66 |        |   | 6.64 |        |   | 6.72 |        |
|   | 6.77 |        |   | 6.62 |        |   | 6.79 |        | 6.74 |   | 6.92 |        |   | 6.72 |        |   | 6.72 |        |
|   | 6.82 |        |   | 6.80 |        |   | 6.81 |        | 6.85 |   | 6.85 |        |   | 6.73 |        |   | 6.73 |        |
|   | 6.85 |        |   |      |        |   |      |        |      |   |      |        |   |      |        |   |      |        |

180 6005 25-34831-003 RACEWAY COVER  
 W= 289.56 WSQ=  
 X= 1506.88 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 6.73 (KS)W= .34 AX=188.36 (KS)X= 1.29  
 1950.42 WN= 43 KW=3.044 SW= .11  
 283836.55 XN= 8 KX=4.278 SX= .30  
 BOEING

BOEING D2-13956-2

|   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |
|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|
| W | 5.53 | X | 77.55 | W | 5.65 | X | 77.45 | W | 5.53 | X | 77.83 | W | 5.80 | X | 77.95 | W | 5.75 | X | 77.75 |
|   | 5.79 |   | 77.80 |   | 5.89 |   | .     |   | 5.76 |   | .     |   | 5.83 |   | .     |   | 5.48 |   | .     |
|   | 5.58 |   | .     |   | 6.01 |   | .     |   | 5.82 |   | .     |   | 5.63 |   | .     |   | 5.77 |   | .     |
|   | 5.75 |   | .     |   | 5.64 |   | .     |   | 5.65 |   | .     |   | 5.76 |   | .     |   | 5.84 |   | .     |
|   | 5.72 |   | .     |   | 5.84 |   | .     |   | 5.88 |   | .     |   | 5.72 |   | .     |   | 5.53 |   | .     |
|   | 5.75 |   | .     |   | 5.87 |   | .     |   | 5.81 |   | .     |   | 5.77 |   | .     |   | 5.82 |   | .     |
|   | 5.61 |   | .     |   | 5.67 |   | .     |   | 5.77 |   | .     |   | 5.71 |   | .     |   | 5.80 |   | .     |
|   | 5.70 |   | .     |   | 5.63 |   | .     |   |      |   |       |   |      |   |       |   |      |   | .     |

260 6005 25-34832-001 RACEWAY COVER  
 W= 252.24 WSQ=  
 X= 466.33 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 5.73 (KS)W= .33 AX= 77.72 (KS)X= .91  
 1446.52 WN= 44 KW=3.037 SW= .11  
 36244.12 XN= 6 KX=4.870 SX= .19  
 BOEING

BOEING D2-13956-2

|   |      |   |        |   |      |   |        |   |      |   |        |   |      |   |        |   |      |   |        |   |      |   |        |
|---|------|---|--------|---|------|---|--------|---|------|---|--------|---|------|---|--------|---|------|---|--------|---|------|---|--------|
| W | 5.99 | X | 130.20 | W | 5.89 | X | 130.35 | W | 5.82 | X | 130.35 | W | 5.97 | X | 130.25 | W | 5.96 | X | 130.50 | W | 6.04 | X | 130.50 |
|   | 5.99 |   | 130.95 |   | 6.02 |   | .      |   | 6.19 |   | .      |   | 6.07 |   | .      |   | 6.00 |   | .      |   | 6.04 |   | 130.35 |
|   | 6.08 |   | 130.40 |   | 5.95 |   | .      |   | 5.92 |   | .      |   | 5.81 |   | .      |   | 6.00 |   | .      |   | 6.06 |   | .      |
|   | 5.94 |   | .      |   | 5.98 |   | .      |   | 6.02 |   | .      |   | 6.00 |   | .      |   | 6.01 |   | .      |   | 6.17 |   | .      |
|   | 6.03 |   | .      |   | 6.02 |   | .      |   | 5.92 |   | .      |   | 5.97 |   | .      |   | 6.00 |   | .      |   | 5.83 |   | .      |
|   | 5.88 |   | .      |   | 6.21 |   | .      |   | 6.05 |   | .      |   | 5.96 |   | .      |   | 6.07 |   | .      |   | 6.06 |   | .      |
|   | 5.88 |   | .      |   | 5.88 |   | .      |   | 6.10 |   | .      |   | 6.01 |   | .      |   | 6.05 |   | .      |   | 6.03 |   | .      |
|   | 6.07 |   | .      |   | 5.99 |   | .      |   | 6.10 |   | .      |   | 6.05 |   | .      |   | 6.07 |   | .      |   | 6.06 |   | .      |
|   | 6.04 |   | .      |   | 6.07 |   | .      |   | 6.03 |   | .      |   | 6.01 |   | .      |   | 6.34 |   | .      |   | 6.43 |   | .      |
|   | 5.87 |   | .      |   | 6.22 |   | .      |   | 6.05 |   | .      |   | 5.97 |   | .      |   |      |   | .      |   |      |   | .      |

260 6005 25-34832-002 RACEWAY COVER  
 W= 349.24 WSQ=  
 X= 1173.85 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AX= 6.02 (KS)W= .33 AX=130.43 (KS)X= .90  
 2103.61 WN= 58 KW=2.963 SW= .11  
 153103.03 XN= 9 KX=4.098 SX= .22  
 BOEING

BOEING D2-13956-2

|   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |
|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|
| W | 5.50 | X | 86.85 | W | 5.59 | X | 87.50 | W | 5.46 | X | 87.50 | W | 5.40 | X | 86.80 | W | 5.66 | X | 86.90 | W | 5.67 | X | 86.98 |
|   | 5.65 |   | 86.85 |   | 5.67 |   | .     |   | 5.58 |   | 86.70 |   | 5.66 |   | 87.00 |   | 5.78 |   | .     |   | 5.77 |   | .     |
|   | 5.72 |   | .     |   | 5.80 |   | .     |   | 5.54 |   | .     |   | 5.57 |   | .     |   | 5.51 |   | .     |   | 5.61 |   | .     |
|   | 5.65 |   | .     |   | 5.69 |   | .     |   | 5.77 |   | .     |   | 5.65 |   | .     |   | 5.72 |   | .     |   | 5.74 |   | .     |
|   | 5.61 |   | .     |   | .    |   | .     |   | 5.72 |   | .     |   | 5.63 |   | .     |   | .    |   | .     |   | 5.73 |   | .     |
|   | 5.75 |   | .     |   | 5.81 |   | .     |   | 5.68 |   | .     |   | 5.68 |   | .     |   | 5.64 |   | .     |   | 5.75 |   | .     |
|   | 5.72 |   | .     |   | 5.68 |   | .     |   | 5.71 |   | .     |   | 5.64 |   | .     |   | 5.68 |   | .     |   | 5.86 |   | .     |
|   | 5.80 |   | .     |   | 5.77 |   | .     |   | 5.91 |   | .     |   | 5.80 |   | .     |   | 5.70 |   | .     |   | 5.68 |   | .     |
|   | 5.73 |   | .     |   | 5.71 |   | .     |   | 5.66 |   | .     |   | 5.71 |   | .     |   | 5.65 |   | .     |   | 5.66 |   | .     |
|   | 5.80 |   | .     |   | 5.75 |   | .     |   | 5.64 |   | .     |   | 5.66 |   | .     |   | 5.65 |   | .     |   | 5.63 |   | .     |
|   | 5.66 |   | .     |   | 5.66 |   | .     |   | .    |   | .     |   | .    |   | .     |   | .    |   | .     |   | .    |   | .     |

340 6005 25-34833-001 RACEWAY COVER  
 W = 340.88 WSQ =  
 X = 783.08 XSQ =  
 BOEING

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW = 5.68 (KS)W = .27 AX = 87.01 (KS)X = 1.20  
 1937.14 WN = 60 KW = 2.955 SW = .09  
 68135.61 XN = 9 KX = 4.098 SX = .29  
 BOEING

|   |      |       |   |       |   |      |       |   |       |   |      |       |   |       |   |      |       |   |       |   |      |       |   |       |
|---|------|-------|---|-------|---|------|-------|---|-------|---|------|-------|---|-------|---|------|-------|---|-------|---|------|-------|---|-------|
| W | 5.50 | 86.85 | X | 86.85 | W | 5.59 | 87.50 | X | 87.50 | W | 5.46 | 87.50 | X | 86.80 | W | 5.66 | 86.90 | X | 86.90 | W | 5.67 | 86.98 | X | 86.98 |
|   | 5.65 | 86.85 |   | 86.85 |   | 5.67 |       |   |       |   | 5.58 | 86.70 |   | 87.00 |   | 5.78 |       |   |       |   | 5.77 |       |   |       |
|   | 5.72 |       |   |       |   | 5.80 |       |   |       |   | 5.54 |       |   |       |   | 5.51 |       |   |       |   | 5.61 |       |   |       |
|   | 5.65 |       |   |       |   | 5.69 |       |   |       |   | 5.77 |       |   |       |   | 5.72 |       |   |       |   | 5.74 |       |   |       |
|   | 5.61 |       |   |       |   |      |       |   |       |   | 5.72 |       |   |       |   |      |       |   |       |   | 5.73 |       |   |       |
|   | 5.75 |       |   |       |   | 5.81 |       |   |       |   | 5.68 |       |   |       |   | 5.64 |       |   |       |   | 5.75 |       |   |       |
|   | 5.72 |       |   |       |   | 5.68 |       |   |       |   | 5.71 |       |   |       |   | 5.68 |       |   |       |   | 5.86 |       |   |       |
|   | 5.80 |       |   |       |   | 5.77 |       |   |       |   | 5.91 |       |   |       |   | 5.70 |       |   |       |   | 5.68 |       |   |       |
|   | 5.73 |       |   |       |   | 5.71 |       |   |       |   | 5.66 |       |   |       |   | 5.65 |       |   |       |   | 5.66 |       |   |       |
|   | 5.80 |       |   |       |   | 5.75 |       |   |       |   | 5.64 |       |   |       |   | 5.65 |       |   |       |   | 5.63 |       |   |       |
|   | 5.66 |       |   |       |   | 5.66 |       |   |       |   |      |       |   |       |   |      |       |   |       |   |      |       |   |       |

340 6005 25-34833-001 RACEWAY COVER  
 W= 340.88 WSQ=  
 X= 783.08 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 5.68 (KS)W= .27 AX= 87.01 (KS)X= 1.20  
 1937.14 WN= 60 KW=2.955 SW= .09  
 68135.61 XN= 9 KX=4.098 SX= .29  
 BOEING

|   |      |   |       |   |      |   |       |   |      |   |       |   |      |   |       |
|---|------|---|-------|---|------|---|-------|---|------|---|-------|---|------|---|-------|
| W | 1.21 | X | 54.95 | W | 1.20 | X | 54.91 | W | 1.24 | X | 54.95 | W | 1.23 | X | 54.85 |
|   | 1.26 |   | 54.94 |   | 1.30 |   | .     |   | 1.25 |   | .     |   | 1.31 |   | 54.85 |
|   | 1.25 |   | .     |   | 1.27 |   | .     |   | 1.27 |   | .     |   | 1.25 |   | .     |
|   | 1.29 |   | .     |   | 1.22 |   | .     |   | 1.26 |   | .     |   | 1.27 |   | .     |
|   | 1.29 |   | .     |   | 1.26 |   | .     |   | 1.27 |   | .     |   | 1.26 |   | .     |
|   | 1.25 |   | .     |   | 1.25 |   | .     |   | 1.23 |   | .     |   | 1.24 |   | .     |
|   | 1.25 |   | .     |   | 1.24 |   | .     |   | 1.24 |   | .     |   | 1.24 |   | .     |
|   | 1.30 |   | .     |   | 1.28 |   | .     |   | 1.26 |   | .     |   | 1.24 |   | .     |
|   | 1.28 |   | .     |   | 1.24 |   | .     |   | 1.22 |   | .     |   | 1.24 |   | .     |
|   | 1.23 |   | .     |   | 1.23 |   | .     |   | 1.22 |   | .     |   | 1.27 |   | .     |
|   | 1.22 |   | .     |   | 1.23 |   | .     |   | 1.23 |   | .     |   | 1.20 |   | .     |
|   | 1.22 |   | .     |   | 1.23 |   | .     |   | 1.25 |   | .     |   | 1.24 |   | .     |
|   | 1.26 |   | .     |   | 1.22 |   | .     |   |      |   | .     |   |      |   | .     |

052 6005 25-36219-001 RACEWAY CAP  
 W = 84.97 W SQ =  
 X = 274.60 X SQ =  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW = 1.25 (KS)W = .08 AX = 54.92 (KS)X = .23  
 106.23 WN = 68 KW = 2.927 SW = .03  
 15081.04 XN = 5 KX = 5.423 SX = .04  
 BOEING

| W    | X     | W    | X     | W    | X     | W    | X     | W    | X     | W    | X     | W    | X     |
|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| 1.50 | 56.50 | 1.53 | 56.65 | 1.52 | 56.65 | 1.57 | 56.65 | 1.58 | 56.62 | 1.56 | 56.62 | 1.57 | 56.62 |
| 1.54 | .     | 1.53 | .     | 1.51 | .     | 1.60 | .     | 1.54 | .     | 1.56 | .     | 1.56 | .     |
| 1.56 | .     | 1.59 | .     | 1.57 | .     | 1.53 | .     | 1.51 | .     | 1.54 | .     | 1.54 | .     |
| 1.54 | .     | 1.52 | .     | 1.54 | .     | 1.52 | .     | 1.56 | .     | 1.54 | .     | 1.54 | .     |
| 1.53 | .     | 1.56 | .     | 1.52 | .     | 1.52 | .     | 1.59 | .     | 1.52 | .     | 1.52 | .     |
| 1.52 | .     | 1.52 | .     | 1.52 | .     | 1.50 | .     | 1.51 | .     | 1.53 | .     | 1.53 | .     |
| 1.49 | .     | 1.54 | .     | 1.53 | .     | 1.52 | .     | 1.50 | .     | 1.50 | .     | 1.50 | .     |
| 1.51 | .     | 1.55 | .     | 1.49 | .     | 1.55 | .     | 1.51 | .     | 1.51 | .     | 1.51 | .     |
| 1.61 | .     | 1.49 | .     | 1.50 | .     | 1.52 | .     | 1.56 | .     | 1.54 | .     | 1.54 | .     |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 340 6005 25-36272-001 RACEWAY CAP  
 W= 84.39 WSQ= 129.53 WN= 55 KW=2.976 SW= .03  
 X= 226.42 XSQ= 12816.52 XN= 4 KX=6.440 SX= .07  
 BOEING

| W    | X     | W    | X     | W    | X     | W    | X     | W    | X     | W    | X     |
|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| 2.61 | 57.30 | 2.57 | 57.32 | 2.51 | 57.20 | 2.38 | 57.40 | 2.44 | 57.42 | 2.58 | .     |
| 2.62 | .     | 2.59 | 57.05 | 2.58 | .     | 2.43 | .     | 2.50 | .     | 2.50 | .     |
| 2.56 | .     | 2.43 | .     | 2.42 | .     | 2.47 | .     | 2.43 | .     | 2.41 | .     |
| 2.41 | .     | 2.38 | .     | 2.45 | .     | 2.39 | .     | 2.50 | .     | 2.57 | 57.10 |
| 2.49 | .     | 2.43 | .     | 2.41 | .     | 2.35 | .     | 2.32 | .     | 2.47 | .     |
| 2.39 | .     | 2.37 | .     | 2.42 | .     | 2.47 | .     | 2.37 | .     | 2.42 | .     |
| 2.41 | .     | 2.38 | .     | 2.30 | .     | 2.39 | .     | 2.43 | .     | 2.35 | .     |
| 2.42 | .     | 2.32 | .     | 2.37 | .     | 2.33 | .     | 2.39 | .     | 2.36 | .     |
| 2.38 | .     | 2.32 | .     | 2.32 | .     | 2.33 | .     | 2.31 | .     | 2.40 | .     |
| 2.35 | .     | 2.32 | .     | 2.34 | .     | 2.36 | .     | 2.33 | .     | 2.30 | .     |
| 2.36 | .     | 2.31 | .     | 2.40 | .     | 2.31 | .     | 2.32 | .     | 2.28 | .     |
| 2.82 | .     | 2.46 | .     |      | .     |      | .     |      | .     |      | .     |
|      | .     | 2.59 | .     |      | .     |      | .     |      | .     |      | .     |

190 6005 25-37043-001 RACEWAY CAP  
 W= 164.68 WSQ=  
 X= 400.79 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AM= 2.42 (KS)W= .29 AX= 57.26 (KS)X= .65  
 399.48 WN= 68 KW=2.927 SW= .10  
 22947.64 XN= 7 KX=4.521 SX= .14  
 BOEING

|      |       |      |       |      |      |      |       |      |      |      |       |      |      |      |       |      |      |      |       |      |      |      |       |
|------|-------|------|-------|------|------|------|-------|------|------|------|-------|------|------|------|-------|------|------|------|-------|------|------|------|-------|
| W    | 1.07  | X    | 83.40 | W    | 1.01 | X    | 83.25 | W    | 1.05 | X    | 83.30 | W    | 1.07 | X    | 83.34 | W    | 1.09 | X    | 83.37 | W    | 1.07 | X    | 83.37 |
| 1.07 | 83.25 | 1.10 | .     | 1.08 | .    | 1.07 | .     | 1.07 | .    | 1.07 | .     | 1.07 | .    | 1.09 | .     | 1.10 | .    | 1.08 | .     | 1.12 | .    | 1.12 | .     |
| 1.13 | .     | 1.11 | .     | 1.07 | .    | 1.09 | .     | 1.07 | .    | 1.09 | .     | 1.09 | .    | 1.13 | .     | 1.10 | .    | 1.15 | .     | 1.11 | .    | 1.11 | .     |
| 1.06 | .     | 1.10 | .     | 1.08 | .    | 1.08 | .     | 1.08 | .    | 1.09 | .     | 1.10 | .    | 1.10 | .     | 1.07 | .    | 1.10 | .     | 1.11 | .    | 1.05 | .     |
| 1.16 | .     | 1.12 | .     | 1.09 | .    | 1.21 | .     | 1.09 | .    | 1.09 | .     | 1.07 | .    | 1.10 | .     | 1.07 | .    | 1.10 | .     | 1.07 | .    | 1.07 | .     |
| 1.10 | .     | 1.08 | .     | 1.05 | .    | 1.10 | .     | 1.05 | .    | 1.10 | .     | 1.09 | .    | 1.09 | .     | 1.08 | .    | 1.10 | .     | 1.07 | .    | 1.08 | .     |
| 1.08 | .     | 1.09 | .     | 1.10 | .    | 1.06 | .     | 1.10 | .    | 1.06 | .     | 1.07 | .    | 1.07 | .     | 1.08 | .    | 1.06 | .     | 1.07 | .    | 1.07 | .     |
| 1.09 | .     | 1.09 | .     | 1.05 | .    | 1.10 | .     | 1.08 | .    | 1.10 | .     | 1.06 | .    | 1.06 | .     | 1.08 | .    | 1.05 | .     | 1.08 | .    | 1.08 | .     |
| 1.08 | .     | 1.05 | .     | 1.10 | .    | 1.07 | .     | 1.07 | .    | 1.07 | .     | 1.07 | .    | 1.07 | .     | 1.08 | .    | 1.05 | .     | 1.08 | .    | 1.08 | .     |
| 1.07 | .     | 1.12 | .     | 1.07 | .    | 1.10 | .     | 1.07 | .    | 1.07 | .     | 1.07 | .    | 1.07 | .     | 1.08 | .    | 1.04 | .     | 1.08 | .    | 1.08 | .     |
| 1.06 | .     | 1.06 | .     | 1.10 | .    | 1.06 | .     | 1.10 | .    | 1.10 | .     | 1.11 | .    | 1.11 | .     | 1.11 | .    | 1.11 | .     | 1.11 | .    | 1.11 | .     |

053 6005 25-37231-001 RACEWAY CAP  
 W= 82.46 WSQ=  
 X= 499.91 XSQ=  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= 1.09 (KS)W= .08 AX= 83.32 (KS)X= .30  
 89.53 WN= 76 KW=2.904 SW= .03  
 41651.69 XN= 6 KX=4.870 SX= .06  
 BOEING

| W   | X     | W   | X     | W   | X     | W   | X     | W   | X     | W   | X     | W   | X     | W   | X     |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| .75 | 53.00 | .74 | 52.95 | .75 | 52.96 | .73 | 53.08 | .75 | 52.98 | .77 | 53.00 | .73 | 53.08 | .75 | 52.98 |
| .73 | .     | .79 | .     | .76 | .     | .77 | .     | .77 | .     | .77 | .     | .77 | .     | .77 | .     |
| .76 | .     | .77 | .     | .80 | .     | .72 | .     | .72 | .     | .72 | .     | .72 | .     | .75 | .     |
| .75 | .     | .73 | .     | .74 | .     | .74 | .     | .74 | .     | .74 | .     | .74 | .     | .75 | .     |
| .74 | .     | .74 | .     | .73 | .     | .73 | .     | .73 | .     | .73 | .     | .73 | .     | .79 | .     |
| .77 | .     | .74 | .     | .76 | .     | .76 | .     | .73 | .     | .73 | .     | .73 | .     | .73 | .     |
| .72 | .     | .75 | .     | .75 | .     | .75 | .     | .75 | .     | .75 | .     | .75 | .     | .75 | .     |
| .73 | .     | .75 | .     | .73 | .     | .73 | .     | .72 | .     | .72 | .     | .72 | .     | .72 | .     |
| .74 | .     | .73 | .     | .72 | .     | .72 | .     | .77 | .     | .77 | .     | .77 | .     | .74 | .     |
| .73 | .     | .75 | .     | .75 | .     | .75 | .     | .73 | .     | .73 | .     | .73 | .     | .72 | .     |
| .73 | .     | .73 | .     | .72 | .     | .72 | .     | .76 | .     | .76 | .     | .76 | .     | .75 | .     |
| .75 | .     | .75 | .     | .74 | .     | .74 | .     | .76 | .     | .76 | .     | .76 | .     | .73 | .     |
| .75 | .     | .   | .     | .   | .     | .   | .     | .   | .     | .   | .     | .   | .     | .   | .     |

072 6005 25-37232-001 RACEWAY CAP  
 W= 54.40 WSQ= 317.97 XSQ= 16850.83 XN= 6 KX=4.870 SX= .05  
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 AW= .75 (KS)W= .05 AX= 53.00 (KS)X= .122  
 40.56 WN= 73 KW=2.912 SW= .102  
 BOEING





|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| W   | W   | W   | W   | W   | W   | W   | W   | W   |
| .28 | .31 | .31 | .31 | .31 | .31 | .32 | .33 | .37 |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 260 6005 25-27209-025 RACEWAY WIRE SUPPORT  

$$\frac{W=2.85}{MSQ=}$$

$$\frac{.91}{WN=}$$

$$\frac{.32}{(KS)W=}$$

$$\frac{.10}{SW=}$$

BOEING

BOEING D2-13956-2



|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| W   | W   | W   | W   | W   | W   | W   | W   | W   | W   |
| .46 | .50 | .51 | .52 | .53 | .53 | .54 | .54 | .55 | .55 |
| .56 | .57 | .57 | .58 | .58 | .59 | .63 |     |     |     |

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 260 6005 25-27209-026 RACEWAY WIRE SUPPORT AW= .55 (KS)W= .13  
 W= 9.31 WSQ= 5.12 WN= 17 KW=3.471 SW= .04

BOEING

|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| W   | W   | W   | W   | W   | W   | W   | W   | W   | W   |
| .29 | .29 | .30 | .31 | .31 | .32 | .32 | .32 | .32 | .33 |
| .34 | .35 |     |     |     |     |     |     |     | .33 |

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 260 6005 25-27209-027 RACEWAY WIRE SUPPORT AW= .32 (KS)W= .07  
 W= 3.81 WSQ= 1.21 WN= 12 KW=3.758 SW= .02

BOEING



|      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
| W    | W    | W    | W    | W    | W    | W    | W    | W    |
| 1.19 | 1.19 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.22 |
| 1.22 | 1.22 | 1.22 | 1.22 | 1.23 | 1.23 | 1.24 | 1.24 | 1.25 |
| 1.25 | 1.26 | 1.27 | 1.32 |      |      |      |      |      |

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 180 6005 25-35471-001 RACEWAY WIRE SUPPORT AW= 1.11 (KS)W= .16  
 W= 325.75 WSQ= 361.96 WN= 294 KW=2.727 SW= .06

BOEING

| W    | W    | W    | W    | W    | W    | W    | W    | W    | W    | W    | W    | W    |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1.07 | 1.09 | 1.11 | 1.11 | 1.15 | 1.15 | 1.16 | 1.16 | 1.16 | 1.17 | 1.17 | 1.17 | 1.17 |
| 1.17 | 1.17 | 1.17 | 1.18 | 1.19 | 1.19 | 1.21 | 1.21 | 1.21 | 1.22 | 1.22 | 1.22 | 1.22 |
| 1.24 | 1.24 | 1.24 | 1.25 | 1.25 | 1.25 | 1.26 | 1.26 | 1.27 | 1.27 | 1.27 | 1.27 | 1.27 |
| 1.28 | 1.28 | 1.28 | 1.29 | 1.29 | 1.30 | 1.30 | 1.30 | 1.32 | 1.34 | 1.34 | 1.34 | 1.34 |

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT  
 180 6005 25-35769-002 RACEWAY WIRE SUPPORT  
 $W = \frac{47.50}{58.02} WSQ = \frac{39}{39} KW = 3.075 SW = .07$   
 $W = \frac{47.50}{58.02} WSQ = \frac{39}{39} KW = 3.075 SW = .07$

BOEING

## WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION   | WT   | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|---------------|------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6009 | BMS 5-62 44   | 0.94 | 1.06       | 306.65 | 18.77     | 108.24 | 2.12      | 115.20 | 8.29      |    |    |    |
| 6009 | BMS 5-62 45-1 | 0.77 | 1.22       | 329.99 | 8.96      | 109.22 | 1.45      | 110.86 | 3.24      |    |    |    |
| 6009 | BMS 5-62 45-2 | 1.99 | 0.80       | 329.37 | 2.05      | 99.30  | 5.24      | 106.48 | 6.34      |    |    |    |
| 6009 | BMS 5-62 45-3 | 0.42 | 0.54       | 349.43 | 6.24      | 105.34 | 11.44     | 108.78 | 20.76     |    |    |    |
| 6009 | BMS 5-62 46   | 2.34 | 1.75       | 425.84 | 13.35     | 109.92 | 1.93      | 117.76 | 3.98      |    |    |    |
| 6009 | BMS 5-62 47-1 | 0.83 | 0.75       | 477.22 | 5.61      | 109.10 | 1.01      | 111.52 | 0.89      |    |    |    |
| 6009 | BMS 5-62 47-2 | 1.53 | 1.61       | 485.20 | 4.84      | 96.26  | 9.08      | 111.90 | 6.10      |    |    |    |
| 6009 | BMS 5-62 47-3 | 0.79 | 1.66       | 513.12 | 23.18     | 109.16 | 19.14     | 113.52 | 38.72     |    |    |    |
| 6009 | BMS 5-62 48   | 2.77 | 2.26       | 669.64 | 63.42     | 112.50 | 7.42      | 121.76 | 12.92     |    |    |    |
| 6009 | BMS 5-62 49   | 2.06 | 1.37       | 761.40 | 14.50     | 106.46 | 13.09     | 108.98 | 13.41     |    |    |    |

## SUMMARY

| W DELTA X       | W DELTA Y      | W DELTA Z      | DELTA W X        | DELTA W Y       | DELTA W Z       |
|-----------------|----------------|----------------|------------------|-----------------|-----------------|
| 0.335235E 05    | 0.172934E 04   | 0.345614E 04   | 0.398402E 06     | 0.556269E 03    | 0.489451E 03    |
| WDX/W<br>12.680 | WDY/W<br>2.880 | WDZ/W<br>4.071 | DWDX/W<br>43.711 | DWDY/W<br>1.633 | DWDZ/W<br>1.532 |

## TOTALS

| DESCRIPTION | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| BMS 5-62    | 14.44 | 4.42       | 506.11 | 56.39     | 106.64 | 4.51      | 113.71 | 5.60      |    |    |    |

# WEIGHT AND BALANCE

## INPUT

| MRCN | DESCRIPTION | WT   | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|------|-------------|------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| 6009 | ATTACH 42   | 1.02 | 0.         | 259.62 | 0.        | 100.00 | 0.        | 100.00 | 0.        |    |    |    |
| 6009 | ATTACH 44   | 1.83 | 0.         | 285.86 | 0.        | 102.18 | 0.        | 105.20 | 0.        |    |    |    |
| 6009 | ATTACH 45-1 | 2.13 | 0.         | 320.87 | 0.        | 101.99 | 0.        | 102.00 | 0.        |    |    |    |
| 6009 | ATTACH 45-2 | 0.09 | 0.         | 323.66 | 0.        | 109.20 | 0.        | 116.00 | 0.        |    |    |    |
| 6009 | ATTACH 45-3 | 1.87 | 0.         | 355.56 | 0.        | 100.28 | 0.        | 102.62 | 0.        |    |    |    |
| 6009 | ATTACH 46   | 0.72 | 0.         | 400.56 | 0.        | 108.50 | 0.        | 115.37 | 0.        |    |    |    |
| 6009 | ATTACH 47-1 | 1.62 | 0.         | 492.91 | 0.        | 104.16 | 0.        | 103.94 | 0.        |    |    |    |
| 6009 | ATTACH 47-2 | 0.09 | 0.         | 470.02 | 0.        | 110.20 | 0.        | 119.50 | 0.        |    |    |    |
| 6009 | ATTACH 47-3 | 1.78 | 0.         | 500.20 | 0.        | 99.95  | 0.        | 103.71 | 0.        |    |    |    |
| 6009 | ATTACH 48   | 1.32 | 0.         | 646.72 | 0.        | 114.24 | 0.        | 116.95 | 0.        |    |    |    |
| 6009 | ATTACH 49   | 2.18 | 0.         | 754.29 | 0.        | 106.29 | 0.        | 106.04 | 0.        |    |    |    |

## SUMMARY

| W DELTA X | W DELTA Y | W DELTA Z | DELTA W X | DELTA W Y | DELTA W Z |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 0.        | 0.        | 0.        | 0.        | 0.        | 0.        |
| WDX/W     | WDY/W     | WDZ/W     | DWDX/W    | DWDY/W    | DWDZ/W    |
| 0.        | 0.        | 0.        | 0.        | 0.        | 0.        |

## TOTALS

| DESCRIPTION | WT    | WT<br>DISP | X      | X<br>DISP | Y      | Y<br>DISP | Z      | Z<br>DISP | IX | IY | IZ |
|-------------|-------|------------|--------|-----------|--------|-----------|--------|-----------|----|----|----|
| ATTACHMENTS | 14.65 | 0.         | 456.18 | 0.        | 103.81 | 0.        | 105.56 | 0.        |    |    |    |

| SECT | MRCN | POPULATION<br>PART NO | 99 PER CENT<br>TITLE | CONFIDENCE LEVEL | 90 PER CENT<br>AVG | DISP |
|------|------|-----------------------|----------------------|------------------|--------------------|------|
| 072  | 6010 | 25-27226-027          | INSULATED GUIDE      | AW=              | .93 (KS)W=         | .14  |
| 072  | 6010 | 25-37125-008          | INSUL COVER          | AW=              | .09 (KS)W=         | .00  |
| 072  | 6010 | 25-37125-009          | INSUL COVER          | AW=              | .08 (KS)W=         | .00  |
| 052  | 6010 | 25-37125-010          | INSUL COVER          | AW=              | .07 (KS)W=         | .00  |
| 052  | 6010 | 25-37125-012          | INSUL COVER          | AW=              | .07 (KS)W=         | .00  |
| 052  | 6010 | 25-37125-018          | INSUL COVER          | AW=              | .14 (KS)W=         | .00  |
| 072  | 6010 | 25-37125-019          | INSUL COVER          | AW=              | .10 (KS)W=         | .05  |
| 180  | 6010 | 25-37125-020          | INSUL COVER          | AW=              | .13 (KS)W=         | .00  |
| 180  | 6010 | 25-37125-021          | INSUL COVER          | AW=              | .17 (KS)W=         | .00  |
| 180  | 6010 | 25-37125-023          | INSUL COVER          | AW=              | .15 (KS)W=         | .00  |
| 180  | 6010 | 25-37125-024          | INSUL COVER          | AW=              | .17 (KS)W=         | .00  |

BOEING

| SECT | MRCN | POPULATION<br>PART NO | 99 PER CENT<br>TITLE   | CONFIDENCE LEVEL | 90 PER CENT<br>AVG | DISP |
|------|------|-----------------------|------------------------|------------------|--------------------|------|
| 051  | 6011 | 25-28046-005          | INSUL CONN             | AW=              | .17 (KS)W=         | .00  |
| 051  | 6011 | 25-28046-006          | INSUL CONN             | AW=              | .18 (KS)W=         | .00  |
| 051  | 6011 | 25-28069-005          | INSUL CONN             | AW=              | .11 (KS)W=         | .00  |
| 051  | 6011 | 25-28069-006          | INSUL CONN             | AW=              | .09 (KS)W=         | .00  |
| 050  | 6011 | 25-28089-002          | G+C CABLE SUPT INSUL   | AW=              | .02 (KS)W=         | .00  |
| 340  | 6011 | 25-29822-003          | G+C CABLE CONNECT BRKT | AW=              | .46 (KS)W=         | .08  |
| 340  | 6011 | 25-30927-003          | THRUST STRAP ASSY      | AW=              | 1.10 (KS)W=        | .08  |
| 070  | 6011 | 25-32271-013          | ENTRY CHUTE LWR        | AW=              | .40 (KS)W=         | .09  |
| 070  | 6011 | 25-32271-015          | ENTRY CHUTE UPR        | AW=              | .32 (KS)W=         | .07  |
| 050  | 6011 | 25-32429-001          | UPPER CHUTE            | AW=              | .71 (KS)W=         | .11  |
| 050  | 6011 | 25-32429-002          | LOWER CHUTE            | AW=              | .58 (KS)W=         | .12  |
| 050  | 6011 | 25-32430-001          | ENTRY CHUTE INSUL      | AW=              | .04 (KS)W=         | .00  |
| 050  | 6011 | 25-32430-002          | ENTRY CHUTE INSUL      | AW=              | .03 (KS)W=         | .00  |
| 050  | 6011 | 25-32430-003          | ENTRY CHUTE INSUL      | AW=              | .07 (KS)W=         | .06  |
| 050  | 6011 | 25-32430-004          | ENTRY CHUTE INSUL      | AW=              | .03 (KS)W=         | .05  |
| 050  | 6011 | 25-32430-005          | ENTRY CHUTE INSUL      | AW=              | .01 (KS)W=         | .00  |
| 050  | 6011 | 25-32430-006          | ENTRY CHUTE INSUL      | AW=              | .01 (KS)W=         | .00  |
| 190  | 6011 | 25-36627-007          | SUPPT INSUL            | AW=              | .04 (KS)W=         | .00  |
| 050  | 6011 | 26-10923-002          | G+C STRUCT SUPT SPACER | AW=              | .03 (KS)W=         | .00  |
| 050  | 6011 | 26-12066-001          | ENTRY CHUTE SEAL INSUL | AW=              | .01 (KS)W=         | .00  |
| 050  | 6011 | 26-12066-002          | ENTRY CHUTE SEAL INSUL | AW=              | .02 (KS)W=         | .00  |
| 071  | 6011 | 26-12078-003          | INSUL CLAMP            | AW=              | .05 (KS)W=         | .00  |
| 051  | 6011 | 26-12435-002          | INSUL JUMPER           | AW=              | .11 (KS)W=         | .04  |
| 051  | 6011 | 26-12454-002          | INSUL JUMPER           | AW=              | .03 (KS)W=         | .00  |
| 050  | 6011 | 26-12467-001          | G+C CHUTE SPACER INSUL | AW=              | .02 (KS)W=         | .00  |
| 050  | 6011 | 26-12467-003          | G+C CHUTE SPACER INSUL | AW=              | .04 (KS)W=         | .04  |

BOEING

| SECT | MRCN | POPULATION   | 99 PER CENT             | CONFIDENCE LEVEL | 90 PER CENT | DISP |
|------|------|--------------|-------------------------|------------------|-------------|------|
|      |      | PART NO      | TITLE                   |                  | AVG         |      |
| 050  | 6011 | 26-12541-002 | CHUTE ATTACH PLATE      | AW=              | .02 (KS)W=  | .00  |
| 340  | 6011 | 26-13079-001 | THRUST STRAP WASHER     | AW=              | .00 (KS)W=  | .00  |
| 340  | 6011 | 26-13080-001 | CABLE THRUST TERM CLAMP | AW=              | .02 (KS)W=  | .00  |
| 340  | 6011 | 26-13082-002 | THRUST FITTING KEY      | AW=              | .00 (KS)W=  | .00  |
| 340  | 6011 | 26-15632-004 | CONNECTOR BOOT          | AW=              | .12 (KS)W=  | .00  |
| 050  | 6011 | 26-15734-001 | THRUST FITTING SHIM     | AW=              | .01 (KS)W=  | .00  |
| 050  | 6011 | 29-21853-002 | ENTRY CHUTE BRKT INSUL  | AW=              | .13 (KS)W=  | .00  |
| 050  | 6011 | 29-21875-002 | 2-3 CHUTE ATTACH YOKE   | AW=              | .17 (KS)W=  | .05  |
| 180  | 6011 | 29-22298-002 | THRUST FITTING          | AW=              | .61 (KS)W=  | .00  |
| 340  | 6011 | 29-23395-003 | STATIC GROUND JUMPER    | AW=              | .18 (KS)W=  | .00  |
| 340  | 6011 | 29-23395-005 | STATIC GROUND JUMPER    | AW=              | .04 (KS)W=  | .00  |
| 340  | 6011 | 29-23398-004 | CLAMP FITTING ASSY      | AW=              | .03 (KS)W=  | .00  |
| 050  | 6011 | 29-24425-008 | ENTRY CHUTE SEAL        | AW=              | .15 (KS)W=  | .00  |
| 070  | 6011 | 29-24685-001 | G+C CLAMP               | AW=              | .09 (KS)W=  | .00  |
| 070  | 6011 | 29-25299-004 | BOLT INSUL              | AW=              | .02 (KS)W=  | .00  |
| 071  | 6011 | 29-25299-007 | INSUL SEAL              | AW=              | .01 (KS)W=  | .00  |
| 071  | 6011 | 29-25299-008 | INSUL SEAL              | AW=              | .21 (KS)W=  | .00  |
| 071  | 6011 | 29-25299-009 | INSUL SEAL              | AW=              | .39 (KS)W=  | .05  |
| 340  | 6011 | 29-25779-004 | INSUL SEAL              | AW=              | .11 (KS)W=  | .00  |
| 340  | 6011 | 29-25779-005 | INSUL SEAL              | AW=              | .13 (KS)W=  | .00  |
| 190  | 6011 | 29-28031-005 | CABLE CLAMP             | AW=              | .07 (KS)W=  | .00  |
| 190  | 6011 | 29-29073-001 | CABLE CLAMP             | AW=              | .07 (KS)W=  | .00  |
| 190  | 6011 | 29-29377-001 | CABLE INSUL             | AW=              | .27 (KS)W=  | .00  |

BOEING

| SECT | MRCN | POPULATION<br>PART NO | 99 PER CENT<br>TITLE | CONFIDENCE LEVEL | 90 PER CENT<br>AVG | DISP |
|------|------|-----------------------|----------------------|------------------|--------------------|------|
| 053  | 6020 | 10-20436-005          | ARM-DISARM MECHANISM | AW=              | 2.84 (KS)W=        | .05  |

BOEING

BOEING D2-13956-2

| SECT | MRCN    | POPULATION                      | 99 PER CENT | CONFIDENCE LEVEL | 90 PER CENT | DISP |
|------|---------|---------------------------------|-------------|------------------|-------------|------|
|      | PART NO | TITLE                           | AVG         |                  |             |      |
| 053  | 6503    | 10-20451-001 LINEAR EXPLOSIVE   | AW=         | 1.13 (KS)W=      | .06         |      |
| 052  | 6503    | 10-20451-003 LINEAR EXPLOSIVE   | AW=         | 1.28 (KS)W=      | .06         |      |
| 053  | 6503    | 10-20451-005 DETONATOR ASSY     | AW=         | .08 (KS)W=       | .00         |      |
| 052  | 6503    | 10-20870-018 BOOSTER EXPLOSIVE  | AW=         | .34 (KS)W=       | .00         |      |
| 052  | 6503    | 10-20870-021 LINEAR EXPLOSIVE   | AW=         | .20 (KS)W=       | .00         |      |
| 052  | 6503    | 10-20870-030 TIME DELAY BOOSTER | AW=         | .16 (KS)W=       | .00         |      |
| 052  | 6503    | 25-25218-015 S+A MECH ASSY      | AW=         | .61 (KS)W=       | .00         |      |

BOEING

BOEING D2-13956-2

| SECT | MRCN | POPULATION<br>PART NO | 99 PER CENT<br>TITLE | CONFIDENCE LEVEL | 90 PER CENT<br>AVG | DISP |
|------|------|-----------------------|----------------------|------------------|--------------------|------|
| 051  | 6507 | 25-27227-002          | INSULATION MOLDED    | AW=              | .10 (KS)W=         | .00  |
| 051  | 6507 | 25-27227-003          | INSULATION MOLDED    | AW=              | .03 (KS)W=         | .03  |
| 051  | 6507 | 25-27227-004          | INSULATION MOLDED    | AW=              | .03 (KS)W=         | .00  |
| 051  | 6507 | 25-27227-005          | INSULATION MOLDED    | AW=              | .16 (KS)W=         | .03  |
| 051  | 6507 | 25-27228-001          | STRUT INSULATED      | AW=              | 1.20 (KS)W=        | .26  |
| 051  | 6507 | 25-27230-005          | FRAME INSULATED      | AW=              | 3.46 (KS)W=        | .40  |
| 052  | 6507 | 25-27232-022          | GUIDE                | AW=              | .54 (KS)W=         | .09  |
| 052  | 6507 | 25-27232-023          | GUIDE                | AW=              | .51 (KS)W=         | .12  |

BOEING

| SECT | MRCN | POPULATION   | 99 PER CENT        | CONFIDENCE LEVEL | 90 PER CENT | DISP |
|------|------|--------------|--------------------|------------------|-------------|------|
|      |      | PART NO      | TITLE              |                  | AVG         |      |
| 073  | 6703 | 10-20451-002 | LINEAR EXPLOSIVE   | AW=              | 1.47 (KS)W= | .05  |
| 072  | 6703 | 10-20451-004 | LINEAR EXPLOSIVE   | AW=              | 1.63 (KS)W= | .07  |
| 073  | 6703 | 10-20451-005 | DETONATOR ASSY     | AW=              | .08 (KS)W=  | .00  |
| 072  | 6703 | 10-20451-018 | BOOSTER EXPLOSIVE  | AW=              | .34 (KS)W=  | .00  |
| 072  | 6703 | 10-20870-020 | LINEAR EXPLOSIVE   | AW=              | .29 (KS)W=  | .00  |
| 072  | 6703 | 10-20870-026 | TIME DELAY BOOSTER | AW=              | .33 (KS)W=  | .04  |
| 072  | 6703 | 25-25218-016 | S+A MECH ASSY      | AW=              | .70 (KS)W=  | .00  |

BOEING

| SECT | MRCN    | POPULATION   | 99 PER CENT     | CONFIDENCE LEVEL | 90 PER CENT | DISP |
|------|---------|--------------|-----------------|------------------|-------------|------|
|      | PART NO | TITLE        |                 | AVG              |             |      |
| 071  | 6706    | 25-27221-002 | INSUL MOLDED    | AW=              | .06 (KS)W=  | .03  |
| 071  | 6706    | 25-27221-003 | INSUL MOLDED    | AW=              | .03 (KS)W=  | .00  |
| 071  | 6706    | 25-27221-004 | INSUL MOLDED    | AW=              | .03 (KS)W=  | .00  |
| 071  | 6706    | 25-27221-005 | INSUL MOLDED    | AW=              | .15 (KS)W=  | .00  |
| 071  | 6706    | 25-27222-005 | FRAME INSUL     | AW=              | 6.45 (KS)W= | 1.23 |
| 071  | 6706    | 25-27224-001 | STRUT INSULATED | AW=              | 1.45 (KS)W= | .47  |
| 071  | 6706    | 25-27226-019 | GUIDE           | AW=              | .95 (KS)W=  | .16  |
| 072  | 6706    | 25-27226-027 | GUIDE           | AW=              | .93 (KS)W=  | .14  |

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