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LUNAR ORBITER PHOTO SITE ACCURACY

ANALYSIS SUPPORTING DATA

(D2-100814-2)

By T. J. Hansen

SEATTLE, WASHINGTON

FILE

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ANALYSIS SUPPORTING DATA

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By T. J. Hansen

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| REVISIONS | | | |
|-----------|--|--|----------|
| LTR | DESCRIPTION | DATE | APPROVAL |
| A | <p>Revision A is the first version of this document to be released.</p> <p>Pages 20, 25, 36, 37, 38 and 43 are revised to indicate the camera-on times that were not read out on the photo frames.</p> <p>Page 5 was revised to correct an error in the spacecraft attitude maneuver.</p> <p>Pages 200 and 247-251 were revised to correct orbit determination data for site 3P12.</p> | <p><i>W.R. Burr</i> 2/5/69</p> <p>Supervised by: W. R. Burr</p> <p><i>L.B. Eldrenkamp</i> 2/5/69</p> <p>Approved by: L. B. Eldrenkamp</p> <p><i>J.C. Graves</i> 2/5/69</p> <p>J. C. Graves Program Manager</p> | |

PHOTO SITE ACCURACY ANALYSIS FINAL REPORT DOCUMENTSTASK A - Photo Support Data

- D2-100814-1 - Lunar Orbiter Photo Site Accuracy Analysis
- Final Report - Photo Site Analysis
- ◆ D2-100814-2 - Lunar Orbiter Photo Site Accuracy Analysis
- Final Report - Supporting Data
- D2-100814-3 - Lunar Orbiter Photo Site Accuracy Analysis
- Final Report - Error Analysis
- D2-100815-1 - Lunar Orbiter Improved Photo Supporting Data
- Final Report - Lunar Orbiter I
- D2-100815-2 - Lunar Orbiter Improved Photo Support Data
- Final Report - Lunar Orbiter II
- D2-100815-3 - Lunar Orbiter Improved Photo Supporting Data
- Final Report - Lunar Orbiter III
- D2-100815-4 - Lunar Orbiter Improved Photo Supporting Data
- Final Report - Lunar Orbiter IV
- D2-100815-5 - Lunar Orbiter Improved Photo Supporting Data
- Final Report - Lunar Orbiter V
- D2-100816-1 - Lunar Orbiter Simple Moon Residuals
- Final Report

TASK B - Residual Feedback Study

- D2-100818-1 - Application of Residual Feedback to Lunar Orbiter
Residual Analysis - Final Report

TASK C - Tracking Data Residuals

- D2-100817-1 - Lunar Orbiter Doppler Residual Study
- Final Report

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ABSTRACT AND KEY WORDS LIST

ABSTRACT

The input data for improved photo location calculations are presented under the analysis categories (attitude maneuvers, exposure times, lunar radii, camera field of view, and state vectors). They were used to produce the replacements to the "Postmission Photo Supporting Data" documents for each Lunar Orbiter flight.

KEY WORDS

Lunar Orbiter

Photo Location

Photo Site Accuracy Analysis

Supporting Data

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TABLE OF CONTENTS

| | <u>Page</u> |
|------------------------|-------------|
| 1.0 INTRODUCTION | 1 |
| 2.0 DISCUSSION | 2 |
| 3.0 ATTITUDE MANEUVERS | 3 |
| 4.0 CAMERA-ON TIMES | 20 |
| 5.0 LUNAR RADII | 58 |
| 6.0 CAMERA GEOMETRY | 60 |
| 7.0 STATE VECTORS | 61 |
| Mission I | |
| Epoch Reports | 62 |
| Map Time Reports | 83 |
| Mission II | |
| Epoch Reports | 129 |
| Map Time Reports | 144 |
| Mission III | |
| Epoch Reports | 185 |
| Map Time Reports | 203 |
| Mission IV | |
| Epoch Reports | 255 |
| Map Time Reports | 286 |
| Mission V | |
| Epoch Reports | 331 |
| Map Time Reports | 365 |

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to present data used for inputs to the calculation of improved photo support data. This includes attitude maneuvers, exposure times, lunar radii and camera field of view, and state vectors.

1.2 SCOPE

This document is part of the final report documentation for the "Lunar Orbiter Photo Site Accuracy Analysis" contract, NAS 1-7954, Task A. The entire documentation follows the numbering system shown on page v.

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2.0 DISCUSSION

The following sections present data input to the photo evaluation program EVAL for the purpose of defining improved photo site locations. The input data were generated using improved procedures found during the investigation of all factors contributing to the calculated location of photo sites.

The data are all included in Section 3.0 of the D2-100815-x, as EVAL input listings for the frames or sequences; here they are collected under the analysis categories, i.e., (1) attitude maneuvers, (2) exposure times, (3) lunar radii, (4) camera field of view, and (5) state vectors.

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3.0 ATTITUDE MANEUVERS

The attitude maneuvers input to EVAL were generated using an analysis of telemetered attitude control system data. In general, attitude maneuvers were calculated for each frame, including frames in sequence. However, because the attitude change from frame to frame within a sequence was always negligible, the maneuver for a central frame was chosen to represent the entire sequence.

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MISSION I

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, | | | Deg. |
|--------------|----------|--------------------------------|--------|--------|--------|
| | | Yaw | Roll | Pitch | Yaw |
| A-0 | 5-24 | 304.62 | 9.72 | - | 67.98 |
| FS | 25 | - | - 2.94 | 0.14 | 0.13 |
| FS | 26 | - | 0.17 | - 0.01 | 0.05 |
| FS | 27 | - | 1.96 | 0.14 | 0.13 |
| Back Side | 28 | 180.00 | 179.74 | - | 180.00 |
| FS | 29 | - | 0.08 | 0.14 | - 0.06 |
| Back Side | 30 | 180.00 | 179.59 | - | 180.00 |
| Film Advance | 31-34 | - | - 0.12 | - 0.09 | 0.05 |
| Back Side | 35-40 | - | 179.17 | 0.0 | 0.0 |
| FS | 41 | - | - 0.88 | - 0.05 | - 0.01 |
| FS | 42 | - | 2.45 | 0.00 | 0.00 |
| FS | 44 | - | 1.30 | 0.00 | 0.00 |
| FS | 46, 47 | - | - 2.75 | - 0.05 | - 0.04 |
| E2 | 48, 49 | - | 0.26 | 0.01 | - 0.01 |
| FS | 50, 51 | - | - 1.75 | 0.02 | 0.03 |
| A-1 | 52-67 | 309.07 | 11.92 | - | 63.28 |
| A-2 | 68-83 | 319.89 | 8.21 | - | 52.73 |
| FS | 84 | - | - 2.67 | 0.07 | - 0.03 |
| A-3 | 85-100 | 346.32 | 6.25 | - | 26.44 |
| Earth | 102 | 107.99 | 153.21 | - | 110.29 |
| FS | 103 | - | - 1.32 | - 0.05 | 0.04 |
| A-4 | 105-112 | 339.80 | 6.75 | - | 32.90 |
| E7 | 113, 114 | - | - 0.24 | - 0.03 | 0.04 |
| B5 | 115, 116 | 0.38 | 174.20 | - | 0.36 |

MISSION I

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | | |
|----------|---------|-------------------------------------|--------|--------|---------|
| | | Yaw | Roll | Pitch | Yaw |
| Earth | 117 | 96.93 | 134.25 | - | 100.01 |
| A-5 | 118-133 | 337.17 | 7.77 | - | 35.14 |
| FS | 134 | - | 1.95 | 0.0 | 0.0 |
| B-8 | 135 | - | - 2.19 | 0.00 | 0.02 |
| Far Side | 136 | 5.56 | 177.94 | - | 5.56 |
| FS | 137 | 264.13 | 36.33 | - | 98.02 |
| FS | 138 | - | 2.05 | - 0.05 | 0.04 |
| FS | 139 | - | - 1.69 | - 0.03 | - 0.01 |
| FS | 140 | - | - 0.11 | - 0.05 | - 0.01 |
| A-6 | 141-148 | 303.63 | 19.44 | - | 68.60 |
| FS | 149 | 352.675 | 1.251 | - | 7.790 |
| FS | 150 | 98.741 | 16.134 | - | 262.535 |
| B-10 | 151 | - | 28.00 | 0.00 | 0.03 |
| B-11 | 153-156 | 0.01 | 11.48 | - | 0.03 |
| A-7 | 157-172 | 304.12 | 15.02 | - | 68.25 |
| FS | 173 | 179.51 | 3.52 | - | 180.53 |
| FS | 174 | 176.01 | 1.74 | - | 184.11 |
| FS | 175 | - | - 2.82 | 0.14 | - 0.11 |
| A-8.1 | 176-183 | 310.62 | 14.64 | - | 61.97 |
| A-9.2A | 184-199 | 325.49 | 11.86 | - | 47.17 |
| A-9.2B | 200-215 | 321.48 | 12.82 | - | 51.21 |

MISSION II

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|---------|-------------------------------------|---------|--------|
| | | Yaw | Roll | Yaw |
| P1 | 5-20 | 32.73 | 5.67 | 336.99 |
| S1 | 21-24 | 33.27 | 5.74 | 336.41 |
| S2A | 25-28 | 104.79 | 11.37 | 262.29 |
| S2B | 29-32 | 328.91 | 15.91 | 42.28 |
| S3 | 33 | 0.00 | -177.77 | 0.00 |
| S4 | 34 | 0.00 | 164.36 | 0.00 |
| P2 | 35-42 | 341.28 | 5.66 | 28.48 |
| P3A | 43-50 | 52.54 | 7.07 | 317.61 |
| P3B | 51-58 | 44.58 | 6.53 | 325.51 |
| P4 | 59-66 | 62.48 | 8.74 | 307.68 |
| P5 | 67-74 | 353.80 | 8.61 | 17.29 |
| S5 | 75 | 0.00 | -164.61 | 0.00 |
| P6A | 76-83 | 310.59 | 9.78 | 59.00 |
| P6B | 84-91 | 307.39 | 11.15 | 62.16 |
| S6 | 92 | 27.29 | 18.60 | 347.40 |
| S7 | 93 | 173.13 | 59.76 | 174.04 |
| S8 | 94 | 308.02 | 10.57 | 61.55 |
| S9 | 95 | 359.13 | 5.49 | 11.10 |
| P7A | 96-103 | 2.48 | 5.16 | 7.57 |
| P7B | 104-111 | 350.34 | 5.68 | 19.52 |
| S10 | 112 | 45.26 | 6.17 | 325.18 |
| P8A | 113-120 | 312.49 | 9.26 | 57.49 |
| P8B | 121-128 | 308.09 | 10.66 | 61.75 |

MISSION II

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|---------|-------------------------------------|--------|--------|
| | | Yaw | Roll | Yaw |
| P8C | 129-136 | 305.02 | 11.96 | 64.79 |
| S11 | 137 | 74.62 | 11.94 | 296.26 |
| P9 | 138-145 | 330.27 | 7.25 | 39.75 |
| P10A | 146-153 | 60.10 | 7.92 | 310.52 |
| P10B | 154-161 | 51.48 | 6.95 | 319.06 |
| S12 | 162 | 9.39 | 73.09 | 22.95 |
| P11A | 163-170 | 311.66 | 9.66 | 58.32 |
| P11B | 171-178 | 308.83 | 10.70 | 61.11 |
| P12A | 179-186 | 32.25 | 5.59 | 338.26 |
| P12B | 187-194 | 17.54 | 5.29 | 352.96 |
| S13 | 195 | 55.01 | 7.88 | 315.87 |
| S14 | 196 | 174.37 | 177.95 | 174.34 |
| P13A | 197-204 | 20.68 | 5.36 | 349.86 |
| P13B | 205-212 | 6.34 | 5.50 | 4.21 |
| S15 | 213 | 26.879 | 71.176 | 6.441 |
| S16 | 214 | 64.23 | 8.76 | 306.72 |
| S17 | 215 | 27.51 | 66.17 | 3.23 |

MISSION III

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|--------|-------------------------------------|-------|---------|
| | | Yaw | Roll | Yaw |
| P1 | 5-20 | 168.02 | 19.72 | 209.14 |
| S1 | 21-24 | 167.25 | 19.76 | 209.58 |
| P2A | 25-32 | 194.29 | 20.25 | 182.76 |
| P2B | 33-36 | 44.55 | 1.84 | 341.08 |
| S2 | 37 | 304.93 | 89.86 | 0.10 |
| S3 | 38 | 191.23 | 69.66 | 165.41 |
| S4 | 39 | 235.80 | 82.69 | 169.44 |
| P3 | 40-43 | 174.29 | 35.57 | 198.11 |
| P4 | 44-51 | 174.82 | 14.41 | 204.42 |
| P5A | 52-59 | 184.86 | 30.56 | 188.66 |
| P5B | 60-67 | 158.27 | 8.17 | 223.29 |
| P6 | 68-71 | 182.98 | 24.03 | 192.70 |
| S5 | 72 | 53.07 | 5.58 | 332.62 |
| S6 | 73 | 51.73 | 39.52 | 337.21 |
| S7 | 74-77 | 153.34 | 23.24 | 223.44 |
| S8 | 78 | 172.02 | 72.09 | 165.20 |
| S9 | 79 | 193.638 | 9.871 | 189.496 |
| S10 | 80-83 | 187.04 | 12.40 | 193.20 |
| S11 | 84 | 236.81 | 76.43 | 160.38 |
| S13 | 85 | 45.27 | 41.45 | 347.43 |
| P7A | 86-93 | 181.08 | 40.24 | 190.30 |
| P7B | 94-101 | 177.88 | 27.55 | 197.39 |
| S14 | 102 | 29.30 | 22.59 | 355.13 |

MISSION III

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|--------|---------|-------------------------------------|--------|---------|
| | | Yaw | Roll | Yaw |
| S15 | 103-106 | 181.40 | 35.69 | 191.74 |
| S16 | 107 | 180.23 | 22.32 | 197.17 |
| S17 | 108-111 | 212.85 | 16.45 | 167.62 |
| S18 | 112-115 | 189.44 | 49.72 | 177.75 |
| S19 | 116-119 | 198.34 | 22.04 | 179.05 |
| S21 | 120 | 236.98 | 78.06 | 162.77 |
| S21.5 | 121 | 176.736 | 34.725 | 196.367 |
| S22 | 122 | 176.75 | 34.90 | 196.35 |
| S20 | 123 | 19.23 | 48.55 | 5.34 |
| P8 | 124-131 | 175.17 | 17.54 | 203.34 |
| S23 | 132-135 | 193.00 | 47.13 | 175.14 |
| S24 | 136 | 233.49 | 83.04 | 170.73 |
| P9A | 137-144 | 189.97 | 51.76 | 176.40 |
| P9B | 145-152 | 190.41 | 24.00 | 185.79 |
| P9C | 153-160 | 190.41 | 13.92 | 189.30 |
| S25 | 161 | 255.51 | 57.17 | 115.26 |
| S26 | 162 | 42.558 | 53.868 | 353.219 |
| P10 | 163-170 | 104.91 | 13.67 | 277.74 |
| S27 | 171 | 236.52 | 79.73 | 164.88 |
| S28 | 172 | 234.59 | 80.60 | 166.98 |
| P11 | 173-180 | 188.65 | 18.72 | 189.28 |
| P12B.2 | 181-184 | 184.89 | 33.87 | 188.08 |
| P12A | 185-200 | 164.84 | 27.81 | 190.17 |

MISSION III

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|--------|---------|-------------------------------------|-------|--------|
| | | Yaw | Roll | Yaw |
| PI2B.1 | 201-204 | 185.94 | 19.74 | 191.64 |
| PI2C | 205-212 | 45.86 | 14.34 | 342.75 |
| S29 | 213 | 181.27 | 80.22 | 177.22 |
| S30 | 214 | 20.50 | 48.54 | 3.10 |
| S31 | 215 | 148.24 | 23.29 | 228.95 |

MISSION IV

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|--------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| 6.1 | 5-8 | 20.410 | 50.480 | 14.230 |
| 6.2 | 9-12 | 89.940 | 30.840 | 232.900 |
| 6.3 | 13-16 | 291.177 | 7.191 | 71.234 |
| 6.4 | 17-20 | 200.917 | 29.924 | 160.331 |
| 6.5 | 21-24 | 183.367 | 58.151 | 172.276 |
| 6.6 | 25 | 78.090 | 134.000 | 72.820 |
| 7.1 | 26 | 12.880 | 30.350 | 348.350 |
| 7.2 | 27 | 284.664 | 6.777 | 77.418 |
| 7.3 | 28 | 201.713 | 30.716 | 159.423 |
| 7.4 | 29 | 183.914 | 58.998 | 170.663 |
| 7.5 | 30 | 176.243 | 80.410 | 149.255 |
| 8.1 | 32 | 20.880 | 51.020 | 13.140 |
| 8.2 | 33 | 14.079 | 31.058 | 347.191 |
| 8.3 | 34 | 290.347 | 6.070 | 71.827 |
| 8.4 | 35 | 199.418 | 29.950 | 161.911 |
| 8.5 | 36 | 182.062 | 58.330 | 173.083 |
| 9.1 | 38 | 14.660 | 30.880 | 345.980 |
| 9.2 | 39 | 291.240 | 5.678 | 70.733 |
| 9.3 | 40 | 198.264 | 29.824 | 162.707 |
| 9.4 | 41 | 181.105 | 58.266 | 173.863 |
| 9.5 | 42 | 174.844 | 79.965 | 151.478 |
| 10.1 | 44 | 21.970 | 51.12 | 11.35 |
| 10.2 | 45 | 15.836 | 31.071 | 345.026 |
| 10.3 | 46 | 29.381 | 5.171 | 68.340 |
| 10.4 | 47 | 198.635 | 30.032 | 163.111 |
| 10.5 | 48 | 181.419 | 58.356 | 173.636 |
| 10.6 | 49-51 | 74.914 | 133.147 | 68.464 |
| 11.1 | 52 | 15.070 | 31.310 | 344.840 |
| 11.2 | 53 | 299.677 | 4.885 | 61.641 |
| 11.3 | 54 | 196.877 | 29.137 | 163.939 |
| 11.4 | 55 | 180.979 | 57.611 | 174.075 |
| 11.5 | 56 | 174.791 | 79.746 | 151.780 |
| 12.1 | 58 | 21.990 | 52.110 | 10.490 |
| 12.2 | 59 | 14.086 | 32.317 | 345.736 |
| 12.3 | 60 | 308.081 | 5.777 | 52.890 |
| 12.4 | 61 | 196.757 | 28.387 | 163.526 |
| 12.5 | 62 | 180.449 | 57.138 | 174.451 |

MISSION IV

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|--------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| 13.1 | 64 | 15.990 | 32.070 | 343.410 |
| 13.2 | 65 | 306.420 | 4.365 | 54.668 |
| 13.3 | 66 | 195.297 | 28.889 | 165.798 |
| 13.4 | 67 | 180.137 | 57.703 | 175.569 |
| 13.5 | 68 | 174.552 | 79.348 | 152.692 |
| 14.1 | 70 | 23.150 | 51.210 | 11.260 |
| 14.2 | 71 | 18.289 | 31.722 | 340.667 |
| 14.3 | 72 | 309.773 | 3.127 | 51.468 |
| 14.4 | 73 | 192.478 | 29.030 | 168.582 |
| 14.5 | 74 | 179.047 | 58.160 | 176.882 |
| 14.6 | 75 | 76.560 | 133.589 | 71.353 |
| 15.1 | 76 | 17.140 | 32.520 | 341.610 |
| 15.2 | 77 | 317.616 | 3.820 | 43.078 |
| 15.3 | 78 | 192.755 | 28.319 | 167.804 |
| 15.4 | 79 | 178.745 | 57.161 | 176.641 |
| 15.5 | 80 | 173.547 | 77.799 | 149.556 |
| 16.1 | 82 | 22.640 | 51.960 | 11.240 |
| 16.2 | 83 | 18.632 | 32.690 | 339.696 |
| 16.3 | 84 | 326.582 | 3.099 | 34.173 |
| 16.4 | 85 | 191.077 | 28.499 | 169.974 |
| 16.5 | 86 | 178.550 | 57.884 | 177.521 |
| 17.1 | 88 | 18.100 | 33.160 | 339.900 |
| 17.2 | 89 | 329.256 | 3.360 | 31.125 |
| 17.3 | 90 | 192.294 | 27.794 | 168.226 |
| 17.4 | 91 | 177.751 | 56.800 | 177.712 |
| 17.5 | 92 | 173.232 | 77.298 | 150.264 |
| 18.1 | 94 | 22.990 | 52.670 | 10.320 |
| 18.2 | 95 | 18.863 | 33.386 | 339.241 |
| 18.3 | 96 | 339.908 | 3.045 | 20.435 |
| 18.4 | 97 | 190.392 | 28.220 | 170.470 |
| 18.5 | 98 | 177.243 | 57.580 | 178.736 |
| 18.6 | 99 | 77.434 | 133.577 | 72.116 |
| 19.1 | 100 | 19.480 | 33.540 | 338.260 |
| 19.2 | 101 | 346.812 | 3.125 | 13.143 |
| 19.3 | 102 | 188.718 | 27.780 | 171.607 |
| 19.4 | 103 | 177.341 | 56.899 | 178.667 |
| 19.5 | 104 | 172.562 | 77.593 | 151.507 |

MISSION IV

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|----------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| 20.1 | 106 | 23.550 | 53.070 | 9.180 |
| 20.2 | 107 | 20.448 | 33.763 | 337.686 |
| 20.3 | 108 | 359.982 | 3.495 | 0.534 |
| 20.4 | 109 | 188.700 | 27.351 | 172.286 |
| 20.5 | 110 | 177.620 | 56.766 | 179.472 |
| 21.1 | 112 | 20.110 | 34.110 | 337.180 |
| 21.2 | 113 | 2.641 | 3.497 | 357.400 |
| 21.3 | 114 | 188.722 | 27.361 | 171.968 |
| 21.4 | 115 | 176.918 | 56.409 | 179.099 |
| 21.5 | 116 | 172.369 | 77.179 | 151.902 |
| 22.1 | 118 | 23.550 | 53.660 | 8.080 |
| 22.2 | 119 | 21.182 | 34.116 | 336.302 |
| 22.3 | 120 | 14.828 | 3.842 | 345.366 |
| 22.4 | 121 | 186.756 | 27.102 | 174.530 |
| 22.5 | 122 | 176.494 | 56.753 | 180.466 |
| 22.6 | 123 | 85.788 | 140.653 | 60.632 |
| 23.1 | 124 | 21.760 | 34.270 | 335.180 |
| 23.2 | 125 | 16.565 | 3.506 | 343.428 |
| 23.3 | 126 | 185.111 | 27.497 | 175.623 |
| 23.4 | 127 | 175.199 | 57.123 | 181.544 |
| 23.5 | 128 | 171.841 | 78.027 | 153.817 |
| 24.1 | 130 | 23.720 | 56.770 | 10.970 |
| 24.2 | 131 | 20.538 | 38.152 | 336.860 |
| 24.3 | 132 | 14.593 | 7.592 | 345.259 |
| 24.4 | 133 | 185.557 | 23.381 | 175.456 |
| 24.5 | 134 | 174.632 | 53.709 | 182.488 |
| 25.1 | 136 | 23.110 | 35.020 | 333.320 |
| 25.2 | 137 | 37.451 | 4.310 | 322.382 |
| 25.3 | 138 | 183.696 | 26.749 | 177.341 |
| 25.4 | 139 | 175.238 | 56.561 | 182.076 |
| 25.5 | 140 | 171.770 | 76.149 | 150.387 |
| 26.1 | None | 25.440 | 53.980 | 7.990 |
| 26.2 | 142 | 24.410 | 35.534 | 332.311 |
| 26.3 | 143 | 42.302 | 5.223 | 317.687 |
| 26.4 | 144 | 180.987 | 26.537 | 180.602 |
| 26.5 | 145 | 174.472 | 56.753 | 184.127 |
| 26.6 | 146, 147 | 85.502 | 142.715 | 60.288 |

MISSION IV

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|----------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| 27.1 | 148 | 24.250 | 35.240 | 332.120 |
| 27.2 | 149 | 45.947 | 4.970 | 313.960 |
| 27.3 | 150 | 181.130 | 27.271 | 180.163 |
| 27.4 | 151 | 173.888 | 57.442 | 184.169 |
| 27.5 | 152 | 171.260 | 77.095 | 151.920 |
| 28.1 | 154 | 28.340 | 55.100 | 5.560 |
| 28.2 | 155 | 24.380 | 35.757 | 331.830 |
| 28.3 | 156 | 46.155 | 5.377 | 313.510 |
| 28.4 | 157 | 180.763 | 26.702 | 180.508 |
| 28.5 | 158 | 174.275 | 56.728 | 183.924 |
| 29.1 | 160 | 25.870 | 35.820 | 330.270 |
| 29.2 | 161 | 53.530 | 5.830 | 306.342 |
| 29.3 | 162 | 178.778 | 26.881 | 182.911 |
| 29.4 | 163 | 173.434 | 57.344 | 185.342 |
| 29.5 | 164 | 171.071 | 77.137 | 153.320 |
| 29.6 | 165 | 115.027 | 136.325 | 123.250 |
| 30.1 | 166 | 26.820 | 55.220 | 5.440 |
| 30.2 | 167 | 26.842 | 36.290 | 329.165 |
| 30.3 | 168 | 56.704 | 6.549 | 303.115 |
| 30.4 | 169 | 177.399 | 26.926 | 184.520 |
| 30.5 | 170 | 173.033 | 57.301 | 186.326 |
| 30.6 | 171 | 90.218 | 43.875 | 269.618 |
| 31.1 | 172 | 27.160 | 36.250 | 328.790 |
| 31.2 | 173 | 56.008 | 6.869 | 303.890 |
| 31.3 | 174 | 177.534 | 26.739 | 184.678 |
| 31.4 | 175 | 172.907 | 57.220 | 186.233 |
| 31.5 | 176 | 170.902 | 77.237 | 153.861 |
| 31.6 | 177 | 115.864 | 137.172 | 123.790 |
| 31.7 | 178 | 50.730 | 120.590 | 32.130 |
| 32.1 | 179 | 27.380 | 56.210 | 6.850 |
| 32.2 | 180 | 26.928 | 37.843 | 328.602 |
| 32.3 | 181 | 50.508 | 8.073 | 309.207 |
| 32.4 | 182 | 174.632 | 25.311 | 187.389 |
| 32.5 | 183 | 171.678 | 55.698 | 187.827 |
| 32.6 | 184, 185 | 51.951 | 120.548 | 33.122 |

MISSION IV

ATTITUDE MANEUVER FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|----------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| 33.1 | 186 | 28.000 | 37.270 | 327.440 |
| 33.2 | 187 | 59.309 | 7.541 | 300.550 |
| 33.3 | 188 | 175.250 | 26.576 | 186.873 |
| 33.4 | 189 | 172.159 | 56.975 | 187.522 |
| 33.5 | 190 | 170.578 | 75.950 | 150.652 |
| 33.6 | 191, 192 | 116.674 | 137.714 | 124.312 |
| 34.1 | 193 | 28.370 | 55.810 | 5.020 |
| 34.2 | 194 | 29.399 | 37.415 | 325.704 |
| 34.3 | 195 | 61.999 | 8.682 | 297.587 |
| 34.4 | 196 | 172.759 | 26.923 | 189.477 |
| 34.5 | 197 | 171.107 | 57.405 | 188.866 |
| 34.6 | 198, 199 | 50.385 | 120.118 | 31.339 |
| 35.1 | 200 | 62.350 | 8.860 | 297.340 |
| 35.2 | 201 | 172.720 | 26.327 | 189.598 |
| 35.3 | 202, 202 | 118.637 | 138.199 | 126.419 |

MISSION V

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|-------|--------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| A1 | 5-12 | 182.97 | 112.52 | 0.57 |
| A2 | 13-20 | 147.86 | 156.65 | 330.22 |
| A3 | 21 | 18.27 | 147.13 | 195.46 |
| A4 | 22 | 39.25 | 153.97 | 216.43 |
| A6 | 24 | 164.00 | 144.93 | 347.08 |
| A7.1 | 25 | 183.45 | 112.19 | 1.82 |
| A8 | 26 | 38.13 | 155.19 | 215.42 |
| A9 | 27 | 253.50 | 139.35 | 248.71 |
| A10 | 28 | 166.07 | 144.94 | 348.87 |
| A11.2 | 29 | 182.95 | 112.03 | 1.61 |
| A12 | 30 | 36.88 | 155.88 | 214.35 |
| A13 | 31 | 148.64 | 139.04 | 334.94 |
| A14 | 32 | 145.66 | 142.25 | 332.11 |
| V1 | 33-36 | 348.45 | 51.12 | 296.00 |
| V2.1 | 37 | 337.87 | 50.19 | 305.55 |
| V3 | 38 | 292.97 | 84.91 | 351.55 |
| A15 | 39 | 152.957 | 129.326 | 342.796 |
| V4 | 40 | 358.63 | 54.59 | 287.89 |
| V5.1 | 41 | 298.56 | 80.36 | 348.11 |
| V6 | 42 | 294.14 | 76.22 | 348.98 |
| A16.1 | 43 | 30.07 | 136.37 | 203.27 |
| V8a | 44-47 | 322.29 | 38.06 | 317.48 |
| V8b | 48-51 | 11.23 | 26.98 | 264.83 |

MISSION V

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|-------|---------|-------------------------------------|---------|---------|
| | | Yaw | Roll | Yaw |
| V9.1 | 52 | 292.54 | 75.53 | 351.26 |
| A17.1 | 53 | 158.27 | 132.76 | 345.50 |
| V10 | 54 | 277.68 | 52.96 | 113.17 |
| V11a | 55-58 | 315.67 | 38.30 | 323.86 |
| V11b | 59-62 | 7.22 | 24.05 | 267.86 |
| V12 | 63 | 21.51 | 27.75 | 253.97 |
| V13 | 64 | 293.99 | 74.99 | 349.14 |
| A18.1 | 65 | 30.110 | 140.113 | 203.812 |
| V14 | 66-69 | 292.72 | 22.78 | 342.00 |
| V15.1 | 70 | 295.56 | 34.55 | 342.84 |
| V16a | 71-74 | 323.79 | 35.67 | 314.93 |
| V16b | 75-78 | 15.95 | 26.66 | 259.03 |
| A19 | 79 | 156.87 | 129.35 | 345.28 |
| V18 | 80-83 | 350.14 | 25.35 | 286.03 |
| V19 | 84 | 339.70 | 45.27 | 301.23 |
| A20 | 85 | 157.50 | 129.49 | 345.88 |
| V21 | 86-89 | 253.94 | 21.15 | 18.23 |
| V22 | 90-93 | 291.63 | 29.72 | 345.68 |
| V23 | 94-97 | 304.32 | 43.24 | 336.12 |
| V24 | 98-101 | 328.89 | 39.83 | 310.26 |
| V25 | 102 | 237.03 | 72.05 | 15.88 |
| A21 | 103 | 158.781 | 129.730 | 346.721 |
| V26.1 | 104-107 | 285.12 | 24.06 | 350.42 |

MISSION V

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|-------|---------|-------------------------------------|--------|---------|
| | | Yaw | Roll | Yaw |
| V27a | 108-111 | 319.24 | 39.50 | 320.09 |
| V27b | 112-115 | 6.87 | 26.92 | 268.68 |
| V28 | 116-119 | 1.33 | 39.20 | 278.30 |
| V29 | 120-123 | 341.16 | 17.86 | 292.96 |
| A22 | 124 | 355.156 | 66.066 | 290.524 |
| V30 | 125-128 | 355.14 | 66.42 | 290.48 |
| V31 | 129-132 | 219.74 | 20.64 | 48.55 |
| V32 | 133-136 | 304.10 | 33.30 | 334.22 |
| V33 | 137 | 311.59 | 38.26 | 327.67 |
| V34 | 138-141 | 340.08 | 38.07 | 298.98 |
| V35 | 142-145 | 331.66 | 17.67 | 302.90 |
| V36 | 146-149 | 358.21 | 21.97 | 276.27 |
| V37 | 150-157 | 331.20 | 22.36 | 304.74 |
| A23 | 158 | 162.21 | 130.07 | 347.91 |
| V38 | 159-162 | 270.33 | 17.19 | 3.19 |
| A24 | 163 | 162.49 | 130.31 | 349.14 |
| V40 | 164-167 | 319.09 | 23.71 | 317.20 |
| V41 | 168 | 343.59 | 60.77 | 298.12 |
| V42a | 169-172 | 328.68 | 39.40 | 310.15 |
| V42b | 173-176 | 8.96 | 31.00 | 267.71 |
| V43.2 | 177-180 | 354.01 | 44.12 | 286.04 |
| A25 | 181 | 166.80 | 127.13 | 352.57 |
| V45.1 | 182-185 | 264.38 | 21.00 | 10.82 |

MISSION V

ATTITUDE MANEUVERS FOR PHOTO SUPPORT DATA (Continued)

| Site | Frames | Equivalent Attitude Maneuvers, deg. | | |
|------|---------|-------------------------------------|-------|--------|
| | | Yaw | Roll | Yaw |
| V46 | 186-193 | 288.70 | 16.66 | 346.04 |
| V48 | 194-201 | 302.60 | 16.61 | 332.51 |
| V49 | 202-205 | 291.18 | 21.68 | 345.51 |
| V50 | 206-209 | 284.87 | 20.84 | 351.30 |
| V51 | 210-217 | 309.77 | 29.24 | 328.48 |

4.0 CAMERA-ON TIMES

The camera-on times presented in this section reflect a detailed analysis in the following areas: (1) timing of the wide angle and telephoto shutters with respect to the spacecraft clock, (2) digital lamp code exposed on film edge data and (3) smoothing of frame times in sequences.

In a few cases the time code was not read out on the photo frames. These times are estimates and are indicated by asterisks.

Page 21 indicates which sequences were smoothed.

USE FOR TYPEWRITTEN MATERIAL ONLY

CAMERA-ON TIME SEQUENCES SMOOTHED

| <u>I</u> | <u>II</u> | <u>III</u> | <u>V</u> |
|----------|-----------|------------|----------|
| A0 | P-1 | P-7a | A-1 |
| A1 | S-2a | P-7b | A-2 |
| A2 | S-2b | S-17 | V-1 |
| A3 | P-2 | S-19 | V-8a |
| A4 | P-3a | P-8 | V-11a |
| A5 | P-3b | P-9a | V-14 |
| A7 | P-4 | P-9b | V-23.1 |
| A8.1 | P-5 | P-10 | V-24 |
| A9.2a | P-6a | P-11 | V-27b |
| A9.2b | P-6b | P-12a | V-28 |
| | P-7a | P-12b.1 | V-29 |
| | P-7b | P-12c | V-30 |
| | P-8a | | V-31 |
| | P-8b | | V-32 |
| | P-8c | | V-35 |
| | P-9 | | V-36 |
| | P-10a | | V-37 |
| | P-10b | | V-40 |
| | P-11a | | V-42a |
| | P-11b | | V-42b |
| | P-12a | | V-45.1 |
| | P-12b | | V-46 |
| | P-13a | | V-48 |
| | | | V-49 |
| | | | V-50 |
| | | | V-51 |

USE FOR TYPEWRITTEN MATERIAL ONLY

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|-------|
| | | | | Telephoto | Wideangle | |
| | | Day | hour, min. | sec. | sec. | |
| A-O | 5 | 8-18-66 | 1442 | 49.82 | 49.94 | |
| | 6 | 8-18-66 | 1442 | 59.70 | 59.82 | |
| | 7 | 8-18-66 | 1443 | 09.58 | 09.70 | |
| | 8 | 8-18-66 | 1443 | 19.44 | 19.56 | |
| | 9 | 8-18-66 | 1443 | 29.30 | 29.42 | |
| | 10 | 8-18-66 | 1443 | 39.15 | 39.27 | |
| | 11 | 8-18-66 | 1443 | 48.98 | 49.10 | |
| | 12 | 8-18-66 | 1443 | 58.81 | 58.93 | |
| | 13 | 8-18-66 | 1444 | 08.63 | 08.75 | |
| | 14 | 8-18-66 | 1444 | 18.44 | 18.56 | |
| | 15 | 8-18-66 | 1444 | 28.24 | 28.36 | |
| | 16 | 8-18-66 | 1444 | 38.03 | 38.15 | |
| | 17 | 8-18-66 | 1444 | 47.81 | 57.93 | |
| | 18 | 8-18-66 | 1444 | 57.58 | 57.70 | |
| | 19 | 8-18-66 | 1445 | 07.35 | 07.47 | |
| | 20 | 8-18-66 | 1445 | 17.10 | 17.22 | |
| | A-O | 21 | 8-18-66 | 1446 | 42.61 | 42.73 |
| | | 22 | 8-18-66 | 1446 | 52.71 | 52.83 |
| | | 23 | 8-18-66 | 1447 | 02.91 | 03.03 |
| | | 24 | 8-18-66 | 1447 | 13.01 | 13.13 |
| FS | 25 | 8-18-66 | 2156 | 24.91 | 25.03 | |
| | 26 | 8-19-66 | 0511 | 16.11 | 16.23 | |
| | 27 | 8-19-66 | 0848 | 44.51 | 44.63 | |
| Back Side | 28 | 8-19-66 | 1705 | 20.91 | 21.03 | |
| FS | 29 | 8-19-66 | 2318 | 34.91 | 35.03 | |
| Back Side | 30 | 8-20-66 | 0735 | 00.71 | 00.83 | |
| FS | 31 | 8-20-66 | 1346 | 59.21 | 59.33 | |
| | 32 | 8-20-66 | 1347 | 33.11 | 33.23 | |
| | 33 | 8-20-66 | 1349 | 31.71 | 31.83 | |
| | 34 | 8-20-66 | 1349 | 56.91 | 57.03 | |

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| BS | 35 | 8-20-66 | 1452 | 00.91 | 01.03 |
| | 36 | 8-20-66 | 1452 | 14.11 | 14.23 |
| | 37 | 8-20-66 | 1454 | 09.81 | 10.93 |
| | 38 | 8-20-66 | 1454 | 23.01 | 23.13 |
| | 39 | 8-20-66 | 1458 | 01.01 | 01.13 |
| | 40 | 8-20-66 | 1458 | 09.41 | 09.53 |
| FS | 41 | 8-21-66 | 2100 | 36.81 | 36.93 |
| | 42 | 8-21-66 | 0414 | 40.71 | 40.83 |
| | 44 | 8-21-66 | 1128 | 00.21 | 00.33 |
| | 46 | 8-21-66 | 1823 | 02.81 | 02.93 |
| | 47 | 8-21-66 | 1823 | 09.51 | 09.63 |
| B2 | 48 | 8-22-66 | 0122 | 50.81 | 50.93 |
| | 49 | 8-22-66 | 0123 | 03.91 | 04.03 |
| FS | 50 | 8-22-66 | 0824 | 13.01 | 13.13 |
| | 51 | 8-22-66 | 0824 | 19.71 | 19.83 |
| A-1 | 52 | 8-22-66 | 1522 | 58.50 | 58.62 |
| | 53 | 8-22-66 | 1523 | 00.90 | 01.02 |
| | 54 | 8-22-66 | 1523 | 03.31 | 03.43 |
| | 55 | 8-22-66 | 1523 | 05.73 | 05.85 |
| | 56 | 8-22-66 | 1523 | 08.15 | 08.27 |
| | 57 | 8-22-66 | 1523 | 10.57 | 10.69 |
| | 58 | 8-22-66 | 1523 | 13.00 | 13.12 |
| | 59 | 8-22-66 | 1523 | 15.44 | 15.56 |
| | 60 | 8-22-66 | 1523 | 17.88 | 18.00 |
| | 61 | 8-22-66 | 1523 | 20.32 | 20.44 |
| | 62 | 8-22-66 | 1523 | 22.77 | 22.89 |
| | 63 | 8-22-66 | 1523 | 25.23 | 25.35 |
| | 64 | 8-22-66 | 1523 | 27.69 | 27.81 |
| | 65 | 8-22-66 | 1523 | 30.15 | 30.27 |
| 66 | 8-22-66 | 1523 | 32.62 | 32.74 | |
| 67 | 8-22-66 | 1523 | 35.09 | 35.21 | |

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| A-2 | 68 | 8-22-66 | 1850 | 45.11 | 45.23 |
| | 69 | 8-22-66 | 1850 | 47.51 | 47.63 |
| | 70 | 8-22-66 | 1850 | 49.91 | 50.03 |
| | 71 | 8-22-66 | 1850 | 52.31 | 52.43 |
| | 72 | 8-22-66 | 1850 | 54.71 | 54.83 |
| | 73 | 8-22-66 | 1850 | 57.11 | 57.23 |
| | 74 | 8-22-66 | 1850 | 59.51 | 59.63 |
| | 75 | 8-22-66 | 1851 | 01.91 | 02.03 |
| | 76 | 8-22-66 | 1851 | 04.31 | 04.43 |
| | 77 | 8-22-66 | 1851 | 06.71 | 06.83 |
| | 78 | 8-22-66 | 1851 | 09.11 | 09.23 |
| | 79 | 8-22-66 | 1851 | 11.51 | 11.63 |
| | 80 | 8-22-66 | 1851 | 13.91 | 14.03 |
| | 81 | 8-22-66 | 1851 | 16.31 | 16.43 |
| 82 | 8-22-66 | 1851 | 18.71 | 18.83 | |
| 83 | 8-22-66 | 1851 | 21.11 | 21.23 | |
| FS | 84 | 8-23-66 | 0144 | 26.21 | 26.33 |
| A-3 | 85 | 8-23-66 | 0846 | 21.22 | 21.34 |
| | 86 | 8-23-66 | 0846 | 23.68 | 23.80 |
| | 87 | 8-23-66 | 0846 | 26.14 | 26.26 |
| | 88 | 8-23-66 | 0846 | 28.59 | 28.71 |
| | 89 | 8-23-66 | 0846 | 31.04 | 31.16 |
| | 90 | 8-23-66 | 0846 | 33.49 | 33.61 |
| | 91 | 8-23-66 | 0846 | 35.94 | 36.06 |
| | 92 | 8-23-66 | 0846 | 38.38 | 38.50 |
| | 93 | 8-23-66 | 0846 | 40.83 | 40.95 |
| | 94 | 8-23-66 | 0846 | 43.27 | 43.39 |
| | 95 | 8-23-66 | 0846 | 45.71 | 45.83 |
| | 96 | 8-23-66 | 0846 | 48.15 | 48.27 |
| | 97 | 8-23-66 | 0846 | 50.58 | 50.70 |
| | 98 | 8-23-66 | 0846 | 53.02 | 53.14 |
| | 99 | 8-23-66 | 0846 | 55.45 | 55.57 |
| | 100 | 8-23-66 | 0846 | 57.88 | 58.00 |
| | Earth | 102 | 8-23-66 | 1636 | 23.51 |

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| B5 | 103 | 8-23-66 | 2239 | 56.71 | 56.83 |
| A-4 | 105 | 8-24-66 | 0909 | 31.56 | 31.68 |
| | 106 | 8-24-66 | 0909 | 40.78 | 40.90 |
| | 107 | 8-24-66 | 0909 | 49.96 | 50.08 |
| | 108 | 8-24-66 | 0909 | 59.10 | 59.22 |
| | 109 | 8-24-66 | 0910 | 08.20 | 08.32 |
| | 110 | 8-24-66 | 0910 | 17.26 | 17.38 |
| | 111 | 8-24-66 | 0910 | 26.27 | 26.39 |
| | 112 | 8-24-66 | 0910 | 35.25 | 35.37 |
| B-7 | 113 | 8-24-66 | 1604 | 03.01 | 03.13 |
| | 114 | 8-24-66 | 1604 | 09.71 | 09.83 |
| B-5 | * 115 | 8-25-66 | 0005 | 54.91 | 55.03 |
| | 116 | 8-25-66 | 0009 | 40.81 | 40.93 |
| Earth | 117 | 8-25-66 | 0715 | 00.81 | 00.93 |
| A-5 | 118 | 8-25-66 | 1302 | 04.86 | 04.98 |
| | 119 | 8-25-66 | 1302 | 07.15 | 07.27 |
| | 120 | 8-25-66 | 1302 | 09.43 | 09.55 |
| | 121 | 8-25-66 | 1302 | 11.70 | 11.82 |
| | 122 | 8-25-66 | 1302 | 13.98 | 14.10 |
| | 123 | 8-25-66 | 1302 | 16.25 | 16.37 |
| | 124 | 8-25-66 | 1302 | 18.51 | 18.63 |
| | 125 | 8-25-66 | 1302 | 20.77 | 20.89 |
| | 126 | 8-25-66 | 1302 | 23.02 | 23.14 |
| | 127 | 8-25-66 | 1302 | 25.27 | 25.39 |
| | 128 | 8-25-66 | 1302 | 27.52 | 27.64 |
| | 129 | 8-25-66 | 1302 | 29.76 | 29.88 |
| | 130 | 8-25-66 | 1302 | 31.99 | 32.11 |
| | 131 | 8-25-66 | 1302 | 34.23 | 34.35 |
| | 132 | 8-25-66 | 1302 | 36.45 | 36.57 |
| 133 | 8-25-66 | 1302 | 38.68 | 38.80 | |
| B-8 | 134 | 8-25-66 | 1955 | 00.71 | 00.83 |
| | 135 | 8-25-66 | 2321 | 38.71 | 38.83 |

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-------------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| B-8 -36° Pitch | 136 | 8-26-66 | 0348 | 35.71 | 35.83 |
| | 137 | 8-26-66 | 0614 | 30.81 | 30.93 |
| FS | 138 | 8-26-66 | 0941 | 35.81 | 35.93 |
| | 139 | 8-26-66 | 1634 | 38.91 | 39.03 |
| | 140 | 8-26-66 | 2001 | 11.41 | 11.53 |
| A-6 | 141 | 8-26-66 | 2332 | 24.61 | 24.73 |
| | 142 | 8-26-66 | 2332 | 33.31 | 33.43 |
| | 143 | 8-26-66 | 2332 | 42.11 | 42.23 |
| | 144 | 8-26-66 | 2332 | 51.01 | 51.13 |
| | 145 | 8-26-66 | 2333 | 00.11 | 00.23 |
| | 146 | 8-26-66 | 2333 | 09.41 | 09.53 |
| | 147 | 8-26-66 | 2333 | 18.91 | 19.03 |
| | 148 | 8-26-66 | 2333 | 28.61 | 28.73 |
| B-9 | 149 | 8-27-66 | 0253 | 40.21 | 40.33 |
| B-10 | 150 | 8-27-66 | 0618 | 38.21 | 38.33 |
| | 151 | 8-27-66 | 0947 | 24.81 | 24.93 |
| B-11 | 153 | 8-27-66 | 2330 | 54.61 | 54.73 |
| | 154 | 8-27-66 | 2331 | 04.61 | 04.73 |
| | 155 | 8-27-66 | 2331 | 14.51 | 14.63 |
| | 156 | 8-27-66 | 2331 | 24.51 | 25.63 |
| A-7 | 157 | 8-28-66 | 0628 | 18.23 | 18.35 |
| | 158 | 8-28-66 | 0628 | 20.39 | 20.50 |
| | 159 | 8-28-66 | 0628 | 22.57 | 22.69 |
| | 160 | 8-28-66 | 0628 | 24.75 | 24.87 |
| | 161 | 8-28-66 | 0628 | 26.94 | 27.06 |
| | 162 | 8-28-66 | 0628 | 29.14 | 29.26 |
| | 163 | 8-28-66 | 0628 | 31.35 | 31.47 |
| | 164 | 8-28-66 | 0628 | 33.57 | 33.69 |
| | 165 | 8-28-66 | 0628 | 35.80 | 35.92 |
| 166 | 8-28-66 | 0628 | 38.04 | 38.16 | |

BOEING

NO. D2-100814-2

SN.

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| A-7 | 167 | 8-28-66 | 0628 | 40.29 | 40.41 |
| | 168 | 8-28-66 | 0628 | 42.55 | 42.67 |
| | 169 | 8-28-66 | 0628 | 44.83 | 44.95 |
| | 170 | 8-28-66 | 0628 | 47.11 | 47.23 |
| | 171 | 8-28-66 | 0628 | 49.40 | 49.52 |
| | 172 | 8-28-66 | 0628 | 51.70 | 51.82 |
| FS | 173 | 8-28-66 | 1321 | 58.71 | 58.83 |
| | 174 | 8-28-66 | 2006 | 00.71 | 00.83 |
| | 175 | 8-29-66 | 0305 | 35.81 | 35.93 |
| A-8.1 | 176 | 8-29-66 | 0631 | 59.01 | 59.13 |
| | 177 | 8-29-66 | 0632 | 01.24 | 01.36 |
| | 178 | 8-29-66 | 0632 | 03.48 | 03.60 |
| | 179 | 8-29-66 | 0632 | 05.72 | 05.84 |
| | 180 | 8-29-66 | 0632 | 07.98 | 08.10 |
| | 181 | 8-29-66 | 0632 | 10.24 | 10.36 |
| | 182 | 8-29-66 | 0632 | 12.52 | 12.64 |
| | 183 | 8-29-66 | 0632 | 14.80 | 14.92 |
| A-9.2a | 184 | 8-29-66 | 0956 | 43.73 | 43.85 |
| | 185 | 8-29-66 | 0956 | 45.82 | 45.94 |
| | 186 | 8-29-66 | 0956 | 47.91 | 48.03 |
| | 187 | 8-29-66 | 0956 | 50.00 | 50.12 |
| | 188 | 8-29-66 | 0956 | 52.10 | 52.22 |
| | 189 | 8-29-66 | 0956 | 54.20 | 54.32 |
| | 190 | 8-29-66 | 0956 | 56.30 | 56.42 |
| | 191 | 8-29-66 | 0956 | 58.40 | 58.52 |
| | 192 | 8-29-66 | 0957 | 00.50 | 00.62 |
| | 193 | 8-29-66 | 0957 | 02.61 | 02.73 |
| | 194 | 8-29-66 | 0957 | 04.72 | 04.84 |
| | 195 | 8-29-66 | 0957 | 06.83 | 06.95 |
| | 196 | 8-29-66 | 0957 | 08.94 | 09.06 |
| | 197 | 8-29-66 | 0957 | 11.05 | 11.17 |
| | 198 | 8-29-66 | 0957 | 13.17 | 13.29 |
| | 199 | 8-29-66 | 0957 | 15.29 | 15.40 |

BOEING

NO. D2-100814-2
SH.

27

CAMERA-ON TIMES

LO MISSION I

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| A-9.2b | 200 | 8-29-66 | 1323 | 30.35 | 30.47 |
| | 201 | 8-29-66 | 1323 | 32.50 | 32.62 |
| | 202 | 8-29-66 | 1323 | 34.64 | 34.76 |
| | 203 | 8-29-66 | 1323 | 36.79 | 36.91 |
| | 204 | 8-29-66 | 1323 | 38.94 | 39.06 |
| | 205 | 8-29-66 | 1323 | 41.09 | 41.21 |
| | 206 | 8-29-66 | 1323 | 43.24 | 43.36 |
| | 207 | 8-29-66 | 1323 | 45.39 | 45.51 |
| | 208 | 8-29-66 | 1323 | 47.55 | 47.67 |
| | 209 | 8-29-66 | 1323 | 49.71 | 49.83 |
| | 210 | 8-29-66 | 1323 | 51.87 | 51.99 |
| | 211 | 8-29-66 | 1323 | 54.03 | 54.15 |
| | 212 | 8-29-66 | 1323 | 56.19 | 56.31 |
| | 213 | 8-29-66 | 1323 | 58.36 | 58.48 |
| | 214 | 8-29-66 | 1324 | 00.53 | 00.65 |
| 215 | 8-29-66 | 1324 | 02.70 | 02.82 | |

BOEINGNO. D2-100814-2
SH.

23

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|-------|
| | | | | Telephoto | Wideangle | |
| | | Day | hour, min. | sec. | sec. | |
| P-1 | 5 | 11-18-66 | 1524 | 52.91 | 53.03 | |
| | 6 | 11-18-66 | 1524 | 55.03 | 55.15 | |
| | 7 | 11-18-66 | 1524 | 57.15 | 57.27 | |
| | 8 | 11-18-66 | 1524 | 59.27 | 59.39 | |
| | 9 | 11-18-66 | 1525 | 01.38 | 01.50 | |
| | 10 | 11-18-66 | 1525 | 03.49 | 03.61 | |
| | 11 | 11-18-66 | 1525 | 05.60 | 05.72 | |
| | 12 | 11-18-66 | 1525 | 07.71 | 07.83 | |
| | 13 | 11-18-66 | 1525 | 09.82 | 09.94 | |
| | 14 | 11-18-66 | 1525 | 11.92 | 12.04 | |
| | 15 | 11-18-66 | 1525 | 14.02 | 14.14 | |
| | 16 | 11-18-66 | 1525 | 16.12 | 16.24 | |
| | 17 | 11-18-66 | 1525 | 18.22 | 18.34 | |
| | 18 | 11-18-66 | 1525 | 20.31 | 20.43 | |
| | 19 | 11-18-66 | 1525 | 22.40 | 22.52 | |
| | 20 | 11-18-66 | 1525 | 24.49 | 24.61 | |
| | S-1 | 21 | 11-18-66 | 1526 | 12.81 | 12.93 |
| | | 22 | 11-18-66 | 1526 | 14.91 | 15.03 |
| | | 23 | 11-18-66 | 1526 | 17.01 | 17.13 |
| | | 24 | 11-18-66 | 1526 | 19.11 | 19.23 |
| S-2a | 25 | 11-18-66 | 1853 | 59.81 | 59.93 | |
| | 26 | 11-18-66 | 1854 | 02.11 | 02.23 | |
| | 27 | 11-18-66 | 1854 | 04.31 | 04.43 | |
| | 28 | 11-18-66 | 1854 | 06.61 | 06.73 | |
| S-2b | 29 | 11-18-66 | 2223 | 12.71 | 12.83 | |
| | 30 | 11-18-66 | 2223 | 14.63 | 14.75 | |
| | 31 | 11-18-66 | 2223 | 16.60 | 16.72 | |
| | 32 | 11-18-66 | 2223 | 18.61 | 18.73 | |
| S-3 | 33 | 11-19-66 | 0254 | 26.21 | 26.33 | |
| S-4 | 34 | 11-19-66 | 0622 | 53.51 | 53.63 | |

BOEING

NO.
SH.

D2-100814-2

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | Day | hour, min. | Telephoto | Wideangle |
| | | | | sec. | sec. |
| P-2 | 35 | 11-19-66 | 0849 | 41.01 | 41.13 |
| | 36 | 11-19-66 | 0849 | 43.01 | 43.13 |
| | 37 | 11-19-66 | 0849 | 45.01 | 45.13 |
| | 38 | 11-19-66 | 0849 | 47.00 | 47.12 |
| | 39 | 11-19-66 | 0849 | 48.98 | 49.10 |
| | 40 | 11-19-66 | 0849 | 50.95 | 51.07 |
| | 41 | 11-19-66 | 0849 | 52.92 | 53.04 |
| | 42 | 11-19-66 | 0849 | 54.89 | 55.01 |
| P-3a | 43 | 11-19-66 | 1544 | 22.20 | 22.32 |
| | 44 | 11-19-66 | 1544 | 24.34 | 24.46 |
| | 45 | 11-19-66 | 1544 | 26.48 | 26.60 |
| | 46 | 11-19-66 | 1544 | 28.62 | 28.74 |
| | 47 | 11-19-66 | 1544 | 30.75 | 30.87 |
| | 48 | 11-19-66 | 1544 | 32.88 | 33.00 |
| | 49 | 11-19-66 | 1544 | 35.00 | 35.12 |
| | 50 | 11-19-66 | 1544 | 37.12 | 37.24 |
| P-3b | 51 | 11-19-66 | 1913 | 24.69 | 24.81 |
| | 52 | 11-19-66 | 1913 | 26.74 | 26.86 |
| | 53 | 11-19-66 | 1913 | 28.79 | 28.91 |
| | 54 | 11-19-66 | 1913 | 30.84 | 30.96 |
| | 55 | 11-19-66 | 1913 | 32.90 | 33.02 |
| | 56 | 11-19-66 | 1913 | 34.97 | 35.09 |
| | 57 | 11-19-66 | 1913 | 37.04 | 37.16 |
| | 58 | 11-19-66 | 1913 | 39.11 | 39.23 |
| P-4 | 59 | 11-19-66 | 2240 | 59.33 | 59.45 |
| | 60 | 11-19-66 | 2241 | 01.51 | 01.63 |
| | 61 | 11-19-66 | 2241 | 03.67 | 03.79 |
| | 62 | 11-19-66 | 2241 | 05.83 | 05.95 |
| | 63 | 11-19-66 | 2241 | 07.98 | 08.10 |
| | 64 | 11-19-66 | 2241 | 10.12 | 10.24 |
| | 65 | 11-19-66 | 2241 | 12.26 | 12.38 |
| | 66 | 11-19-66 | 2241 | 14.38 | 14.50 |

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-5 | 67 | 11-20-66 | 0212 | 35.61 | 35.73 |
| | 68 | 11-20-66 | 0212 | 37.58 | 37.70 |
| | 69 | 11-20-66 | 0212 | 39.55 | 39.67 |
| | 70 | 11-20-66 | 0212 | 41.53 | 41.65 |
| | 71 | 11-20-66 | 0212 | 43.51 | 43.63 |
| | 72 | 11-20-66 | 0212 | 45.49 | 45.61 |
| | 73 | 11-20-66 | 0212 | 47.47 | 47.59 |
| | 74 | 11-20-66 | 0212 | 49.45 | 49.57 |
| S-5 | 75 | 11-20-66 | 1012 | 17.91 | 18.03 |
| P-6a | 76 | 11-20-66 | 1608 | 47.41 | 47.53 |
| | 77 | 11-20-66 | 1608 | 49.49 | 49.61 |
| | 78 | 11-20-66 | 1608 | 51.60 | 51.72 |
| | 79 | 11-20-66 | 1608 | 53.72 | 53.84 |
| | 80 | 11-20-66 | 1608 | 55.87 | 55.99 |
| | 81 | 11-20-66 | 1608 | 58.04 | 58.16 |
| | 82 | 11-20-66 | 1609 | 00.22 | 00.34 |
| | 83 | 11-20-66 | 1609 | 02.43 | 02.55 |
| P-6b | 84 | 11-20-66 | 1937 | 51.01 | 51.13 |
| | 85 | 11-20-66 | 1937 | 53.20 | 53.32 |
| | 86 | 11-20-66 | 1937 | 55.41 | 55.53 |
| | 87 | 11-20-66 | 1937 | 57.63 | 57.75 |
| | 88 | 11-20-66 | 1937 | 59.87 | 59.99 |
| | 89 | 11-20-66 | 1938 | 02.13 | 02.25 |
| | 90 | 11-20-66 | 1938 | 04.41 | 04.53 |
| | 91 | 11-20-66 | 1938 | 06.71 | 06.83 |
| S-6 | 92 | 11-21-66 | 0230 | 46.11 | 46.23 |
| S-7 | 93 | 11-21-66 | 0927 | 37.21 | 37.33 |
| S-8 | 94 | 11-21-66 | 1629 | 25.01 | 25.13 |
| S-9 | 95 | 11-21-66 | 2324 | 10.71 | 10.83 |

BOEING

NO. D2-100814-2
SH.

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-7a | 96 | 11-22-66 | 0252 | 34.62 | 34.74 |
| | 97 | 11-22-66 | 0252 | 36.41 | 36.53 |
| | 98 | 11-22-66 | 0252 | 38.20 | 38.32 |
| | 99 | 11-22-66 | 0252 | 40.00 | 40.12 |
| | 100 | 11-22-66 | 0252 | 41.81 | 41.93 |
| | 101 | 11-22-66 | 0252 | 43.62 | 43.74 |
| | 102 | 11-22-66 | 0252 | 45.45 | 45.57 |
| | 103 | 11-22-66 | 0252 | 47.28 | 47.40 |
| P-7b | 104 | 11-22-66 | 0621 | 36.63 | 36.75 |
| | 105 | 11-22-66 | 0621 | 38.47 | 38.59 |
| | 106 | 11-22-66 | 0621 | 40.31 | 40.43 |
| | 107 | 11-22-66 | 0621 | 42.14 | 42.26 |
| | 108 | 11-22-66 | 0621 | 43.98 | 44.10 |
| | 109 | 11-22-66 | 0621 | 45.81 | 45.93 |
| | 110 | 11-22-66 | 0621 | 47.65 | 47.77 |
| | 111 | 11-22-66 | 0621 | 49.48 | 49.60 |
| S-10.2 | 112 | 11-22-66 | 1317 | 11.71 | 11.83 |
| P-8a | 113 | 11-22-66 | 1649 | 09.12 | 09.24 |
| | 114 | 11-22-66 | 1649 | 11.18 | 11.30 |
| | 115 | 11-22-66 | 1649 | 13.24 | 13.36 |
| | 116 | 11-22-66 | 1649 | 15.32 | 15.44 |
| | 117 | 11-22-66 | 1649 | 17.40 | 17.52 |
| | 118 | 11-22-66 | 1649 | 19.50 | 19.62 |
| | 119 | 11-22-66 | 1649 | 21.60 | 21.72 |
| | 120 | 11-22-66 | 1649 | 23.72 | 23.84 |
| P-8b | 121 | 11-22-66 | 2018 | 11.92 | 12.04 |
| | 122 | 11-22-66 | 2018 | 14.11 | 14.23 |
| | 123 | 11-22-66 | 2018 | 16.30 | 16.42 |
| | 124 | 11-22-66 | 2018 | 18.50 | 18.62 |
| | 125 | 11-22-66 | 2018 | 20.71 | 20.83 |
| | 126 | 11-22-66 | 2018 | 22.92 | 23.04 |
| | 127 | 11-22-66 | 2018 | 25.15 | 25.27 |
| | 128 | 11-22-66 | 2018 | 27.38 | 27.50 |

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-8c | 129 | 11-22-66 | 2347 | 13.60 | 13.72 |
| | 130 | 11-22-66 | 2347 | 15.90 | 16.02 |
| | 131 | 11-22-66 | 2347 | 18.22 | 18.34 |
| | 132 | 11-22-66 | 2347 | 20.56 | 20.68 |
| | 133 | 11-22-66 | 2347 | 22.92 | 23.04 |
| | 134 | 11-22-66 | 2347 | 25.31 | 25.43 |
| | 135 | 11-22-66 | 2347 | 27.72 | 27.84 |
| | 136 | 11-22-66 | 2347 | 30.16 | 30.28 |
| S-11 | 137 | 11-23-66 | 0309 | 15.31 | 15.43 |
| P-9 | 138 | 11-23-66 | 1011 | 15.02 | 15.14 |
| | 139 | 11-23-66 | 1011 | 17.00 | 17.12 |
| | 140 | 11-23-66 | 1011 | 18.99 | 19.11 |
| | 141 | 11-23-66 | 1011 | 20.98 | 21.10 |
| | 142 | 11-23-66 | 1011 | 22.98 | 23.10 |
| | 143 | 11-23-66 | 1011 | 24.99 | 25.11 |
| | 144 | 11-23-66 | 1011 | 27.00 | 27.12 |
| | 145 | 11-23-66 | 1011 | 29.01 | 29.13 |
| P-10a | 146 | 11-23-66 | 1336 | 25.02 | 25.14 |
| | 147 | 11-23-66 | 1336 | 27.00 | 27.12 |
| | 148 | 11-23-66 | 1336 | 28.98 | 29.10 |
| | 149 | 11-23-66 | 1336 | 30.95 | 31.07 |
| | 150 | 11-23-66 | 1336 | 32.93 | 33.05 |
| | 151 | 11-23-66 | 1336 | 34.90 | 35.02 |
| | 152 | 11-23-66 | 1336 | 36.87 | 36.99 |
| | 153 | 11-23-66 | 1336 | 38.84 | 38.96 |
| P-10b | 154 | 11-23-66 | 1705 | 29.89 | 30.01 |
| | 155 | 11-23-66 | 1705 | 31.79 | 31.91 |
| | 156 | 11-23-66 | 1705 | 33.70 | 33.82 |
| | 157 | 11-23-66 | 1705 | 35.62 | 35.74 |
| | 158 | 11-23-66 | 1705 | 37.56 | 37.68 |
| | 159 | 11-23-66 | 1705 | 39.51 | 39.63 |
| | 160 | 11-23-66 | 1705 | 41.47 | 41.59 |
| | 161 | 11-23-66 | 1705 | 43.45 | 43.57 |
| S-12 | 162 | 11-24-66 | 0005 | 42.70 | 42.82 |

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-11a | 163 | 11-24-66 | 0703 | 50.09 | 50.11 |
| | 164 | 11-24-66 | 0703 | 52.34 | 52.46 |
| | 165 | 11-24-66 | 0703 | 54.61 | 54.73 |
| | 166 | 11-24-66 | 0703 | 56.90 | 57.02 |
| | 167 | 11-24-66 | 0703 | 59.21 | 59.33 |
| | 168 | 11-24-66 | 0704 | 01.53 | 01.65 |
| | 169 | 11-24-66 | 0704 | 03.87 | 03.99 |
| | 170 | 11-24-66 | 0704 | 06.23 | 06.35 |
| P-11b | 171 | 11-24-66 | 1032 | 54.40 | 54.52 |
| | 172 | 11-24-66 | 1032 | 56.83 | 56.95 |
| | 173 | 11-24-66 | 1032 | 59.28 | 59.40 |
| | 174 | 11-24-66 | 1033 | 01.74 | 01.86 |
| | 175 | 11-24-66 | 1033 | 04.21 | 04.33 |
| | 176 | 11-24-66 | 1033 | 06.70 | 06.82 |
| | 177 | 11-24-66 | 1033 | 09.20 | 09.32 |
| | 178 | 11-24-66 | 1033 | 11.72 | 11.84 |
| P-12a | 179 | 11-24-66 | 1358 | 00.72 | 00.84 |
| | 180 | 11-24-66 | 1358 | 02.68 | 02.80 |
| | 181 | 11-24-66 | 1358 | 04.63 | 04.75 |
| | 182 | 11-24-66 | 1358 | 06.59 | 06.71 |
| | 183 | 11-24-66 | 1358 | 08.55 | 08.67 |
| | 184 | 11-24-66 | 1358 | 10.51 | 10.63 |
| | 185 | 11-24-66 | 1358 | 12.47 | 12.59 |
| | 186 | 11-24-66 | 1358 | 14.43 | 14.55 |
| P-12b | 187 | 11-24-66 | 1727 | 06.13 | 06.25 |
| | 188 | 11-24-66 | 1727 | 08.10 | 08.22 |
| | 189 | 11-24-66 | 1727 | 10.07 | 10.19 |
| | 190 | 11-24-66 | 1727 | 12.04 | 12.16 |
| | 191 | 11-24-66 | 1727 | 14.02 | 14.14 |
| | 192 | 11-24-66 | 1727 | 16.01 | 16.13 |
| | 193 | 11-24-66 | 1727 | 18.01 | 18.13 |
| | 194 | 11-24-66 | 1727 | 20.01 | 20.13 |
| S-13 | 195 | 11-25-66 | 0022 | 55.81 | 55.93 |
| S-14 | 196 | 11-25-66 | 0458 | 04.91 | 05.03 |

CAMERA-ON TIMES

LO MISSION II

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-13a | 197 | 11-25-66 | 0721 | 13.13 | 13.25 |
| | 198 | 11-25-66 | 0721 | 15.18 | 15.30 |
| | 199 | 11-25-66 | 0721 | 17.23 | 17.35 |
| | 200 | 11-25-66 | 0721 | 19.28 | 19.40 |
| | 201 | 11-25-66 | 0721 | 21.34 | 21.46 |
| | 202 | 11-25-66 | 0721 | 23.39 | 23.51 |
| | 203 | 11-25-66 | 0721 | 25.44 | 25.56 |
| | 204 | 11-25-66 | 0721 | 27.49 | 27.61 |
| P-13b | 205 | 11-25-66 | 1050 | 17.71 | 17.83 |
| | 206 | 11-25-66 | 1050 | 19.81 | 19.93 |
| | 207 | 11-25-66 | 1050 | 21.91 | 22.03 |
| | 208 | 11-25-66 | 1050 | 24.01 | 24.13 |
| | 209 | 11-25-66 | 1050 | 26.11 | 26.23 |
| | 210 | 11-25-66 | 1050 | 28.21 | 28.33 |
| | 211 | 11-25-66 | 1050 | 30.31 | 30.43 |
| | 212 | 11-25-66 | 1050 | 32.41 | 32.53 |
| S-15 | 213 | 11-25-66 | 1416 | 09.11 | 09.23 |
| S-16 | 214 | 11-25-66 | 1745 | 14.91 | 15.03 |
| S-17 | 215 | 11-25-66 | 2112 | 53.41 | 53.53 |

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|-------|
| | | | | Telephoto | Wideangle | |
| | | Day | hour, min. | sec. | sec. | |
| P-1 | 5 | 2-15-67 | 1000 | 40.51 | 40.63 | |
| | 6 | 2-15-67 | 1000 | 43.11 | 43.23 | |
| | 7 | 2-15-67 | 1000 | 45.61 | 45.73 | |
| | 8 | 2-15-67 | 1000 | 48.11 | 48.23 | |
| | 9 | 2-15-67 | 1000 | 50.51 | 50.63 | |
| | 10 | 2-15-67 | 1000 | 53.01 | 53.13 | |
| | 11 | 2-15-67 | 1000 | 55.51 | 55.63 | |
| | 12 | 2-15-67 | 1000 | 58.01 | 58.13 | |
| | 13 | 2-15-67 | 1001 | 00.41 | 00.53 | |
| | 14 | 2-15-67 | 1001 | 02.91 | 03.03 | |
| | 15 | 2-15-67 | 1001 | 05.31 | 05.43 | |
| | 16 | 2-15-67 | 1001 | 07.81 | 07.93 | |
| | 17 | 2-15-67 | 1001 | 10.21 | 10.33 | |
| | 18 | 2-15-67 | 1001 | 12.61 | 12.73 | |
| | 19 | 2-15-67 | 1001 | 15.11 | 15.23 | |
| | 20 | 2-15-67 | 1001 | 17.51 | 17.63 | |
| | S-1 | 21 | 2-15-67 | 1004 | 19.31 | 19.43 |
| | | 22 | 2-15-67 | 1004 | 21.61 | 21.73 |
| | | 23 | 2-15-67 | 1004 | 24.01 | 24.13 |
| | | 24 | 2-15-67 | 1004 | 26.41 | 26.53 |
| P-2A P-2A | 25 | 2-15-67 | 1332 | 03.51 | 03.63 | |
| | 26 | 2-15-67 | 1332 | 05.81 | 05.93 | |
| | 27 | 2-15-67 | 1332 | 08.11 | 08.23 | |
| | 28 | 2-15-67 | 1332 | 10.41 | 10.53 | |
| | 29 | 2-15-67 | 1332 | 12.61 | 12.73 | |
| | 30 | 2-15-67 | 1332 | 14.91 | 15.03 | |
| | 31 | 2-15-67 | 1332 | 17.21 | 17.33 | |
| | 32 | 2-15-67 | 1332 | 19.51 | 19.63 | |
| P-2B | * 33 | 2-15-67 | 1701 | 14.31 | 14.43 | |
| | * 34 | 2-15-67 | 1701 | 16.71 | 16.8 | |
| | * 35 | 2-15-67 | 1701 | 19.01 | 19.13 | |
| | * 36 | 2-15-67 | 1701 | 21.31 | 21.43 | |
| S-2 | * 37 | 2-15-67 | 2049 | 52.51 | 52.63 | |
| S-3 | * 38 | 2-15-67 | 2358 | 43.01 | 43.13 | |

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| S-4 | * 39 | 2-16-67 | 0324 | 46.11 | 46.23 |
| P-3 | * 40 | 2-16-67 | 0651 | 04.21 | 04.33 |
| | * 41 | 2-16-67 | 0651 | 14.81 | 14.93 |
| | * 42 | 2-16-67 | 0651 | 25.21 | 25.33 |
| | * 43 | 2-16-67 | 0651 | 35.41 | 35.53 |
| P-4 | * 44 | 2-16-67 | 1022 | 18.01 | 18.13 |
| | * 45 | 2-16-67 | 1022 | 20.21 | 20.33 |
| | * 46 | 2-16-67 | 1022 | 22.41 | 22.53 |
| | * 47 | 2-16-67 | 1022 | 24.61 | 24.73 |
| | * 48 | 2-16-67 | 1022 | 26.81 | 26.93 |
| | * 49 | 2-16-67 | 1022 | 29.01 | 29.13 |
| | * 50 | 2-16-67 | 1022 | 31.21 | 31.33 |
| | * 51 | 2-16-67 | 1022 | 33.41 | 33.53 |
| P-5A | 52 | 2-16-67 | 1350 | 37.01 | 37.13 |
| | 53 | 2-16-67 | 1350 | 39.21 | 39.33 |
| | 54 | 2-16-67 | 1350 | 41.51 | 41.63 |
| | 55 | 2-16-67 | 1350 | 43.71 | 43.83 |
| | 56 | 2-16-67 | 1350 | 45.91 | 46.03 |
| | 57 | 2-16-67 | 1350 | 48.11 | 48.23 |
| | 58 | 2-16-67 | 1350 | 50.41 | 50.53 |
| | 59 | 2-16-67 | 1350 | 52.61 | 52.73 |
| P-5B | 60 | 2-16-67 | 1719 | 37.91 | 38.03 |
| | 61 | 2-16-67 | 1719 | 40.01 | 40.13 |
| | 62 | 2-16-67 | 1719 | 42.31 | 42.43 |
| | 63 | 2-16-67 | 1719 | 44.41 | 44.53 |
| | 64 | 2-16-67 | 1719 | 46.71 | 46.83 |
| | 65 | 2-16-67 | 1719 | 48.91 | 49.03 |
| | 66 | 2-16-67 | 1719 | 51.11 | 51.23 |
| | 67 | 2-16-67 | 1719 | 53.41 | 53.53 |
| P-6 | 68 | 2-16-67 | 2047 | 50.61 | 50.73 |
| | 69 | 2-16-67 | 2047 | 59.11 | 59.23 |
| | 70 | 2-16-67 | 2048 | 07.71 | 07.83 |
| | 71 | 2-16-67 | 2048 | 16.21 | 16.33 |

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| S-5 | * 72 | 2-17-67 | 0017 | 48.51 | 48.63 |
| S-6 | * 73 | 2-17-67 | 0341 | 29.51 | 29.63 |
| S-7 | * 74 | 2-17-67 | 0710 | 45.51 | 45.63 |
| | * 75 | 2-17-67 | 0710 | 55.71 | 55.83 |
| | * 76 | 2-17-67 | 0711 | 05.61 | 05.73 |
| | * 77 | 2-17-67 | 0711 | 15.51 | 15.63 |
| S-8 | 78 | 2-17-67 | 1045 | 47.41 | 47.53 |
| S-9 | 79 | 2-17-67 | 1412 | 15.41 | 15.53 |
| S-10 | 80 | 2-17-67 | 2109 | 03.61 | 03.73 |
| | 81 | 2-17-67 | 2109 | 11.51 | 11.63 |
| | 82 | 2-17-67 | 2109 | 19.51 | 19.63 |
| | 83 | 2-17-67 | 2109 | 27.61 | 27.73 |
| S-11 | 84 | 2-18-67 | 0035 | 14.21 | 14.33 |
| S-13 | 85 | 2-18-67 | 0403 | 04.81 | 04.93 |
| P-7a | 86 | 2-18-67 | 0732 | 09.41 | 09.53 |
| P-7a | 87 | 2-18-67 | 0732 | 11.71 | 11.83 |
| | 88 | 2-18-67 | 0732 | 14.00 | 14.12 |
| | 89 | 2-18-67 | 0732 | 16.27 | 16.39 |
| | 90 | 2-18-67 | 0732 | 18.53 | 18.65 |
| | 91 | 2-18-67 | 0732 | 20.77 | 20.89 |
| | 92 | 2-18-67 | 0732 | 22.99 | 23.11 |
| | 93 | 2-18-67 | 0732 | 25.19 | 25.31 |
| P-7b | 94 | 2-18-67 | 1101 | 10.30 | 10.42 |
| | 95 | 2-18-67 | 1101 | 12.32 | 12.44 |
| | 96 | 2-18-67 | 1101 | 14.34 | 14.46 |
| | 97 | 2-18-67 | 1101 | 16.37 | 16.49 |
| | 98 | 2-18-67 | 1101 | 18.41 | 18.53 |
| | 99 | 2-18-67 | 1101 | 20.44 | 20.56 |
| | 100 | 2-18-67 | 1101 | 22.48 | 22.60 |
| 101 | 2-18-67 | 1101 | 24.52 | 24.64 | |

BOEING

NO. D2-100814-2

SH.

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| S-14 | 102 | 2-18-67 | 1428 | 02.51 | 02.63 |
| S-15 | 103 | 2-18-67 | 1758 | 00.61 | 00.73 |
| | 104 | 2-18-67 | 1758 | 09.11 | 09.23 |
| | 105 | 2-18-67 | 1758 | 17.61 | 17.73 |
| | 106 | 2-18-67 | 1758 | 26.11 | 26.23 |
| S-16 | 107 | 2-19-67 | 0056 | 15.91 | 16.03 |
| S-17 | 108 | 2-19-67 | 0427 | 53.60 | 53.72 |
| | 109 | 2-19-67 | 0428 | 02.52 | 02.64 |
| | 110 | 2-19-67 | 0428 | 11.60 | 11.72 |
| | 111 | 2-19-67 | 0428 | 20.82 | 20.94 |
| S-18 | 112 | 2-19-67 | 0753 | 44.51 | 44.63 |
| | 113 | 2-19-67 | 0753 | 46.91 | 47.03 |
| | 114 | 2-19-67 | 0753 | 49.31 | 49.43 |
| | 115 | 2-19-67 | 0753 | 51.71 | 51.83 |
| S-19 | 116 | 2-19-67 | 1123 | 48.82 | 48.94 |
| | 117 | 2-19-67 | 1123 | 56.99 | 57.11 |
| | 118 | 2-19-67 | 1124 | 05.32 | 05.44 |
| | 119 | 2-19-67 | 1124 | 13.81 | 13.93 |
| S-21 | 120 | 2-19-67 | 1818 | 34.51 | 34.63 |
| 2-21.5 | 121 | 2-19-67 | 1922 | 00.21 | 00.33 |
| S-22 | 122 | 2-19-67 | 2145 | 56.91 | 57.03 |
| S-20 | 123 | 2-20-67 | 0113 | 17.41 | 17.53 |
| P-8 | 124 | 2-20-67 | 0444 | 32.19 | 32.31 |
| | 125 | 2-20-67 | 0444 | 34.21 | 34.34 |
| | 126 | 2-20-67 | 0444 | 36.23 | 36.35 |
| | 127 | 2-20-67 | 0444 | 38.25 | 38.37 |
| | 128 | 2-20-67 | 0444 | 40.27 | 40.39 |
| | 129 | 2-20-67 | 0444 | 42.29 | 42.41 |
| | 130 | 2-20-67 | 0444 | 44.31 | 44.43 |
| | 131 | 2-20-67 | 0444 | 46.33 | 46.45 |

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|-------|
| | | | | Telephoto | Wideangle | |
| | | Day | hour, min. | sec. | sec. | |
| S-23 | 132 | 2-20-67 | 0814 | 20.21 | 20.33 | |
| | 133 | 2-20-67 | 0814 | 29.61 | 29.73 | |
| | 134 | 2-20-67 | 0814 | 38.51 | 38.63 | |
| | 135 | 2-20-67 | 0814 | 48.51 | 48.63 | |
| S-24 | 136 | 2-20-67 | 1142 | 42.31 | 42.43 | |
| P-9a | 137 | 2-20-67 | 1510 | 50.59 | 50.71 | |
| | 138 | 2-20-67 | 1510 | 53.25 | 53.37 | |
| | 139 | 2-20-67 | 1510 | 55.91 | 56.03 | |
| | 140 | 2-20-67 | 1510 | 58.57 | 58.69 | |
| | 141 | 2-20-67 | 1511 | 01.23 | 01.35 | |
| | 142 | 2-20-67 | 1511 | 03.89 | 04.01 | |
| | 143 | 2-20-67 | 1511 | 06.54 | 06.66 | |
| | 144 | 2-20-67 | 1511 | 09.20 | 09.32 | |
| P-9b | 145 | 2-20-67 | 1839 | 52.03 | 52.15 | |
| | 146 | 2-20-67 | 1839 | 54.18 | 54.30 | |
| | 147 | 2-20-67 | 1839 | 56.33 | 56.45 | |
| | 148 | 2-20-67 | 1839 | 58.48 | 58.60 | |
| | 149 | 2-20-67 | 1840 | 00.64 | 00.76 | |
| | 150 | 2-20-67 | 1840 | 02.79 | 02.91 | |
| | 151 | 2-20-67 | 1840 | 04.94 | 05.06 | |
| | 152 | 2-20-67 | 1840 | 07.09 | 07.21 | |
| P-9c | P-9c | 153 | 2-20-67 | 2208 | 45.91 | 46.03 |
| 154 | | 2-20-67 | 2208 | 48.11 | 48.23 | |
| 155 | | 2-20-67 | 2208 | 50.31 | 50.43 | |
| 156 | | 2-20-67 | 2208 | 52.51 | 52.63 | |
| 157 | | 2-20-67 | 2208 | 54.71 | 54.83 | |
| 158 | | 2-20-67 | 2208 | 56.91 | 57.03 | |
| 159 | | 2-20-67 | 2208 | 59.11 | 59.23 | |
| 160 | | 2-20-67 | 2209 | 01.31 | 01.43 | |
| S-25 | 161 | 2-21-67 | 0133 | 37.81 | 37.93 | |
| S-26 | 162 | 2-21-67 | 0502 | 01.31 | 01.43 | |

BOEING

NO. D2-100814-2

SH.

CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-10 | 163 | 2-21-67 | 1159 | 21.53 | 21.65 |
| | 164 | 2-21-67 | 1159 | 23.98 | 24.10 |
| | 165 | 2-21-67 | 1159 | 26.43 | 26.55 |
| | 166 | 2-21-67 | 1159 | 28.87 | 28.99 |
| | 167 | 2-21-67 | 1159 | 31.30 | 31.42 |
| | 168 | 2-21-67 | 1159 | 33.73 | 33.85 |
| | 169 | 2-21-67 | 1159 | 36.16 | 36.18 |
| | 170 | 2-21-67 | 1159 | 38.57 | 38.69 |
| S-27 | 171 | 2-21-67 | 1531 | 02.31 | 02.43 |
| S-28 | 172 | 2-21-67 | 1858 | 12.51 | 12.63 |
| P-11 | 173 | 2-21-67 | 2227 | 58.81 | 58.93 |
| | 174 | 2-21-67 | 2228 | 01.13 | 01.25 |
| | 175 | 2-21-67 | 2228 | 03.47 | 03.59 |
| | 176 | 2-21-67 | 2228 | 05.81 | 05.93 |
| | 177 | 2-21-67 | 2228 | 08.16 | 08.28 |
| | 178 | 2-21-67 | 2228 | 10.51 | 10.63 |
| | 179 | 2-21-67 | 2228 | 12.87 | 12.99 |
| | 180 | 2-21-67 | 2228 | 15.23 | 15.35 |
| P-12.B2 | 181 | 2-22-67 | 0155 | 14.11 | 14.23 |
| | 182 | 2-22-67 | 0155 | 16.51 | 16.63 |
| | 183 | 2-22-67 | 0155 | 18.91 | 19.03 |
| | 184 | 2-22-67 | 0155 | 21.31 | 21.43 |
| P-12A | 185 | 2-22-67 | 0523 | 53.02 | 53.14 |
| | 186 | 2-22-67 | 0523 | 55.40 | 55.52 |
| | 187 | 2-22-67 | 0523 | 57.79 | 57.91 |
| | 188 | 2-22-67 | 0524 | 00.17 | 00.29 |
| | 189 | 2-22-67 | 0524 | 02.56 | 02.68 |
| | 190 | 2-22-67 | 0524 | 04.95 | 05.07 |
| | 191 | 2-22-67 | 0524 | 07.33 | 07.45 |
| | 192 | 2-22-67 | 0524 | 09.72 | 09.84 |
| | 193 | 2-22-67 | 0524 | 12.10 | 12.22 |
| | 194 | 2-22-67 | 0524 | 14.49 | 14.61 |
| | 195 | 2-22-67 | 0524 | 16.87 | 16.99 |
| | 196 | 2-22-67 | 0524 | 19.26 | 19.38 |

BOEING

NO. D2-10081-2

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CAMERA-ON TIMES

LO MISSION III

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| P-12A | 197 | 2-22-67 | 0524 | 21.65 | 21.77 |
| | 198 | 2-22-67 | 0524 | 24.03 | 24.15 |
| | 199 | 2-22-67 | 0524 | 26.42 | 26.54 |
| | 200 | 2-22-67 | 0524 | 28.80 | 28.92 |
| P-12B1 | 201 | 2-22-67 | 0853 | 12.30 | 12.42 |
| | 202 | 2-22-67 | 0853 | 14.62 | 14.74 |
| | 203 | 2-22-67 | 0853 | 16.99 | 17.11 |
| | 204 | 2-22-67 | 0853 | 19.42 | 19.54 |
| P-12C | 205 | 2-22-67 | 1221 | 42.21 | 42.33 |
| | 206 | 2-22-67 | 1221 | 45.01 | 45.13 |
| | 207 | 2-22-67 | 1221 | 47.82 | 47.94 |
| | 208 | 2-22-67 | 1221 | 50.64 | 50.76 |
| | 209 | 2-22-67 | 1221 | 53.47 | 53.59 |
| | 210 | 2-22-67 | 1221 | 56.30 | 56.42 |
| | 211 | 2-22-67 | 1221 | 59.15 | 59.27 |
| | 212 | 2-22-67 | 1222 | 02.00 | 02.12 |
| S-29 | 213 | 2-22-67 | 1546 | 56.41 | 56.53 |
| S-30 | 214 | 2-22-67 | 2243 | 04.11 | 04.23 |
| S-31 | 215 | 2-23-67 | 0211 | 23.81 | 23.93 |

BOEING

NO.
SH.

D2-100814-2

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 6.1 | 5 | 5-11-67 | 1546 | 17.81 | 17.93 |
| | 6 | 5-11-67 | 1546 | 27.91 | 28.03 |
| | 7 | 5-11-67 | 1546 | 38.11 | 38.23 |
| | 8 | 5-11-67 | 1546 | 48.21 | 48.33 |
| 6.2 | 9 | 5-11-67 | 1626 | 37.91 | 38.03 |
| | 10 | 5-11-67 | 1626 | 48.11 | 48.23 |
| | 11 | 5-11-67 | 1626 | 58.21 | 58.33 |
| | 12 | 5-11-67 | 1627 | 08.31 | 08.43 |
| 6.3 | 13 | 5-11-67 | 1658 | 47.31 | 47.43 |
| | 14 | 5-11-67 | 1658 | 57.51 | 57.63 |
| | 15 | 5-11-67 | 1659 | 07.61 | 07.73 |
| | 16 | 5-11-67 | 1659 | 17.71 | 17.83 |
| 6.4 | 17 | 5-11-67 | 1729 | 56.61 | 56.73 |
| | 18 | 5-11-67 | 1730 | 06.71 | 06.83 |
| | * 19 | 5-11-67 | 1730 | 16.91 | 17.03 |
| | 20 | 5-11-67 | 1730 | 27.01 | 27.13 |
| 6.5 | * 21 | 5-11-67 | 1803 | 33.51 | 33.63 |
| | 22 | 5-11-67 | 1803 | 43.61 | 43.73 |
| | 23 | 5-11-67 | 1803 | 53.81 | 53.93 |
| | 24 | 5-11-67 | 1804 | 03.91 | 04.03 |
| 6.6 | 25 | 5-11-67 | 2313 | 42.01 | 42.13 |
| 7.1 | 26 | 5-12-67 | 0427 | 23.31 | 23.43 |
| 7.2 | 27 | 5-12-67 | 0459 | 32.41 | 32.53 |
| 7.3 | 28 | 5-12-67 | 0530 | 40.21 | 40.33 |
| 7.4 | 29 | 5-12-67 | 0604 | 15.51 | 15.63 |
| 7.5 | 30 | 5-12-67 | 0631 | 05.31 | 05.43 |

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 8.1 | 32 | 5-12-67 | 1547 | 46.91 | 47.03 |
| 8.2 | 33 | 5-12-67 | 1628 | 01.11 | 01.23 |
| 8.3 | 34 | 5-12-67 | 1700 | 08.91 | 09.03 |
| 8.4 | 35 | 5-12-67 | 1731 | 16.41 | 16.53 |
| 8.5 | 36 | 5-12-67 | 1804 | 52.31 | 52.43 |
| 9.1 | 38 | 5-13-67 | 0428 | 45.81 | 45.93 |
| 9.2 | 39 | 5-13-67 | 0500 | 52.21 | 52.33 |
| 9.3 | 40 | 5-13-67 | 0531 | 59.01 | 59.13 |
| 9.4 | 41 | 5-13-67 | 0605 | 35.21 | 35.33 |
| 9.5 | 42 | 5-13-67 | 0645 | 06.21 | 06.33 |
| 10.1 | 44 | 5-13-67 | 1549 | 23.71 | 23.83 |
| 10.2 | 45 | 5-13-67 | 1629 | 31.71 | 31.83 |
| 10.3 | 46 | 5-13-67 | 1701 | 37.01 | 37.13 |
| 10.4 | 47 | 5-13-67 | 1732 | 42.11 | 42.23 |
| 10.5 | 48 | 5-13-67 | 1806 | 18.11 | 18.23 |
| 10 FS | 49 | 5-13-67 | 2316 | 48.01 | 48.13 |
| | 50 | 5-13-67 | 2317 | 39.41 | 39.53 |
| | 51 | 5-13-67 | 2318 | 04.81 | 04.93 |
| 11.1 | 52 | 5-14-67 | 0430 | 24.21 | 24.33 |
| 11.2 | 53 | 5-14-67 | 0502 | 28.51 | 28.63 |
| 11.3 | 54 | 5-14-67 | 0533 | 33.01 | 33.13 |
| 11.4 | 55 | 5-14-67 | 0607 | 06.51 | 06.63 |
| 11.5 | 56 | 5-14-67 | 0646 | 39.21 | 39.33 |
| 12.1 | 58 | 5-14-67 | 1551 | 18.21 | 18.33 |
| 12.2 | 59 | 5-14-67 | 1631 | 21.81 | 21.93 |
| 12.3 | 60 | 5-14-67 | 1703 | 25.51 | 25.63 |
| 12.4 | 61 | 5-14-67 | 1734 | 28.21 | 28.33 |
| 12.5 | 62 | 5-14-67 | 1807 | 58.91 | 59.03 |

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|-----------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour,min. | sec. | sec. |
| 13.1 | 64 | 5-15-67 | 0432 | 29.71 | 29.83 |
| 13.2 | 65 | 5-15-67 | 0504 | 33.01 | 33.13 |
| 13.3 | 66 | 5-15-67 | 0535 | 33.51 | 33.63 |
| 13.4 | 67 | 5-15-67 | 0609 | 00.81 | 00.93 |
| 13.5 | 68 | 5-15-67 | 0648 | 26.61 | 26.73 |
| 14.1 | 70 | 5-15-67 | 1553 | 35.21 | 35.33 |
| 14.2 | 71 | 5-15-67 | 1633 | 44.11 | 44.23 |
| 14.3 | 72 | 5-15-67 | 1705 | 47.51 | 47.63 |
| 14.4 | 73 | 5-15-67 | 1736 | 45.71 | 45.83 |
| 14.5 | 74 | 5-15-67 | 1810 | 08.21 | 08.33 |
| 14 FS | 75 | 5-15-67 | 2321 | 04.21 | 04.33 |
| 15.1 | 76 | 5-16-67 | 0435 | 13.81 | 13.93 |
| 15.2 | 77 | 5-16-67 | 0507 | 17.51 | 17.63 |
| 15.3 | 78 | 5-16-67 | 0538 | 13.31 | 13.43 |
| 15.4 | 79 | 5-16-67 | 0611 | 30.51 | 30.63 |
| 15.5 | 80 | 5-16-67 | 0651 | 07.01 | 07.13 |
| 16.1 | 82 | 5-16-67 | 1556 | 37.91 | 38.03 |
| 16.2 | 83 | 5-16-67 | 1636 | 52.11 | 52.23 |
| 16.3 | 84 | 5-16-67 | 1708 | 56.81 | 56.93 |
| 16.4 | 85 | 5-16-67 | 1739 | 49.71 | 49.83 |
| 16.5 | 86 | 5-16-67 | 1813 | 00.31 | 00.43 |
| 17.1 | 88 | 5-17-67 | 0438 | 38.21 | 38.33 |
| 17.2 | 89 | 5-17-67 | 0510 | 44.31 | 44.43 |
| 17.3 | 90 | 5-17-67 | 0541 | 34.61 | 34.73 |
| 17.4 | 91 | 5-17-67 | 0614 | 38.81 | 38.93 |
| 17.5 | 92 | 5-17-67 | 0653 | 56.91 | 57.03 |

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 18.1 | 94 | 5-17-67 | 1600 | 08.11 | 08.23 |
| 18.2 | 95 | 5-17-67 | 1640 | 33.41 | 33.53 |
| 18.3 | 96 | 5-17-67 | 1712 | 40.51 | 40.63 |
| 18.4 | 97 | 5-17-67 | 1743 | 28.01 | 28.13 |
| 18.5 | 98 | 5-17-67 | 1816 | 25.41 | 25.53 |
| 18 FS | 99 | 5-17-67 | 2324 | 21.21 | 21.33 |
| 19.1 | 100 | 5-18-67 | 0442 | 36.61 | 36.73 |
| 19.2 | 101 | 5-18-67 | 0514 | 43.91 | 44.03 |
| 19.3 | 102 | 5-18-67 | 0545 | 27.31 | 27.43 |
| 19.4 | 103 | 5-18-67 | 0618 | 15.41 | 15.53 |
| 19.5 | 104 | 5-18-67 | 0657 | 07.91 | 08.03 |
| 20.1 | 106 | 5-18-67 | 1604 | 05.71 | 05.83 |
| 20.2 | 107 | 5-18-67 | 1644 | 42.31 | 42.43 |
| 20.3 | 108 | 5-18-67 | 1716 | 51.01 | 51.13 |
| 20.4 | 109 | 5-18-67 | 1747 | 31.71 | 31.83 |
| 20.5 | 110 | 5-18-67 | 1820 | 12.71 | 12.83 |
| 21.1 | 112 | 5-19-67 | 0446 | 49.51 | 49.63 |
| 21.2 | 113 | 5-19-67 | 0519 | 00.01 | 00.13 |
| 21.3 | 114 | 5-19-67 | 0549 | 38.21 | 38.33 |
| 21.4 | 115 | 5-19-67 | 0622 | 12.31 | 12.43 |
| 21.5 | 116 | 5-19-67 | 0700 | 40.91 | 41.03 |
| 22.1 | 118 | 5-19-67 | 1608 | 04.91 | 05.03 |
| 22.2 | 119 | 5-19-67 | 1648 | 55.01 | 55.13 |
| 22.3 | 120 | 5-19-67 | 1721 | 57.71 | 57.83 |
| 22.4 | 121 | 5-19-67 | 1751 | 42.81 | 42.93 |
| 22.5 | 122 | 5-19-67 | 1824 | 11.31 | 11.43 |

BOEING

NO. D2-100314-2
SH.

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 22 FS | 123 | 5-19-67 | 2327 | 53.61 | 54.73 |
| 23.1 | 124 | 5-20-67 | 0518 | 18.21 | 18.33 |
| 23.2 | 125 | 5-20-67 | 0523 | 13.41 | 13.53 |
| 23.3 | 126 | 5-20-67 | 0553 | 47.71 | 47.83 |
| 23.4 | 127 | 5-20-67 | 0626 | 10.21 | 10.33 |
| 23.5 | 128 | 5-20-67 | 0704 | 16.91 | 17.03 |
| 24.1 | 130 | 5-20-67 | 1611 | 43.11 | 43.23 |
| 24.2 | 131 | 5-20-67 | 1652 | 51.81 | 51.93 |
| 24.3 | 132 | 5-20-67 | 1725 | 06.71 | 06.83 |
| 24.4 | 133 | 5-20-67 | 1759 | 04.51 | 04.63 |
| 24.5 | 134 | 5-20-67 | 1827 | 59.01 | 59.13 |
| 25.1 | 136 | 5-21-67 | 0454 | 35.31 | 35.43 |
| 25.2 | 137 | 5-22-67 | 0526 | 51.21 | 51.33 |
| 25.3 | 138 | 5-21-67 | 0557 | 23.81 | 23.93 |
| 25.4 | 139 | 5-21-67 | 0629 | 40.01 | 40.13 |
| 25.5 | 140 | 5-21-67 | 0708 | 00.81 | 00.93 |
| 26.2 | 142 | 5-21-67 | 1656 | 05.21 | 05.33 |
| 26.3 | 143 | 5-21-67 | 1728 | 21.61 | 21.73 |
| 26.4 | 144 | 5-21-67 | 1758 | 53.61 | 53.73 |
| 26.5 | 145 | 5-21-67 | 1831 | 09.21 | 09.33 |
| 26 FS | 146 | 5-21-67 | 2330 | 24.91 | 25.03 |
| | 147 | 5-21-67 | 2330 | 56.51 | 56.63 |
| 27.1 | 148 | 5-22-67 | 0457 | 22.21 | 22.33 |
| 27.2 | 149 | 5-22-67 | 0529 | 39.51 | 39.63 |
| 27.3 | 150 | 5-22-67 | 0600 | 11.81 | 11.93 |
| 27.4 | 151 | 5-22-67 | 0632 | 27.51 | 27.63 |
| 27.5 | 152 | 5-22-67 | 0710 | 43.71 | 43.83 |

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 28.1 | 154 | 5-22-67 | 1615 | 55.31 | 55.43 |
| 28.2 | 155 | 5-22-67 | 1658 | 26.41 | 26.53 |
| 28.3 | 156 | 5-22-67 | 1730 | 43.11 | 43.23 |
| 28.4 | 157 | 5-22-67 | 1801 | 16.11 | 16.23 |
| 28.5 | 158 | 5-22-67 | 1833 | 33.01 | 33.13 |
| 29.1 | 160 | 5-23-67 | 0459 | 16.71 | 16.83 |
| 29.2 | 161 | 5-23-67 | 0531 | 34.11 | 34.23 |
| 29.3 | 162 | 5-23-67 | 0602 | 07.51 | 07.63 |
| 29.4 | 163 | 5-23-67 | 0634 | 26.11 | 26.23 |
| 29.5 | 164 | 5-23-67 | 0712 | 46.81 | 46.93 |
| 29.6 | 165 | 5-23-67 | 0943 | 50.91 | 51.03 |
| 30.1 | 166 | 5-23-67 | 1618 | 43.71 | 43.83 |
| 30.2 | 167 | 5-23-67 | 1700 | 11.51 | 11.63 |
| 30.3 | 168 | 5-23-67 | 1732 | 28.81 | 28.93 |
| 30.4 | 169 | 5-23-67 | 1803 | 02.01 | 02.13 |
| 30.5 | 170 | 5-23-67 | 1835 | 18.31 | 18.43 |
| 30.6 | 171 | 5-24-67 | 0128 | 56.71 | 56.83 |
| 31.1 | 172 | 5-24-67 | 0500 | 29.11 | 29.23 |
| 31.2 | 173 | 5-24-67 | 0532 | 43.11 | 43.23 |
| 31.3 | 174 | 5-24-67 | 0603 | 17.71 | 17.83 |
| 31.4 | 175 | 5-24-67 | 0635 | 41.11 | 41.23 |
| 31.5 | 176 | 5-24-67 | 0714 | 12.71 | 12.83 |
| 31.6 | 177 | 5-24-67 | 0945 | 28.41 | 28.53 |
| 31.7 | 178 | 5-24-67 | 1329 | 33.21 | 33.33 |
| 32.1 | 179 | 5-24-67 | 1619 | 23.81 | 23.93 |
| 32.2 | 180 | 5-24-67 | 1700 | 54.31 | 54.43 |
| 32.3 | 181 | 5-24-67 | 1733 | 06.71 | 06.83 |
| 32.4 | 182 | 5-24-67 | 1803 | 41.71 | 41.83 |

BOEING

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D2-100814-2

CAMERA-ON TIMES

LO MISSION IV

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| 32.5 | 183 | 5-24-67 | 1836 | 07.31 | 07.43 |
| 32.6 | 184 | 5-25-67 | 0130 | 32.01 | 32.13 |
| 32.7 | 185 | 5-25-67 | 0130 | 35.91 | 36.03 |
| 33.1 | 186 | 5-25-67 | 0501 | 22.91 | 23.03 |
| 33.2 | 187 | 5-25-67 | 0533 | 33.51 | 33.63 |
| 33.3 | 188 | 5-25-67 | 0604 | 08.61 | 08.73 |
| 33.4 | 189 | 5-25-67 | 0636 | 35.91 | 36.03 |
| 33.5 | 190 | 5-25-67 | 0715 | 53.41 | 53.53 |
| 33.6 | 191 | 5-25-67 | 0947 | 05.51 | 05.63 |
| 33.7 | 192 | 5-25-67 | 0947 | 09.01 | 09.13 |
| 34.1 | 193 | 5-25-67 | 1624 | 27.51 | 27.63 |
| 34.2 | 194 | 5-25-67 | 1701 | 47.31 | 47.43 |
| 34.3 | 195 | 5-25-67 | 1733 | 56.31 | 56.43 |
| 34.4 | 196 | 5-25-67 | 1804 | 30.81 | 30.93 |
| 34.5 | 197 | 5-25-67 | 1836 | 58.81 | 58.93 |
| 35.1 | 198 | 5-26-67 | 0132 | 14.81 | 14.93 |
| 35.1 | 199 | 5-26-67 | 0132 | 18.41 | 18.63 |
| 35.2 | 200 | 5-26-67 | 0534 | 28.51 | 28.63 |
| 35.3 | 201 | 5-26-67 | 0605 | 02.31 | 02.43 |
| 35.4 | 202 | 5-26-67 | 0948 | 38.81 | 38.93 |
| 35.4 | 203 | 5-26-67 | 0948 | 42.51 | 42.63 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|-------|
| | | | | Telephoto | Wideangle | |
| | | Day | hour, min. | sec. | sec. | |
| A-1 | 5 | 8-6-67 | 1122 | 02.60 | 02.72 | |
| | 6 | 8-6-67 | 1122 | 05.32 | 05.44 | |
| | 7 | 8-6-67 | 1122 | 08.02 | 08.14 | |
| | 8 | 8-6-67 | 1122 | 10.72 | 10.84 | |
| | 9 | 8-6-67 | 1122 | 13.40 | 13.52 | |
| | 10 | 8-6-67 | 1122 | 16.08 | 16.20 | |
| | 11 | 8-6-67 | 1122 | 18.74 | 18.86 | |
| | 12 | 8-6-67 | 1122 | 21.40 | 21.52 | |
| | A-2 | 13 | 8-6-67 | 1333 | 25.00 | 25.12 |
| | | 14 | 8-6-67 | 1333 | 27.72 | 27.84 |
| | | 15 | 8-6-67 | 1333 | 30.42 | 30.54 |
| | | 16 | 8-6-67 | 1333 | 33.12 | 33.24 |
| 17 | | 8-6-67 | 1333 | 35.80 | 35.92 | |
| 18 | | 8-6-67 | 1333 | 38.48 | 38.60 | |
| 19 | | 8-6-67 | 1333 | 41.14 | 41.26 | |
| 20 | | 8-6-67 | 1333 | 43.80 | 43.92 | |
| A-3 | 21 | 8-6-67 | 1717 | 06.31 | 06.42 | |
| A-4 | 22 | 8-7-67 | 0034 | 59.61 | 59.73 | |
| A-6 | 24 | 8-7-67 | 1350 | 51.31 | 51.43 | |
| A-7.1 | 25 | 8-7-67 | 2050 | 18.91 | 19.03 | |
| A-8 | 26 | 8-8-67 | 0142 | 05.01 | 05.13 | |
| A-9 | 27 | 8-8-67 | 0905 | 00.11 | 00.23 | |
| A-10 | 28 | 8-8-67 | 1452 | 30.01 | 30.13 | |
| A-11.2 | 29 | 8-8-67 | 2151 | 31.31 | 31.43 | |
| A-12 | 30 | 8-9-67 | 0243 | 34.91 | 35.03 | |
| A-13 | 31 | 8-9-67 | 0932 | 18.81 | 18.93 | |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| A-14 | 32 | 8-9-67 | 1557 | 41.21 | 41.33 |
| V-1 | 33 | 8-9-67 | 2057 | 43.22 | 43.35 |
| | 34 | 8-9-67 | 2057 | 49.88 | 50.00 |
| | 35 | 8-9-67 | 2057 | 56.44 | 56.56 |
| | 36 | 8-9-67 | 2058 | 02.90 | 03.02 |
| V-2.1 | 37 | 8-10-67 | 0322 | 03.51 | 03.63 |
| V-3 | 38 | 8-10-67 | 0949 | 36.21 | 36.33 |
| A-15 | 39 | 8-10-67 | 1052 | 51.41 | 51.53 |
| V-4 | 40 | 8-10-67 | 1251 | 48.01 | 48.13 |
| V-5.1 | 41 | 8-10-67 | 1611 | 26.41 | 26.53 |
| V-6 | 42 | 8-10-67 | 2234 | 08.51 | 08.63 |
| A-16.1 | 43 | 8-11-67 | 0358 | 21.21 | 21.33 |
| V-8a | 44 | 8-11-67 | 0807 | 25.39 | 25.51 |
| | 45 | 8-11-67 | 0807 | 29.96 | 30.08 |
| | 46 | 8-11-67 | 0807 | 34.47 | 34.59 |
| | 47 | 8-11-67 | 0807 | 38.93 | 39.05 |
| V-8b | 48 | 8-11-67 | 1118 | 35.11 | 35.23 |
| | 49 | 8-11-67 | 1118 | 39.91 | 40.03 |
| | 50 | 8-11-67 | 1118 | 44.91 | 45.03 |
| | 51 | 8-11-67 | 1118 | 49.71 | 49.83 |
| V-9.1 | 52 | 8-11-67 | 1430 | 52.11 | 52.23 |
| A-17.1 | 53 | 8-11-67 | 1840 | 05.71 | 05.83 |
| V-10 | 54 | 8-11-67 | 2045 | 36.81 | 36.93 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-11a | 55 | 8-12-67 | 0004 | 00.12 | 00.24 |
| | 56 | 8-12-67 | 0004 | 04.58 | 04.70 |
| | 57 | 8-12-67 | 0004 | 09.04 | 09.16 |
| | 58 | 8-12-67 | 0004 | 13.50 | 13.62 |
| V-11b | 59 | 8-12-67 | 0315 | 08.71 | 08.83 |
| | 60 | 8-12-67 | 0315 | 13.51 | 13.63 |
| | 61 | 8-12-67 | 0315 | 18.31 | 18.43 |
| | 62 | 8-12-67 | 0315 | 23.21 | 23.33 |
| V-12 | 63 | 8-12-67 | 0625 | 30.61 | 30.73 |
| V-13 | 64 | 8-12-67 | 0936 | 53.31 | 53.43 |
| A-18.1 | 65 | 8-12-67 | 1149 | 21.71 | 21.83 |
| V-14 | 66 | 8-12-67 | 1254 | 00.79 | 00.91 |
| | 67 | 8-12-67 | 1254 | 06.57 | 06.69 |
| | 68 | 8-12-67 | 1254 | 12.35 | 12.47 |
| | 69 | 8-12-67 | 1254 | 18.13 | 18.25 |
| V-15.1 | 70 | 8-12-67 | 1603 | 49.11 | 49.23 |
| V-16a | 71 | 8-12-67 | 1910 | 02.21 | 02.33 |
| | 72 | 8-12-67 | 1910 | 06.61 | 06.73 |
| | 73 | 8-12-67 | 1910 | 11.01 | 11.13 |
| | 74 | 8-12-67 | 1910 | 15.41 | 15.53 |
| V-16b | 75 | 8-12-67 | 2221 | 09.01 | 09.13 |
| | 76 | 8-12-67 | 2221 | 13.81 | 13.93 |
| | 77 | 8-12-67 | 2221 | 18.71 | 18.83 |
| | 78 | 8-12-67 | 2221 | 23.71 | 23.83 |
| A-19 | 79 | 8-13-67 | 0234 | 32.21 | 32.33 |
| V-18 | 80 | 8-13-67 | 0754 | 55.51 | 55.63 |
| | 81 | 8-13-67 | 0755 | 00.01 | 00.13 |
| | 82 | 8-13-67 | 0755 | 04.51 | 04.63 |
| | 83 | 8-13-67 | 0755 | 09.01 | 09.13 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-19 | 84 | 8-13-67 | 1100 | 57.51 | 57.63 |
| A-20 | 85 | 8-13-67 | 1829 | 40.21 | 40.33 |
| V-21 | 86 | 8-13-67 | 2049 | 42.31 | 42.43 |
| | 87 | 8-13-67 | 2049 | 50.71 | 50.83 |
| | 88 | 8-13-67 | 2049 | 59.21 | 59.33 |
| | 89 | 8-13-67 | 2050 | 07.81 | 07.93 |
| V-22 | 90 | 8-13-67 | 2355 | 25.41 | 25.53 |
| | 91 | 8-13-67 | 2355 | 30.91 | 31.03 |
| | 92 | 8-13-67 | 2355 | 36.51 | 36.63 |
| | 93 | 8-13-67 | 2355 | 42.21 | 42.33 |
| V-23.1 | 94 | 8-14-67 | 0302 | 41.62 | 41.74 |
| | 95 | 8-14-67 | 0302 | 46.38 | 46.50 |
| | 96 | 8-14-67 | 0302 | 51.14 | 51.26 |
| | 97 | 8-14-67 | 0302 | 55.90 | 56.02 |
| V-24 | 98 | 8-14-67 | 0610 | 11.71 | 11.83 |
| | 99 | 8-14-67 | 0610 | 16.30 | 16.42 |
| | 100 | 8-14-67 | 0610 | 20.83 | 20.95 |
| | 101 | 8-14-67 | 0610 | 25.31 | 25.43 |
| V-25 | 102 | 8-14-67 | 0938 | 23.11 | 23.23 |
| A-21 | 103 | 8-14-67 | 1024 | 50.61 | 50.73 |
| V-26.1 | 104 | 8-14-67 | 1240 | 36.31 | 36.43 |
| | 105 | 8-14-67 | 1241 | 02.71 | 02.83 |
| | 106 | 8-14-67 | 1241 | 27.51 | 27.63 |
| | 107 | 8-14-67 | 1241 | 53.01 | 53.13 |
| V-27a | 108 | 8-14-67 | 1544 | 45.91 | 46.03 |
| | 109 | 8-14-67 | 1544 | 50.41 | 50.53 |
| | 110 | 8-14-67 | 1544 | 54.91 | 55.03 |
| | 111 | 8-14-67 | 1544 | 59.41 | 59.53 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-27b | 112 | 8-14-67 | 1855 | 49.00 | 49.12 |
| | 113 | 8-14-67 | 1855 | 53.74 | 53.86 |
| | 114 | 8-14-67 | 1855 | 58.48 | 58.60 |
| | 115 | 8-14-67 | 1856 | 03.22 | 03.34 |
| V-28 | 116 | 8-14-67 | 2202 | 43.30 | 43.42 |
| | 117 | 8-14-67 | 2202 | 48.72 | 48.84 |
| | 118 | 8-14-67 | 2202 | 54.10 | 54.22 |
| | 119 | 8-14-67 | 2202 | 59.41 | 59.53 |
| V-29 | 120 | 8-15-67 | 0121 | 29.52 | 29.64 |
| | 121 | 8-15-67 | 0121 | 34.40 | 34.52 |
| | 122 | 8-15-67 | 0121 | 39.33 | 39.45 |
| | 123 | 8-15-67 | 0121 | 44.31 | 44.43 |
| A-22 | 124 | 8-15-67 | 0220 | 03.81 | 03.93 |
| V-30 | 125 | 8-15-67 | 0416 | 04.93 | 05.05 |
| | 126 | 8-15-67 | 0416 | 15.06 | 15.18 |
| | 127 | 8-15-67 | 0416 | 25.35 | 25.47 |
| | 128 | 8-15-67 | 0416 | 35.80 | 35.92 |
| V-31 | 129 | 8-15-67 | 0754 | 37.20 | 37.32 |
| | 130 | 8-15-67 | 0754 | 48.44 | 48.56 |
| | 131 | 8-15-67 | 0754 | 59.88 | 50.00 |
| | 132 | 8-15-67 | 0755 | 11.52 | 11.64 |
| V-32 | 133 | 8-15-67 | 1054 | 16.04 | 16.16 |
| | 134 | 8-15-67 | 1054 | 35.34 | 35.46 |
| | 135 | 8-15-67 | 1054 | 55.49 | 55.61 |
| | 136 | 8-15-67 | 1055 | 16.48 | 16.60 |
| V-33 | 137 | 8-15-67 | 1714 | 49.61 | 49.73 |
| V-34 | 138 | 8-15-67 | 2021 | 47.21 | 47.33 |
| | 139 | 8-15-67 | 2021 | 52.01 | 52.13 |
| | 140 | 8-15-67 | 2021 | 56.81 | 56.93 |
| | 141 | 8-15-67 | 2022 | 01.61 | 01.73 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-35 | 142 | 8-15-67 | 2338 | 40.12 | 40.24 |
| | 143 | 8-15-67 | 2338 | 59.68 | 59.80 |
| | 144 | 8-15-67 | 2339 | 19.74 | 19.86 |
| | 145 | 8-15-67 | 2339 | 40.30 | 40.42 |
| V-36 | 146 | 8-16-67 | 0247 | 50.29 | 50.41 |
| | 147 | 8-16-67 | 0247 | 55.17 | 55.29 |
| | 148 | 8-16-67 | 0247 | 59.85 | 59.97 |
| | 149 | 8-16-67 | 0248 | 04.33 | 04.45 |
| V-37 | 150 | 8-16-67 | 0559 | 37.30 | 37.42 |
| | 151 | 8-16-67 | 0559 | 42.12 | 42.24 |
| | 152 | 8-16-67 | 0559 | 46.92 | 47.04 |
| | 153 | 8-16-67 | 0559 | 51.72 | 51.84 |
| | 154 | 8-16-67 | 0559 | 56.50 | 56.62 |
| | 155 | 8-16-67 | 0600 | 01.28 | 01.40 |
| | 156 | 8-16-67 | 0600 | 06.04 | 06.16 |
| | 157 | 8-16-67 | 0600 | 10.80 | 10.92 |
| A-23 | 158 | 8-16-67 | 1010 | 05.61 | 05.73 |
| V-38 | 159 | 8-16-67 | 1228 | 16.71 | 16.83 |
| | 160 | 8-16-67 | 1228 | 23.91 | 24.03 |
| | 161 | 8-16-67 | 1228 | 31.41 | 31.53 |
| | 162 | 8-16-67 | 1228 | 39.21 | 39.33 |
| A-24 | 163 | 8-16-67 | 1942 | 58.41 | 58.53 |
| V-40 | 164 | 8-17-67 | 0106 | 25.12 | 25.24 |
| | 165 | 8-17-67 | 0106 | 30.10 | 30.23 |
| | 166 | 8-17-67 | 0106 | 35.03 | 35.15 |
| | 167 | 8-17-67 | 0106 | 39.91 | 40.03 |
| V-41 | 168 | 8-17-67 | 0404 | 40.41 | 40.53 |
| V-42a | 169 | 8-17-67 | 0723 | 33.32 | 33.44 |
| | 170 | 8-17-67 | 0723 | 38.20 | 38.32 |
| | 171 | 8-17-67 | 0723 | 43.03 | 43.15 |
| | 172 | 8-17-67 | 0723 | 47.81 | 47.93 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-42b | 173 | 8-17-67 | 1034 | 35.11 | 35.23 |
| | 174 | 8-17-67 | 1034 | 40.13 | 40.25 |
| | 175 | 8-17-67 | 1034 | 45.10 | 45.22 |
| | 176 | 8-17-67 | 1034 | 50.02 | 50.14 |
| V-43.2 | 177 | 8-17-67 | 1341 | 06.91 | 07.03 |
| | 178 | 8-17-67 | 1341 | 30.81 | 30.93 |
| | 179 | 8-17-67 | 1341 | 53.91 | 54.03 |
| | 180 | 8-17-67 | 1342 | 16.71 | 16.83 |
| A-25 | 181 | 8-17-67 | 1756 | 42.31 | 42.43 |
| V-45.1 | 182 | 8-17-67 | 2329 | 47.41 | 47.53 |
| | 183 | 8-17-67 | 2329 | 55.31 | 55.43 |
| | 184 | 8-17-67 | 2330 | 03.21 | 03.33 |
| | 185 | 8-17-67 | 2330 | 11.11 | 11.23 |
| V-46 | 186 | 8-18-67 | 0237 | 57.83 | 57.95 |
| | 187 | 8-18-67 | 0238 | 04.12 | 04.24 |
| | 188 | 8-18-67 | 0238 | 10.44 | 10.56 |
| | 189 | 8-18-67 | 0238 | 16.81 | 16.93 |
| | 190 | 8-18-67 | 0238 | 23.22 | 23.34 |
| | 191 | 8-18-67 | 0238 | 29.68 | 29.80 |
| | 192 | 8-18-67 | 0238 | 36.17 | 36.29 |
| | 193 | 8-18-67 | 0238 | 42.71 | 42.83 |
| V-48 | 194 | 8-18-67 | 0858 | 44.31 | 44.43 |
| | 195 | 8-18-67 | 0858 | 50.10 | 50.22 |
| | 196 | 8-18-67 | 0858 | 55.93 | 56.05 |
| | 197 | 8-18-67 | 0859 | 01.79 | 01.91 |
| | 198 | 8-18-67 | 0859 | 07.68 | 07.80 |
| | 199 | 8-18-67 | 0859 | 13.61 | 13.73 |
| | 200 | 8-18-67 | 0859 | 19.57 | 19.69 |
| | 201 | 8-18-67 | 0859 | 25.57 | 25.69 |
| V-49 | 202 | 8-18-67 | 1210 | 29.31 | 29.43 |
| | 203 | 8-18-67 | 1210 | 35.91 | 36.03 |
| | 204 | 8-18-67 | 1210 | 42.41 | 42.53 |
| | 205 | 8-18-67 | 1210 | 48.81 | 48.93 |

CAMERA-ON TIMES

LO MISSION V

| Mission Site | Frame No. | EXPOSURE TIME - GMT | | | |
|-----------------|--------------|---------------------|------------|-----------|-----------|
| | | | | Telephoto | Wideangle |
| | | Day | hour, min. | sec. | sec. |
| V-50 | 206 | 8-18-67 | 1833 | 07.16 | 07.28 |
| | 207 | 8-18-67 | 1833 | 12.98 | 13.10 |
| | 208 | 8-18-67 | 1833 | 19.45 | 19.57 |
| | 209 | 8-18-67 | 1833 | 26.57 | 26.69 |
| V-51 | 210 | 8-18-67 | 2139 | 42.19 | 42.31 |
| | 211 | 8-18-67 | 2139 | 47.24 | 47.36 |
| | 212 | 8-18-67 | 2139 | 52.32 | 52.44 |
| | 213 | 8-18-67 | 2139 | 57.44 | 57.56 |
| | 214 | 8-18-67 | 2140 | 02.58 | 02.70 |
| | 215 | 8-18-67 | 2140 | 07.76 | 07.88 |
| | 216 | 8-18-67 | 2140 | 12.96 | 13.08 |
| | 217 | 8-18-67 | 2140 | 18.20 | 18.32 |

BOEINGNO. D2-10011-2
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5.0 LUNAR RADII

The list on page 59 indicates the values used for lunar radius for all improved photo site data. Note that outside the region $\pm 10^\circ$ latitude (-40°) - ($+50^\circ$) longitude, 1736.1 km is used. Inside the region, a value is input varying from 1733 to 1738 km, depending on longitude.

USE FOR TYPEWRITTEN MATERIAL ONLY

LUNAR RADII INPUT TO PHOTO SUPPORT DATA

| LO I | | LO II | | LO III | | LO V | |
|----------|---------|--------|---------|--------|---------|--------|---------|
| A.0 | 1736 km | P-1 | 1734 km | P-1 | 1734 km | A-1 | |
| F25 | 1736 | S-1 | 1734 | S-1 | 1733 | thru | |
| F26 | 1736 | S-2 | 1734 | P-2 | 1733 | A-25 | 1736 km |
| F27 | 1736 | S-3 | 1736 | S-2 | 1736 | V-1 | 1736 |
| F28 | 1736 | S-4 | 1736 | S-3 | 1733 | V-2.1 | 1736 |
| F29 | 1734 | P-2 | 1734 | S-4 | 1735.5 | V-3.1 | 1733 |
| F30 | 1736 | P-3 | 1736 | P-3 | 1736 | V-4 | 1736 |
| F31-34 | 1734 | P-4 | 1736.5 | P-4 | 1735 | V-5.1 | 1733 |
| F35-40 | 1736 | P-5 | 1735.5 | P-5 | 1735.5 | V-6 | 1733 |
| F41 | 1733 | S-5 | 1736 | P-6 | 1736 | V-8 | 1733 |
| F42 | 1734 | P-6 | 1735.5 | S-5 | 1735.5 | V-9.1 | 1734 |
| F44 | 1733 | S-6 | 1737.5 | S-6 | 1737 | V-10 | 1736 |
| F46, 47 | 1734.5 | S-7 | 1738 | S-7 | 1737 | V-11 | 1734 |
| F48, 49 | 1734 | S-8 | 1737 | S-8 | 1736 | V-12 | 1734.5 |
| F50, 51 | 1733 | S-9 | 1738 | S-9 | 1736 | V-13 | 1735.5 |
| A-1 | 1733 | P-7 | 1738 | S-10 | 1736.5 | V-14 | 1736 |
| A-2 | 1734 | S-10.2 | 1738 | S-11 | 1738 | V-15.1 | 1736 |
| F84 | 1736.5 | P-8 | 1738 | S-13 | 1738 | V-16 | 1735.5 |
| A-3 | 1735.5 | S-11 | 1737.5 | P-7 | 1738 | V-18 | 1736 |
| F102 | 1736 | P-9 | 1738 | S-14 | 1738 | V-19 | 1736 |
| F103 | 1737.5 | P-10 | 1737.5 | S-15 | 1738 | V-21 | 1736 |
| A-4 | 1736.5 | S-12 | 1738 | S-16 | 1738 | V-22 | 1736 |
| F113,114 | 1738 | P-11 | 1738 | S-17 | 1738 | V-23.2 | 1737 |
| F115,116 | 1736 | P-12 | 1736.5 | S-18 | 1738 | V-24 | 1737.5 |
| F117 | 1738 | S-13 | 1735.5 | S-19 | 1738 | V-25 | 1736 |
| A-5 | 1738 | S-14 | 1736 | S-21 | 1737.5 | V-26.1 | 1736 |
| F134 | 1738 | P-13 | 1735.5 | S-21.5 | 1736 | V-27 | 1738 |
| F135 | 1738 | S-15 | 1736 | S-22 | 1737.5 | V-28 | 1736 |
| F136 | 1736 | S-16 | 1736 | S-20 | 1737.5 | V-29 | 1736 |
| F137 | 1738 | S-17 | 1736 | P-8 | 1737.5 | V-30 | 1736 |
| F138 | 1738 | | | S-23 | 1738 | V-31 | 1736 |
| F139 | 1738 | | | S-24 | 1737.5 | V-32 | 1738 |
| F140 | 1738 | | | P-9 | 1737.5 | V-33 | 1738 |
| A-6 | 1738 | | | S-25 | 1735.5 | V-34 | 1738 |
| F149 | 1737.5 | | | S-26 | 1736 | V-35 | 1738 |
| F150 | 1737 | | | P-10 | 1735.5 | V-36 | 1737.5 |
| F151 | 1737.5 | | | S-27 | 1736.5 | V-37 | 1737.5 |
| F153-156 | 1736 | | | S-28 | 1735.5 | V-38 | 1736 |
| A-7 | 1737.5 | | | P-11 | 1736.5 | V-40 | 1736 |
| F173 | 1737.5 | | | P-12 | 1735.5 | V-41 | 1736 |
| F174 | 1736 | | | S-29 | 1736 | V-42 | 1736 |
| F175 | 1736.5 | | | S-30 | 1736 | V-43.2 | 1736 |
| A-8.1 | 1736.5 | | | S-31 | 1736 | V-45.1 | 1736 |
| A9.2 | 1735.5 | | | | | V-46 | 1736 |
| | | | | | | V-48 | 1736 |
| | | | | | | V-49 | 1736 |
| | | | | | | V-50 | 1736 |
| | | | | | | V-51 | 1736 |

USE FOR TYPEWRITTEN MATERIAL ONLY

LO IV

All 1736 km

6.0 CAMERA GEOMETRY

The quantities used to express the geometry of the camera's field of view are (1) length and width of the frame, (2) focal length, (3) cone and clock angle of the geometrical center of the frame (camera axis), and (4) angular orientation of the frame about the axis. (1) and (2) above, were verified by consulting the frame dimensions on the drawings. (3) and (4) were checked by measuring the feature-matched locations of the telephoto corners in the same wide-angle picture where this was possible (LO II, III and V).

The following table presents the camera geometry data.

| Mission | Camera Axis | | Frame Orientation deg. | Focal Length, mm | |
|---------|-------------|------------|------------------------|------------------|--------|
| | Cone deg. | Clock deg. | | T | WA |
| I | 0 | 0 | 0 | 208.203 | 80.025 |
| II | -.027 | .122 | -.007 | 609.6 | 79.875 |
| III | .090 | .059 | -.028 | 609.6 | 79.833 |
| IV | 0 | 0 | 0 | 610.771 | 79.895 |
| V | -.024 | .148 | -.107 | 608.702 | 79.842 |

| FRAME DIMENSIONS | WIDTH (X) mm | LENGTH (Y) mm |
|------------------|-----------------|------------------|
| TELEPHOTO | 54.991 | 218.999 |
| WIDE ANGLE | 54.991 | 64.999 |

USE FOR TYPEWRITTEN MATERIAL ONLY

7.0 STATE VECTORS

Presented in this section are the state vectors used in producing improved photo support data. They are in the form generated automatically by the orbit determination program as "reports": The epoch report, which gives the actual OD solution at the beginning of the tracking data arc, and the mapping report, which forwards the solution state vector to about one minute before the single exposure time or the first exposure time of a sequence.

USE FOR TYPEWRITTEN MATERIAL ONLY

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION I EPOCH REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|--------------|----------------|----------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 18. | 13. | 10. | 0.000 |
| AGINJ+2 | 598.05224609 | -3311.30722046 | -1143.93429565 | .93442082 | .15592415 | .29771051 | |

5.1 O.D. IDENTIFICATION NO. 1AC TAPE NO. 606Y

5.2 EPOCH DAY ²³⁰~~150~~, 13, 10, 0.000 GMT
 HR MIN SEC ITEM NO. 1
 SEQ. NO. 1
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 584.09411 | KM | DX | .93545885 | KM/SEC |
| Y | -3313.5070 | KM | DY | .15250778 | KM/SEC |
| Z | -1144.7766 | KM | DZ | .29621671 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 17.34 M | DX | .00107 M/S | X | 17.34 M | DX | .0011 M/S |
| Y | 82.73 M | DY | .03022 M/S | Y | 82.73 M | DY | .0302 M/S |
| Z | 253.9 M | DZ | .01682 M/S | Z | 253.9 M | DZ | .0168 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2765.43 | KM | ECC | .296425 | APF | 183.552 | DEG |
| LAN | 273.000 | DEG | INC | 12.1721 | IFP | -5782.43 | SEC |
| RCA | 1945.68 | KM | PALT | 207.593 | KM | PER | 217.500 |
| APO | 3585.17 | KM | AALT | 1047.08 | KM | TA | 191.708 |
| LAT | 3.18125 | DEG | LONG | 287.933 | DEG | | |

5.6 LUNAR HARMONICS USED, LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398001.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.33000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.48122671E-04 | C33 | -.14824341E-04 | C41 | -.51000000E-05 |
| C42 | -.69533934E-05 | C43 | +.62551049E-05 | C44 | +.94000000E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.34580001E-04 | S33 | -.36338681E-05 | S41 | -.10200000E-04 |
| S42 | +.34518174E-04 | S43 | +.10109306E-06 | S44 | +.17000000E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1764.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 356Y ITEM NO. 1

5.10 REMARKS: EPOCH REPORT

EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 194, 05 HR, 15 MIN
 PREPARED BY: J.E. HEDKALL 0900
 G.M.T. J.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|----------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 19. | 3. | 11. | 0.000 |
| AGINJ+2 | -1029.42648315 | -3048.55368042 | -1447.83425903 | .89278962 | -.45453013 | .04899934 | |

5.1 O.D. IDENTIFICATION NO. 1F26

TAPE NO. 403Y

5.2 EPOCH DAY ~~---~~ ²³¹, 3 ' 11 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 2

SEQ. NO. 2

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1042.8934 | KM | DX | .89119534 | KM/SEC |
| Y | -3044.8011 | KM | DY | -.45779669 | KM/SEC |
| Z | -1446.0923 | KM | DZ | .04759223 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 26.06 | M | DX | .00270 | M/S | X | 26.06 | M | DX | .0027 | M/S |
| Y | 160.1 | M | DY | .01630 | M/S | Y | 160.1 | M | DY | .0163 | M/S |
| Z | 302.1 | M | DZ | .05741 | M/S | Z | 302.1 | M | DZ | .0574 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2765.36 | KM | ECC | .296112 | APF | 184.017 | DEG | |
| LAN | 264.922 | DEG | INC | 12.1813 | DEG | TFP | 5530.32 | SEC |
| RCA | 1946.51 | KM | PALT | 208.416 | KM | PER | 217.493 | MIN |
| APO | 3584.22 | KM | AALT | 1846.13 | KM | TA | 164.237 | DEG |
| LAT | 357.538 | DEG | LONG | 253.434 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.37507789E-04 | C33 | -.49343639E-05 | C41 | -.51000000E-05 |
| C42 | +.54032547E-05 | C43 | +.58105719E-06 | C44 | -.15680056E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.43948106E-06 | S33 | +.16886071E-05 | S41 | -.10200000E-04 |
| S42 | +.30893382E-04 | S43 | +.36575660E-05 | S44 | -.62270501E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 126.67

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 684Y

ITEM NO. 2

5.10 REMARKS: EPOCH REPORT

10 HARMONICS IN SOLUTION.

TIME OF REPORT:
 DAY 194, 08 HR, 15 MIN

PREPARED BY: GEO. S. GOODWIN
 GMT C.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 19. 14. 20. 0.000
 AGINJ+2 -101.80384254 -3330.42822266 -1320.13645935
 .95469350 -.10844866 .19946036

5.1 O.D. IDENTIFICATION NO. 1F28 TAPE NO. 475Y
 5.2 EPOCH DAY ²³¹ ~~151~~, 14, 20, 0.000 GMT ITEM NO. 3
 HR MIN SEC SEQ. NO. 3
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 X -116.10763 KM DX .95460632 KM/SEC
 Y -3330.0689 KM DY -.11194028 KM/SEC
 Z -1319.8627 KM DZ .19794304 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI
 X 17.25 M DX .00432 M/S X 17.25 M DX .0043 M/S
 Y 108.1 M DY .01655 M/S Y 108.1 M DY .0166 M/S
 Z 261.4 M DZ .02770 M/S Z 261.4 M DZ .0277 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)
 SMA 2765.37 KM ECC .296021 APF 184.218 DEG
 LAN 258.639 DEG INC 12.1859 DEG TFP 6523.13 SEC
 RCA 1946.76 KM PALT 208.672 KM PER 217.493 MIN
 APO 3583.97 KM AALT 1845.88 KM TA 179.974 DEG
 LAT .884059 DEG LONG 262.737 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.207000000E-03 J30 -.445999999E-04 J40 -.209000000E-04
 C21 +.880000000E-05 C22 +.276000000E-04 C31 +.435000000E-04
 C32 +.32867934E-04 C33 -.26601069E-05 C41 -.510000000E-05
 C42 +.12644415E-04 C43 +.10158342E-05 C44 -.27576015E-06
 S21 -.411000000E-04 S22 -.579999998E-05 S31 +.170000000E-04
 S32 -.11960051E-04 S33 +.37681525E-05 S41 -.102000000E-04
 S42 +.31926437E-04 S43 +.59971710E-05 S44 -.79862911E-06

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 254.26

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 031Y ITEM NO. 3

5.10 REMARKS: EPOCH REPORT
 TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 207, 02 HR, 48 MIN PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|--------------|----|----------------|----|----------------|-------|
| AGINAT | 1. | 66. | 8. | 20. | 4. | 50. | 0.000 |
| AGINJ+2 | | -95.89986038 | | -3333.11120605 | | -1314.70195007 | |
| | | .95461202 | | -.10639200 | | .20044200 | |

5.1 O.D. IDENTIFICATION NO. 1F30 TAPE NO. 835Y

| | | | | | | | | | | | |
|-----------|-----|-----|----|---|-----|----|-----|-------|-----|----------|---|
| 5.2 EPOCH | DAY | 232 | HR | 4 | MIN | 50 | SEC | 0.000 | GMT | ITEM NO. | 4 |
| | | | | | | | | | | SEQ. NO. | 4 |
| | | | | | | | | | | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -110.20522 | KM | DX | .95453393 | KM/SEC |
| Y | -3332.7734 | KM | DY | -.10988339 | KM/SEC |
| Z | -1314.4375 | KM | DZ | .19892470 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 17.68 | M | DX | .00609 | M/S | X | 17.68 | M | DX | .0061 | M/S |
| Y | 93.11 | M | DY | .01125 | M/S | Y | 93.11 | M | DY | .0112 | M/S |
| Z | 226.9 | M | DZ | .03339 | M/S | Z | 226.9 | M | DZ | .0334 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2765.45 | KM | ECC | .296105 | APF | 184.592 | DEG |
| LAN | 250.367 | DEG | INC | 12.2032 | TFP | -6523.95 | SEC |
| RCA | 1946.58 | KM | PALT | 208.493 | PER | 217.502 | MIN |
| APO | 3584.31 | KM | AALT | 1846.22 | TA | 180.018 | DEG |
| LAT | .973398 | DEG | LONG | 254.873 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | +.16553562E-04 | C33 | +.84502982E-06 | C41 | -.510000000E-05 |
| C42 | +.21637898E-04 | C43 | +.32458116E-05 | C44 | -.58669616E-06 |
| S21 | -.411000000E-04 | S22 | -.57999998E-05 | S31 | +.170000000E-04 |
| S32 | -.24872345E-04 | S33 | +.47030492E-05 | S41 | -.102000000E-04 |
| S42 | +.22536398E-04 | S43 | +.56237223E-05 | S44 | -.50183188E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 180.67

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 418Y ITEM NO. 4

5.10 REMARKS: EPOCH REPORT
TEN HARMONICS IN THIS SOLUTION **

| | | | |
|-----------------|--------------------------|--------------|------------------|
| TIME OF REPORT: | DAY 207 , 04 HR , 38 MIN | PREPARED BY: | J.E.HEDWALL 0000 |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----------------|-----|----------------|-----|-------|
| AGINAT | 1. | 66. | 8. | 20. | 19. | 13. | 0.000 |
| AGINJ+2 | -489.31792831 | | -3259.82223511 | | -1384.62879944 | | |
| | .94139132 | | -.25264845 | | .14026356 | | |

5.1 O.D. IDENTIFICATION NO. 1F41

TAPE NO. 144Y

5.2 EPOCH DAY ²³² ~~150~~, 19 ' 13 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 5
 SEQ. NO. 5
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -503.46356 | KM | DX | .94068158 | KM/SEC |
| Y | -3258.0452 | KM | DY | -.25609220 | KM/SEC |
| Z | -1383.7401 | KM | DZ | .13877216 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 10.46 M | DX | .00704 M/S | X | 10.46 M | DX | .0070 M/S |
| Y | 70.63 M | DY | .00520 M/S | Y | 70.63 M | DY | .0052 M/S |
| Z | 172.7 M | DZ | .04630 M/S | Z | 172.7 M | DZ | .0463 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2765.57 | KM | ECC | .296367 | APF | 184.723 | DEG |
| LAN | 242.410 | DEG | INC | 12.1911 | TFP | 6107.87 | SEC |
| RCA | 1945.95 | KM | PALT | 207.858 | KM | PER | 217.517 |
| APO | 3585.20 | KM | AALT | 1847.11 | KM | TA | 173.441 |
| LAT | 359.612 | DEG | LONG | 240.615 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.81646702E-05 | C33 | +.38766376E-05 | C41 | -.51000000E-05 |
| C42 | +.34548481E-04 | C43 | +.78695919E-05 | C44 | -.12209478E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.36705768E-04 | S33 | +.54753732E-05 | S41 | -.10200000E-04 |
| S42 | +.23179701E-04 | S43 | +.71785665E-05 | S44 | -.20119626E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 530.66

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 876Y ITEM NO. 5

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | | |
|-----------------|--------------------------|--------------|--------------|
| TIME OF REPORT: | DAY 207 . 06 HR , 33 MIN | PREPARED BY: | J.A.BEACON |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 21. 10. 0. 0.000
 AGINJ+2 471.44537735 -3317.06878662 -1158.61526489
 .91798040 .14570839 .28560297

5.1 O.D. IDENTIFICATION NO. 1F44 TAPE NO. 962Y

5.2 EPOCH DAY ²³³ ~~150~~, 10 ' 0 ' 0.000 GMT ITEM NO. 7
 HR MIN SEC SEQ. NO. 7
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 457.44159 | KM | DX | .91896201 | KM/SEC |
| Y | -3318.8055 | KM | DY | .14235149 | KM/SEC |
| Z | -1159.2556 | KM | DZ | .28413546 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 4.953 | M | DX | .00574 | M/S | X | 4.953 | M | DX | .0057 | M/S |
| Y | 40.34 | M | DY | .00132 | M/S | Y | 40.34 | M | DY | .0013 | M/S |
| Z | 125.1 | M | DZ | .01979 | M/S | Z | 125.1 | M | DZ | .0198 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2693.19 | KM | ECC | .333278 | APF | 181.566 | DEG |
| LAN | 233.795 | DEG | INC | 12.0708 | TFP | -5421.83 | SEC |
| RCA | 1795.61 | KM | PALT | 57.5198 | PER | 209.034 | MIN |
| APO | 3590.77 | KM | AALT | 1852.68 | TA | 193.039 | DEG |
| LAT | 3.02268 | DEG | LONG | 248.091 | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | -.305464040E-04 | C33 | +.700525655E-05 | C41 | -.510000000E-05 |
| C42 | +.73782913E-05 | C43 | +.16201978E-05 | C44 | +.940000000E-07 |
| S21 | -.411000000E-04 | S22 | -.579999998E-05 | S31 | +.170000000E-04 |
| S32 | -.50921449E-05 | S33 | -.24772937E-05 | S41 | -.102000000E-04 |
| S42 | -.14674047E-04 | S43 | -.27147273E-05 | S44 | +.170000000E-06 |

5.7 DATA ARC LENGTH 0 HRS 0 MIN SUS= 1744.6

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS TAPE NO. 972Y ITEM NO. 7

5.10 REMARKS EPOCH REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT DAY 207, 09 HR, 06 MIN PREPARED BY GEO.S.GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 21. 23. 39. 0.000
 AGINJ+2 -471.64988327 -3281.82592773 -1377.25894165
 .91758032 -.21793775 .14631414

5.1 O.D. IDENTIFICATION NO. 1F48 TAPE NO. 732Y
 5.2 EPOCH DAY ²³³ ~~150~~, 23, 39, 0.000 GMT ITEM NO. 8
 HR MIN SEC SEQ. NO. 8
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -485.86641 | KM | DX | .91700753 | KM/SEC |
| Y | -3280.1129 | KM | DY | -.22129478 | KM/SEC |
| Z | -1376.3979 | KM | DZ | .14485930 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 4.492 | M | DX | .00817 | M/S | X | 4.492 | M | DX | .0082 | M/S |
| Y | 49.51 | M | DY | .00839 | M/S | Y | 49.51 | M | DY | .0084 | M/S |
| Z | 124.1 | M | DZ | .03882 | M/S | Z | 124.1 | M | DZ | .0388 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2693.40 | KM | ECC | .333712 | APF | 181.943 | DEG | |
| LAN | 226.074 | DEG | INC | 12.1089 | DEG | TFP | 6093.94 | SEC |
| RCA | 1794.58 | KM | PALT | 56.4937 | KM | PER | 209.059 | MIN |
| APO | 3592.22 | KM | AALT | 1854.13 | KM | TA | 177.294 | DEG |
| LAT | 359.840 | DEG | LONG | 225.328 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.37026476E-04 | C33 | +.62333655E-05 | C41 | -.51000000E-05 |
| C42 | +.24336206E-04 | C43 | +.86464692E-05 | C44 | +.85232741E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.71176666E-05 | S33 | -.42368055E-05 | S41 | -.10200000E-04 |
| S42 | -.17007959E-04 | S43 | -.71566056E-05 | S44 | +.11908773E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 960.01

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 227Y ITEM NO. 8

5.10 REMARKS: EPOCH REPORT
TEN HARMONICS IN THIS SOLUTION **

| | |
|------------------------|----------------------------------|
| TIME OF REPORT: | PREPARED BY: |
| DAY 208, 03 HR, 28 MIN | J.E.HEDWALL 0000 O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----------------|-----|----------------|----|-------|
| AGINAT | 1. | 66. | 8. | 22. | 3. | 7. | 0.000 |
| AGINJ+2 | -525.99254608 | | -3267.59890747 | | -1387.65217590 | | |
| | .91454897 | | -.23853843 | | .13656100 | | |

5.1 O.D. IDENTIFICATION NO. 1A1

TAPE NO.

234

ITEM NO.

5.2 EPOCH DAY 250 ; 3 ' 7 ' 0.000 GMT

SEQ. NO.

HR MIN SEC

COMPUTER

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -540.17338 | KM | DX | .91388515 | KM/SEC |
| Y | -3265.6870 | KM | DY | -.24188456 | KM/SEC |
| Z | -1386.7051 | KM | DZ | .13511163 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 3.775 | M | DX | .00483 | M/S | X | 3.775 | M | DX | .0048 | M/S |
| Y | 22.34 | M | DY | .00496 | M/S | Y | 22.34 | M | DY | .0050 | M/S |
| Z | 53.22 | M | DZ | .02353 | M/S | Z | 53.22 | M | DZ | .0235 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2693.41 | KM | ECC | .333782 | APF | 181.802 | DEG |
| LAN | 224.340 | DEG | INC | 12.0511 | TFP | 6032.48 | SEC |
| RCA | 1794.40 | KM | PALT | 56.3119 | PER | 209.060 | MIN |
| APO | 3592.43 | KM | AALT | 1854.34 | TA | 176.358 | DEG |
| LAT | 359.616 | DEG | LONG | 222.541 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.18850939E-04 | C33 | -.29309694E-05 | C41 | -.51000000E-05 |
| C42 | -.22394625E-04 | C43 | -.29528759E-07 | C44 | +.94000000E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.32626895E-04 | S33 | -.10257521E-04 | S41 | -.10200000E-04 |
| S42 | -.11753256E-04 | S43 | -.13102704E-05 | S44 | +.17000000E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 42493

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 243Y ITEM NO. 9

5.10 REMARKS: EPOCH REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 208 , 08 HR , 48 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|----------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 66. | 8. | 22. | 23. | 44. | 0.000 |
| AGINJ+2 | -1404.59104919 | -2852.71841431 | -1443.02685547 | .80424773 | -.58365429 | -.01988708 | |

5.1 O.D. IDENTIFICATION NO. 1F84

TAPE NO. 410Y

5.2 EPOCH DAY ²³⁴ ~~150~~, 23 : 44 : 0.000 GMT
 HR MIN SEC

ITEM NO. 10
 SEQ. NO. 10
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1417.3347 | KM | DX | .80207051 | KM/SEC |
| Y | -2847.5902 | KM | DY | -.58659858 | KM/SEC |
| Z | -1440.6936 | KM | DZ | -.02114945 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 13.93 | M | DX | .01989 | M/S | X | 13.93 | M | DX | .0199 | M/S |
| Y | 27.94 | M | DY | .03091 | M/S | Y | 27.94 | M | DY | .0309 | M/S |
| Z | 64.94 | M | DZ | .09299 | M/S | Z | 64.94 | M | DZ | .0930 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2693.53 | KM | ECC | .334577 | APF | 182.665 | DEG | |
| LAN | 212.490 | DEG | INC | 12.2099 | DEG | TFP | 4999.14 | SEC |
| RCA | 1792.34 | KM | PALT | 54.2483 | KM | PER | 209.074 | MIN |
| APO | 3594.73 | KM | AALT | 1856.64 | KM | TA | 160.291 | DEG |
| LAT | 356.446 | DEG | LONG | 195.810 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.26802807E-05 | C33 | +.91178538E-06 | C41 | -.51000000E-05 |
| C42 | -.22008095E-04 | C43 | -.82528566E-05 | C44 | -.14558056E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.76942089E-05 | S33 | -.17848739E-05 | S41 | -.10200000E-04 |
| S42 | -.69145398E-05 | S43 | +.55361971E-05 | S44 | -.13089192E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1081.5

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 659Y ITEM NO. 10

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 209 , 03 HR , 41 MIN
 PREPARED BY: J.A.BEACON
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 23. | 13. | 50. | 0.000 |
| AGINJ+2 | -891.08222198 | -3146.44491577 | -1423.30438232 | .88148647 | -.38246723 | .07624310 | |

5.1 O.D. IDENTIFICATION NO. 1F102

TAPE NO. 881Y

235
 5.2 EPOCH DAY ~~151~~, 13, 50, 0.000 GMT
 HR MIN SEC

ITEM NO. 11

SEQ. NO. 11

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -904.87682 | KM | DX | .88019902 | KM/SEC |
| Y | -3143.1957 | KM | DY | -.38569377 | KM/SEC |
| Z | -1421.7797 | KM | DZ | .07485076 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 96.00 | M | DX | .04957 | M/S | X | 96.00 | M | DX | .0496 | M/S |
| Y | 194.8 | M | DY | .07111 | M/S | Y | 194.8 | M | DY | .0711 | M/S |
| Z | 480.6 | M | DZ | .20444 | M/S | Z | 480.6 | M | DZ | .2044 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2693.54 | KM | ECC | .335093 | APF | 183.042 | DEG | |
| LAN | 204.620 | DEG | INC | 12.1924 | TFP | 5589.30 | SEC | |
| RCA | 1790.95 | KM | PALT | 52.8648 | KM | PER | 209.075 | MIN |
| APO | 3596.13 | KM | AALT | 1858.04 | KM | TA | 169.583 | DEG |
| LAT | 358.447 | DEG | LONG | 197.410 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.19811710E-04 | C33 | -.72938515E-06 | C41 | -.51000000E-05 |
| C42 | +.50023409E-05 | C43 | -.40173540E-05 | C44 | +.12604988E-05 |
| S21 | -.41100000E-04 | S22 | -.57999999E-05 | S31 | +.17000000E-04 |
| S32 | +.95514470E-05 | S33 | -.42152606E-05 | S41 | -.10200000E-04 |
| S42 | -.23477763E-04 | S43 | -.84914458E-05 | S44 | -.46581331E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 133.04

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 488Y ITEM NO. 11

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
 DAY 209, 05 HR, 30 MIN

PREPARED BY: J.E.HEDWALL 000
 O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 23. 21. 20. 0.000
 AGINJ+2 864.61686707 -3235.42770386 -1017.34059143
 .88258556 .29985907 .33507901

(5.1 O.D. IDENTIFICATION NO. 1A4 TAPE NO. 117Y
 (235 ITEM NO. 12
 (5.2 EPOCH DAY ~~151~~, 21, 20, 0.000 GMT SEQ. NO. 12
 (HR MIN SEC COMPUTER 6

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 851.12812 KM DX .88421182 KM/SEC
 (Y -3238.6029 KM DY .29663063 KM/SEC
 (Z -1018.6116 KM DZ .33366220 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 20.83 M DX .01041 M/S X 20.83 M DX .0104 M/S
 (Y 30.09 M DY .01628 M/S Y 30.09 M DY .0163 M/S
 (Z 80.34 M DZ .04129 M/S Z 80.34 M DZ .0413 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2693.34 KM ECC .335349 APF 183.153 DEG
 (LAN 200.515 DEG INC 12.1024 DEG TFP -5039.43 SEC
 (RCA 1790.13 KM PALT 52.0389 KM PER 209.051 MIN
 (APO 3596.55 KM AALT 1858.46 KM TA 199.026 DEG
 (LAT 4.53943 DEG LONG 222.247 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 -.11076339E-04 C33 +.15156033E-05 C41 -.51000000E-05
 C42 -.18413419E-04 C43 +.12104167E-04 C44 -.14949738E-05
 S21 -.41100000E-04 S22 -.57999999E-05 S31 +.17000000E-04
 S32 +.70052295E-05 S33 -.29077521E-05 S41 -.10200000E-04
 S42 +.18506801E-04 S43 +.92101213E-05 S44 +.93545960E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3170.7

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 709Y ITEM NO. 12

(5.10 REMARKS: EPOCH REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN (R)
 (DAY 210, 03 HR, 42 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 24. | 21. | 15. | 0.000 |
| AGINJ+2 | -661.84879303 | -3232.21932983 | -1399.85502625 | .90115954 | -.30035743 | .11533504 | |

(5.1 O.D. IDENTIFICATION NO. 1F115

TAPE NO. 757Y

(²³⁶

ITEM NO. 13

(5.2 EPOCH DAY ~~150~~, 21 ' 15 ' 0.000 GMT

SEQ. NO. 13

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -675.92682 | KM | DX | .90023492 | KM/SEC |
| Y | -3229.8083 | KM | DY | -.30365666 | KM/SEC |
| Z | -1398.6927 | KM | DZ | .11390813 | KM/SEC |

(5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 26.94 M | DX | .02171 M/S | X | 26.94 M | DX | .0217 M/S |
| Y | 20.97 M | DY | .03585 M/S | Y | 20.97 M | DY | .0359 M/S |
| Z | 40.24 M | DZ | .07565 M/S | Z | 40.24 M | DZ | .0757 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2693.39 | KM | ECC | .335809 | APF | 183.547 | DEG |
| LAN | 187.478 | DEG | INC | 12.3421 | DEG | TFP | 5804.57 |
| RCA | 1788.92 | KM | PALT | 50.8326 | KM | PER | 209.057 |
| APO | 3597.85 | KM | AALT | 1859.76 | KM | TA | 172.904 |
| LAT | 359.242 | DEG | LONG | 184.011 | DEG | | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.67472972E-05 | C33 | +.85590173E-05 | C41 | -.51000000E-05 |
| C42 | +.17993787E-04 | C43 | -.22565407E-04 | C44 | +.21700813E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.47119433E-04 | S33 | -.15968891E-05 | S41 | -.10200000E-04 |
| S42 | -.45530375E-04 | S43 | +.20870453E-06 | S44 | -.26549385E-05 |

(5.7 DATA ARC LENGTH: 0 HRS: 0 MIN SOS= 2786.2

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 023Y ITEM NO. 13

(5.10 REMARKS: EPOCH REPORT

(**TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 210 , 07 HR , 28 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 25. 5. 0. 0.000
 AGINJ+2 1786.60273743 -2654.16830444 -561.45117188
 .68306826 .72807632 .44901288

(5.1 O.D. IDENTIFICATION NO. 1A5 TAPE NO. 890Y
 (ITEM NO. 14
 (5.2 EPOCH DAY ²³⁷ ~~159~~ 5 0 0.000 GMT SEQ. NO. 14
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X 1775.9605 KM DX .68644859 KM/SEC
 (Y -2660.7172 KM DY .72557863 KM/SEC
 (Z -564.21212 KM DZ .44789956 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X 63.43 M DX .00780 M/S X 63.43 M DX .0078 M/S
 (Y 72.09 M DY .03087 M/S Y 72.09 M DY .0309 M/S
 (Z 148.9 M DZ .06129 M/S Z 148.9 M DZ .0613 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)
 (SMA 2693.41 KM ECC .335934 APF 183.830 DEG
 (LAN 183.102 DEG INC 12.1657 DEG TFP -3924.33 SEC
 (RCA 1788.60 KM PALT 50.5114 KM PER 209.059 MIN
 (APO 3598.22 KM AALT 1860.13 KM TA 218.086 DEG
 (LAT 8.09297 DEG LONG 224.371 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 -.28904608E-04 C33 +.36279928E-05 C41 -.51000000E-05
 C42 -.17785355E-04 C43 -.29859120E-05 C44 -.14658145E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 -.52391494E-05 S33 -.57245871E-05 S41 -.10200000E-04
 S42 -.25817629E-04 S43 +.12195016E-04 S44 -.41449321E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1242.4

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 134Y ITEM NO. 14

(5.10 REMARKS: EPOCH REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (

(TIME OF REPORT: PREPARED BY: J.A.BEACON (R)
 (DAY 211, 03 HR, 06 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

AGINAT 1. 66. 8. 25. 18. 0. 0.000
 AGINJ+2 -1005.30260468 -3040.89886475 -1413.25880432
 .87044982 -.45247468 .04692884

(5.1 O.D. IDENTIFICATION NO. 1F134

TAPE NO. 259Y

(237

ITEM NO. 15

(5.2 EPOCH DAY ~~150~~, 18 ' 0 ' 0.000 GMT
 (HR MIN SEC

SEQ. NO. 15
 COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1018.7008 KM DX .86885826 KM/SEC
 (Y -3037.2294 KM DY -.45566284 KM/SEC
 (Z -1411.5547 KM DZ .04555565 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 9.853 M DX .01543 M/S X 9.853 M DX .0154 M/S
 (Y 49.82 M DY .02453 M/S Y 49.82 M DY .0245 M/S
 (Z 99.65 M DZ .04565 M/S Z 99.65 M DZ .0457 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2669.84 KM ECC .333582 APF 185.188 DEG
 (LAN 176.131 DEG INC 12.1907 DEG TFP 5227.29 SEC
 (RCA 1779.23 KM PALT 41.1366 KM PER 206.321 MIN
 (APO 3560.45 KM AALT 1822.36 KM TA 164.997 DEG
 (LAT 357.937 DEG LONG 166.533 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.38000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 -.22837791E-04 C33 -.13612533E-05 C41 -.51000000E-05
 C42 -.21238900E-04 C43 +.10366451E-04 C44 -.40481617E-06
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 +.25465209E-04 S33 -.52536081E-05 S41 -.10200000E-04
 S42 -.35537685E-05 S43 +.27543596E-05 S44 +.13771513E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 946.52

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 560Y

ITEM NO. 15

(5.10 REMARKS: EPOCH REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT:
 DAY 211, 05 HR, 35 MIN

PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----------------|-----|----------------|----|-------|
| AGINAT | 1. | 66. | 8. | 26. | 1. | 0. | 0.000 |
| AGINJ+2 | -600.14809418 | | -3210.05072021 | | -1374.08584595 | | |
| | .91168024 | | -.29415322 | | .11649156 | | |

(5.1 O.D. IDENTIFICATION NO. 1F138 TAPE NO. 660Y

(238 ITEM NO. 16

(5.2 EPOCH DAY 150 , 1 ' 0 ' 0.000 GMT SEQ. NO. 16

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -614.10842 | KM | DX | .91077985 | KM/SEC |
| Y | -3207.8649 | KM | DY | -.29749204 | KM/SEC |
| Z | -1373.0221 | KM | DZ | .11504727 | KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 56.95 | M | DX | .03259 | M/S | X | 56.95 | M | DX | .0326 | M/S |
| Y | 92.15 | M | DY | .05971 | M/S | Y | 92.15 | M | DY | .0597 | M/S |
| Z | 173.5 | M | DZ | .10306 | M/S | Z | 173.5 | M | DZ | .1031 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2669.91 | KM | ECC | .333501 | APF | 185.435 | DEG | |
| LAN | 172.201 | DEG | INC | 12.1199 | DEG | TFP | 5671.21 | SEC |
| RCA | 1779.50 | KM | PALT | 41.4062 | KM | PER | 206.330 | MIN |
| APO | 3560.33 | KM | AALT | 1822.24 | KM | TA | 171.977 | DEG |
| LAT | 359.457 | DEG | LONG | 169.671 | DEG | | | |

(5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.27749752E-04 | C33 | -.56955633E-05 | C41 | -.51000000E-05 |
| C42 | -.43432842E-04 | C43 | +.17897547E-04 | C44 | -.74730258E-06 |
| S21 | -.41100000E-04 | S22 | -.57999999E-05 | S31 | +.17000000E-04 |
| S32 | +.57566072E-04 | S33 | -.48375117E-05 | S41 | -.10200000E-04 |
| S42 | -.13124714E-06 | S43 | +.64448358E-05 | S44 | +.22764113E-05 |

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 243.66

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 868Y ITEM NO. 16

(5.10REMARKS' EPOCH REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

| | | | |
|-----------------|--------------------------|--------------|------------------|
| TIME OF REPORT' | DAY 211 , 07 HR , 07 MIN | PREPARED BY' | J.E.HEDWALL 0000 |
| | | | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 8. 26. 14. 35. 0.000
 AGINJ+2 -1127.10862732 -2969.93075562 -1415.26573181
 .85330842 -.50465866 .02157978

(5.1 O.D. IDENTIFICATION NO. 1F139 TAPE NO. 136Y
 (238 ITEM NO. 17
 (5.2 EPOCH DAY ~~150~~, 14 ' 35 ' 0.000 GMT SEQ. NO. 17
 (HR MIN SEC COMPUTER 8

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1140.2516 KM DX .85148481 KM/SEC
 (Y -2965.8144 KM DY -.50778496 KM/SEC
 (Z -1413.3690 KM DZ .02023543 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 6.271 M DX .00851 M/S X 6.271 M DX .0085 M/S
 (Y 41.94 M DY .01294 M/S Y 41.94 M DY .0129 M/S
 (Z 88.20 M DZ .02010 M/S Z 88.20 M DZ .0201 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2669.93 KM ECC .333336 APF 185.638 DEG
 (LAN 164.790 DEG INC 12.1160 DEG TFP 5060.14 SEC
 (RCA 1779.94 KM PALT 41.8539 KM PER 206.332 MIN
 (APO 3559.91 KM AALT 1821.82 KM TA 162.302 DEG
 (LAT 357.487 DEG LONG 152.991 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 +.68871411E-04 C33 -.22885600E-06 C41 -.51000000E-05
 C42 +.15983978E-04 C43 +.18810070E-05 C44 +.21840364E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 +.33109650E-04 S33 +.10352016E-04 S41 -.10200000E-04
 S42 +.49983465E-04 S43 -.21006599E-04 S44 -.24974189E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2919.0

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 725Y ITEM NO. 17

(5.10 REMARKS: EPOCH REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
 (DAY 211, 08 HR, 45 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|----------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 66. | 8. | 27. | 0. | 49. | 0.000 |
| AGINJ+2 | -1362.73550415 | -2811.01620483 | -1412.67993164 | .81149458 | -.60353094 | -.02660267 | |

5.1 O.D. IDENTIFICATION NO. 1F150 TAPE NO. 153Y

5.2 EPOCH DAY ²³⁹~~151~~, 0 : 49 : 0.000 GMT
 HR MIN SEC ITEM NO. 18
 SEQ. NO. 18
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1375.2908 | KM | DX | .80923153 | KM/SEC |
| Y | -2806.0360 | KM | DY | -.60650478 | KM/SEC |
| Z | -1410.4122 | KM | DZ | -.02787711 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 9.838 | M | DX | .01318 | M/S | X | 9.838 | M | DX | .0132 | M/S |
| Y | 83.25 | M | DY | .02162 | M/S | Y | 83.25 | M | DY | .0216 | M/S |
| Z | 136.3 | M | DZ | .02769 | M/S | Z | 136.3 | M | DZ | .0277 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2669.63 | KM | ECC | .333107 | APF | 185.866 | DEG | |
| LAN | 159.102 | DEG | INC | 12.1050 | DEG | TFP | 4766.41 | SEC |
| RCA | 1780.36 | KM | PALT | 42.2674 | KM | PER | 206.297 | MIN |
| APO | 3558.90 | KM | AALT | 1820.81 | KM | TA | 157.495 | DEG |
| LAT | 356.558 | DEG | LCNG | 142.814 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.10594639E-04 | C33 | +.13492725E-05 | C41 | -.51000000E-05 |
| C42 | -.35712645E-05 | C43 | +.27548141E-05 | C44 | -.25816604E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.22599166E-05 | S33 | -.23579815E-05 | S41 | -.10200000E-04 |
| S42 | -.91510330E-05 | S43 | +.35993876E-07 | S44 | +.51103359E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 932.79

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 653Y ITEM NO. 18

5.10 REMARKS: EPOCH REPORT.

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 213, 03 HR, 23 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|----------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 27. | 21. | 30. | 0.000 |
| AGINJ+2 | -1185.53944397 | -2929.59326172 | -1409.83612061 | .84473646 | -.53226084 | .00818767 | |

5.1 O.D. IDENTIFICATION NO. 1F153

TAPE NO. 190Y

5.2 EPOCH DAY ²³⁹~~151~~, 21 ' 30 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 19

SEQ. NO. 19

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1198.5290 | KM | DX | .84278974 | KM/SEC |
| Y | -2925.2618 | KM | DY | -.53535673 | KM/SEC |
| Z | -1407.8461 | KM | DZ | .00685768 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 7.207 M | DX | .00743 M/S | X | 7.207 M | DX | .0074 M/S |
| Y | 37.05 M | DY | .01214 M/S | Y | 37.05 M | DY | .0121 M/S |
| Z | 73.21 M | DZ | .01186 M/S | Z | 73.21 M | DZ | .0119 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2669.62 | KM | ECC | .332545 | APF | 186.362 | DEG |
| LAN | 147.539 | DEG | INC | 12.0406 | TFP | 4962.86 | SEC |
| RCA | 1781.85 | KM | PALT | 43.7611 | KM | PER | 206.296 |
| APO | 3557.39 | KM | AALT | 1819.30 | KM | TA | 160.709 |
| LAT | 357.325 | DEG | LONG | 134.885 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.16589525E-04 | C33 | +.53233069E-05 | C41 | -.51000000E-05 |
| C42 | +.87703593E-05 | C43 | +.12383097E-05 | C44 | +.94000000E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.87152475E-05 | S33 | -.60471272E-06 | S41 | -.10200000E-04 |
| S42 | +.82899532E-05 | S43 | -.39742925E-05 | S44 | +.17000000E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4422.5

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 533Y ITEM NO. 19

5.10 REMARKS: EPOCH REPORT

EIGHT HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 213 , 06 HR , 53 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 66. | 8. | 28. | 11. | 20. | 0.000 |
| AGINJ+2 | -922.95381165 | -3075.93408203 | -1393.00555420 | .88283277 | -.42684675 | .05586570 | |

5.1 O.D. IDENTIFICATION NO. 1F173

TAPE NO

ITEM NO

5.2 EPOCH DAY ²⁴⁰ ~~150~~ , 11 ' 20 ' 0.000 GMT

HR MIN SEC

SEQ. NO.

COMPUTER

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -936.45698 | KM | DX | .88134844 | KM/SEC |
| Y | -3072.5646 | KM | DY | -.43008218 | KM/SEC |
| Z | -1391.4290 | KM | DZ | .05447131 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 9.341 M | DX | .00936 M/S | X | 9.341 M | DX | .0094 M/S |
| Y | 43.25 M | DY | .01690 M/S | Y | 43.25 M | DY | .0169 M/S |
| Z | 93.18 M | DZ | .01661 M/S | Z | 93.18 M | DZ | .0166 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2669.75 | KM | ECC | .332159 | APF | 186.979 | DEG |
| LAN | 139.513 | DEG | INC | 11.9072 | TFP | 5256.48 | SEC |
| RCA | 1782.97 | KM | PALT | 44.8809 | KM | PER | 206.311 |
| APO | 3556.54 | KM | AALT | 1818.45 | KM | TA | 165.427 |
| LAT | 358.437 | DEG | LONG | 132.080 | DEG | | |

5.6 LUNAR HARMONICS USED LRC II/II MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.73747759E-04 | C33 | +.18482260E-04 | C41 | -.51000000E-05 |
| C42 | +.70966437E-04 | C43 | -.14944764E-04 | C44 | -.11979043E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.80096280E-04 | S33 | +.16280469E-05 | S41 | -.10200000E-04 |
| S42 | +.21756226E-04 | S43 | -.26687657E-05 | S44 | -.15390767E-05 |

5.7 DATA ARC LENGTH 0 HRS 0 MIN SOS= 3519.2

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS TAPE NO. 218Y ITEM NO. 20

5.10 REMARKS EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT DAY 214 , 06 HR , 07 MIN

PREPARED BY J.E.HEDWALL 0000 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|----------------|-----|----------------|----|-------|
| AGINAT | 1. | 66. | 8. | 29. | 1. | 0. | 0.000 |
| AGINJ+2 | -1180.27842712 | | -2932.24575806 | | -1398.13099670 | | |
| | .84677722 | | -.53221353 | | .00755247 | | |

5.1 O.D. IDENTIFICATION NO. 1F175 TAPE NO. 654Y
 5.2 EPOCH DAY ²⁴¹ ~~150~~, 1 ' 0 ' 0.000 GMT ITEM NO. 21
 HR MIN SEC SEQ. NO. 21
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1193.2616 | KM | DX | .84482925 | KM/SEC |
| Y | -2927.9329 | KM | DY | -.53531754 | KM/SEC |
| Z | -1396.1481 | KM | DZ | .00621913 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 13.37 | M | DX | .01284 | M/S | X | 13.37 | M | DX | .0128 | M/S |
| Y | 78.46 | M | DY | .01994 | M/S | Y | 78.46 | M | DY | .0199 | M/S |
| Z | 161.2 | M | DZ | .00961 | M/S | Z | 161.2 | M | DZ | .0096 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2669.42 | KM | ECC | .331741 | APF | 187.430 | DEG | |
| LAN | 131.706 | DEG | INC | 11.9070 | TFP | 4949.56 | SEC | |
| RCA | 1783.87 | KM | PALT | 45.7767 | KM | PER | 206.273 | MIN |
| APO | 3554.98 | KM | AALT | 1816.89 | KM | TA | 160.472 | DEG |
| LAT | 357.522 | DEG | LONG | 119.861 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.13985054E-04 | C33 | +.28779100E-05 | C41 | -.51000000E-05 |
| C42 | +.21748216E-04 | C43 | +.60455638E-06 | C44 | +.94000000E-07 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.29308482E-04 | S33 | -.95967056E-05 | S41 | -.10200000E-04 |
| S42 | -.11147256E-04 | S43 | -.21004513E-05 | S44 | +.17000000E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 14790

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 601Y ITEM NO. 21

5.10 REMARKS: EPOCH REPORT
 ****EIGHT HARMONICS IN THIS SOLUTION ****

TIME OF REPORT: DAY 214, 05 HR, 23 MIN
 PREPARED BY: GEO. S. GOODWIN
 O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION I MAP TIME REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A0 TAPE NO. 606Y

5.2 EPOCH DAY ~~50~~ ²³⁰, 14 ' 42 ' 0.000 GMT
 HR MIN SEC ITEM NO. 1
 SEQ. NO. 1
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 521.01297 | KM | DX | -1.7072376 | KM/SEC |
| Y | 1710.6465 | KM | DY | .51470557 | KM/SEC |
| Z | 799.37882 | KM | DZ | -.23095517 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 33.04 M | DX | .01136 M/S | X | 33.04 M | DX | .0114 M/S |
| Y | 69.51 M | DY | .04203 M/S | Y | 69.51 M | DY | .0420 M/S |
| Z | 137.8 M | DZ | .04267 M/S | Z | 137.8 M | DZ | .0427 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2765.35 | KM | ECC | .296379 | APF | 183.484 | DEG |
| LAN | 272.195 | DEG | INC | 12.1648 | TFP | -261.260 | SEC |
| RCA | 1945.76 | KM | PALT | 207.673 | PER | 217.492 | MIN |
| APO | 3584.95 | KM | AALT | 1346.86 | TA | 346.158 | DEG |
| LAT | 2.17130 | DEG | LONG | 82.0648 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 602.41

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 358Y ITEM NO. 1

5.10 REMARKS: MAP TIME REPORT

EIGHT HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 194 , 05 HR , 21 MIN | GMT | U.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F25 TAPE NO. 606Y
 5.2 EPOCH DAY ²³⁰~~159~~, 21 ' 55 ' 0.000 GMT ITEM NO. 1
 SEQ. NO. 1

HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 718.99417 | KM | DX | -1.6599033 | KM/SEC |
| Y | 1643.7641 | KM | DY | .64138495 | KM/SEC |
| Z | 622.10874 | KM | DZ | -.16970545 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 144.4 | M | DX | .03638 | M/S | X | 144.4 | M | DX | .0364 | M/S |
| Y | 99.63 | M | DY | .09788 | M/S | Y | 99.63 | M | DY | .0979 | M/S |
| Z | 136.2 | M | DZ | .08085 | M/S | Z | 136.2 | M | DZ | .0808 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2765.27 | KM | ECC | .296155 | APF | 183.674 | DEG |
| LAN | 268.086 | DEG | INC | 12.1636 | TFP | -379.543 | SEC |
| RCA | 1946.32 | KM | PALT | 208.230 | PER | 217.482 | MIN |
| APO | 3584.22 | KM | AALT | 1846.13 | TA | 339.998 | DEG |
| LAT | 3.39596 | DEG | LONG | 72.1057 | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 358Y ITEM NO. 1

5.10 REMARKS' MAP TIME REPORT
 -EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT' DAY 194 , 05 HR , 25 MIN
 PREPARED BY' J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F26

TAPE NO. 403Y

231

ITEM NO. 2

5.2 EPOCH DAY ~~17~~, 5 ' 11 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 2

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 614.42135 | KM | DX | -1.6864000 | KM/SEC |
| Y | 1682.9448 | KM | DY | .57422028 | KM/SEC |
| Z | 809.04971 | KM | DZ | -.20310000 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 99.91 M | DX | .01293 M/S | X | 99.91 M | DX | .0129 M/S |
| Y | 94.49 M | DY | .05913 M/S | Y | 94.49 M | DY | .0591 M/S |
| Z | 168.2 M | DZ | .09727 M/S | Z | 168.2 M | DZ | .0973 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2765.22 | KM | ECC | .296006 | APF | 183.942 | DEG | |
| LAN | 263.858 | DEG | INC | 12.1716 | DEG | TFP | -317.532 | SEC |
| RCA | 1946.70 | KM | PALT | 208.607 | KM | PER | 217.476 | MIN |
| APO | 3583.74 | KM | AALT | 1845.65 | KM | TA | 343.226 | DEG |
| LAT | 2.68389 | DEG | LONG | 71.3051 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -450.21

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 684Y ITEM NO. 2

5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 194, 08 HR, 21 MINPREPARED BY: GEO.S.GOODWIN
J.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F27

TAPE NO. 403Y

5.2 EPOCH DAY ~~194~~²³¹, 8 ' 48 ' 0.000 GMT
HR MIN SEC

ITEM NO. 2
SEQ. NO. 2
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 662.86189 | KM | DX | -1.6744945 | KM/SEC |
| Y | 1666.2993 | KM | DY | .60509695 | KM/SEC |
| Z | 814.28656 | KM | DZ | -.18822582 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 286.4 | M | DX | .06158 | M/S | X | 286.4 | M | DX | .0616 | M/S |
| Y | 125.4 | M | DY | .16975 | M/S | Y | 125.4 | M | DY | .1698 | M/S |
| Z | 164.5 | M | DZ | .14011 | M/S | Z | 164.5 | M | DZ | .1401 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2765.20 | KM | ECC | .295964 | APF | 184.023 | DEG |
| LAN | 261.807 | DEG | INC | 12.1731 | TFP | -346.622 | SEC |
| RCA | 1946.80 | KM | PALT | 208.713 | PER | 217.474 | MIN |
| APO | 3583.60 | KM | AALT | 1845.51 | TA | 341.713 | DEG |
| LAT | 2.97818 | DEG | LONG | 67.8514 | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 684Y ITEM NO. 2

5.10 REMARKS' MAP TIME REPORT
10 HARMONICS.

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT' | PREPARED BY' | GEO.S.GOODWIN |
| DAY 194 , 08 HR , 24 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F28 TAPE NO. 475Y
 231 ITEM NO. 3
 5.2 EPOCH DAY ~~151~~ 17 4 0.000 GMT SEQ. NO. 3
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2502.0613 | KM | DX | .30625480 | KM/SEC |
| Y | -1252.0875 | KM | DY | -1.1227186 | KM/SEC |
| Z | -1117.3718 | KM | DZ | -.35733087 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 48.02 M | DX | .02488 M/S | X | 48.02 M | DX | .0249 M/S |
| Y | 88.29 M | DY | .02752 M/S | Y | 88.29 M | DY | .0275 M/S |
| Z | 73.07 M | DZ | .09497 M/S | Z | 73.07 M | DZ | .0950 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2765.76 | KM | ECC | .295888 | APF | 184.319 | DEG | |
| LAN | 257.075 | DEG | INC | 12.1890 | DEG | TFP | 3313.95 | SEC |
| RCA | 1947.40 | KM | PALT | 209.312 | KM | PER | 217.539 | MIN |
| APO | 3584.11 | KM | AALT | 1846.02 | KM | TA | 123.277 | DEG |
| LAT | 350.370 | DEG | LONG | 205.305 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -294.60

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 031Y ITEM NO. 3

5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 207 , 02 HR , 51 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F31

TAPE NO. 835Y

5.2 EPOCH DAY ²³²~~150~~, 13, 46, 0.000 GMT
 HR MIN SEC

ITEM NO. 4
 SEQ. NO. 4
 COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 848.51275 | KM | DX | -1.6209266 | KM/SEC |
| Y | 1592.9001 | KM | DY | .72079363 | KM/SEC |
| Z | 828.78732 | KM | DZ | -.13163901 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 326.5 | M | DX | .10249 | M/S | X | 326.5 | M | DX | .1025 | M/S |
| Y | 145.6 | M | DY | .19914 | M/S | Y | 145.6 | M | DY | .1991 | M/S |
| Z | 90.42 | M | DZ | .14935 | M/S | Z | 90.42 | M | DZ | .1494 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2765.34 | KM | ECC | .296257 | APF | 184.659 | DEG | |
| LAN | 245.395 | DEG | INC | 12.2009 | DEG | TFP | -461.244 | SEC |
| RCA | 1946.09 | KM | PALT | 207.997 | KM | PER | 217.490 | MIN |
| APO | 3584.59 | KM | AALT | 1846.50 | KM | TA | 335.793 | DEG |
| LAT | 4.05506 | DEG | LONG | 46.2560 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 418Y ITEM NO. 4

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
 DAY 207, 04 HR, 44 MIN

PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F35

TAPE NO. 835Y

232

ITEM NO. 4

5.2 EPOCH DAY ~~150~~, 14 ' 51 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 4

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2457.9608 | KM | DX | .36188287 | KM/SEC |
| Y | -1395.9314 | KM | DY | -1.0940434 | KM/SEC |
| Z | -1159.4305 | KM | DZ | -.32994825 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 121.7 M | DX | .10557 M/S | X | 121.7 M | DX | .1056 M/S |
|---|---------|----|------------|---|---------|----|-----------|

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| Y | 249.7 M | DY | .05587 M/S | Y | 249.7 M | DY | .0559 M/S |
| Z | 103.6 M | DZ | .09576 M/S | Z | 103.6 M | DZ | .0958 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2765.85 | KM | ECC | .296166 | APF | 184.822 | DEG |
| LAN | 244.709 | DEG | INC | 12.2151 | DEG | TFP | 3437.76 |
| RCA | 1946.70 | KM | PALT | 208.609 | KM | PER | 217.550 |
| APO | 3585.00 | KM | AALT | 1846.91 | KM | TA | 126.010 |
| LAT | 350.788 | DEG | LONG | 196.191 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 418Y ITEM NO. 4

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 207, 04 HR, 47 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F41
 232
 TAPE NO. 144Y
 ITEM NO. 5
 5.2 EPOCH DAY ~~150~~, 21 ' 0 ' 0.000 GMT
 HR MIN SEC
 SEQ. NO. 5
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 943.04188 | KM | DX | -1.5886478 | KM/SEC |
| Y | 1548.2991 | KM | DY | .77798580 | KM/SEC |
| Z | 835.54720 | KM | DZ | -.10058330 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 39.87 M | DX | .01349 M/S | X | 39.87 M | DX | .0135 M/S |
| Y | 45.66 M | DY | .01658 M/S | Y | 45.66 M | DY | .0166 M/S |
| Z | 59.33 M | DZ | .10400 M/S | Z | 59.33 M | DZ | .1040 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2765.44 | KM | ECC | .296477 | APF | 184.625 | DEG |
| LAN | 241.491 | DEG | INC | 12.1786 | DEG | TFP | -520.654 |
| RCA | 1945.55 | KM | PALT | 207.457 | KM | PER | 217.501 |
| APO | 3585.33 | KM | AALT | 1847.24 | KM | TA | 332.761 |
| LAT | 4.65294 | DEG | LONG | 39.3359 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 523.11

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 876Y ITEM NO. 5

5.10 REMARKS: MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 207 , 06 HR , 37 MIN
 PREPARED BY: J.A.BEACON
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F42

TAPE NO. 144Y

5.2 EPOCH DAY ²³³~~159~~, 4 : 14 : 0.000 GMT

ITEM NO. 5

SEQ. NO. 5

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 1035.9671 | KM | DX | -1.5532559 | KM/SEC |
| Y | 1500.5212 | KM | DY | .83300753 | KM/SEC |
| Z | 839.79562 | KM | DZ | -.07071514 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 253.0 | M | DX | .09816 | M/S | X | 253.0 | M | DX | .0982 | M/S |
| Y | 140.7 | M | DY | .14205 | M/S | Y | 140.7 | M | DY | .1420 | M/S |
| Z | 56.79 | M | DZ | .14714 | M/S | Z | 56.79 | M | DZ | .1471 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2765.50 | KM | ECC | .296730 | APF | 184.764 | DEG | |
| LAN | 237.426 | DEG | INC | 12.1801 | DEG | TFP | -580.464 | SEC |
| RCA | 1944.89 | KM | PALT | 206.805 | KM | PER | 217.509 | MIN |
| APO | 3586.11 | KM | AALT | 1848.02 | KM | TA | 329.737 | DEG |
| LAT | 5.21128 | DEG | LONG | 32.4304 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 876Y ITEM NO. 5

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 207, 06 HR, 40 MINPREPARED BY: J.A.BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F44

TAPE NO. 962Y

233

ITEM NO. 7

5.2 EPOCH DAY ~~150~~, 11 ' 27 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 7

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 532.14136 | KM | DX | -1.7908354 | KM/SEC |
| Y | 1562.0850 | KM | DY | .59628715 | KM/SEC |
| Z | 732.29795 | KM | DZ | -.21910334 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 22.42 M | DX | .00924 M/S | X | 22.42 M | DX | .0092 M/S |
| Y | 22.14 M | DY | .00997 M/S | Y | 22.14 M | DY | .0100 M/S |
| Z | 40.44 M | DZ | .07130 M/S | Z | 40.44 M | DZ | .0713 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2693.28 | KM | ECC | .333439 | APF | 181.583 | DEG |
| LAN | 232.984 | DEG | INC | 12.0882 | DEG | TFP | -200.983 |
| RCA | 1795.23 | KM | PALT | 57.1443 | KM | PER | 209.044 |
| APO | 3591.33 | KM | AALT | 1853.24 | KM | TA | 347.806 |
| LAT | 2.21006 | DEG | LONG | 42.6032 | DEG | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 1340.9

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 972Y ITEM NO. 7

5.10 REMARKS' MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT'

DAY 207 , 09 HR , 09 MIN

PREPARED BY'

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F46

TAPE NO. 962Y

5.2 EPOCH DAY ²³³~~150~~, 18 ' 22 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 7
 SEQ. NO. 7
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 849.60446 | KM | DX | -1.6884384 | KM/SEC |
| Y | 1432.3976 | KM | DY | .81960229 | KM/SEC |
| Z | 761.48424 | KM | DZ | -.10843281 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 101.6 M | DX | .03299 M/S | X | 101.6 M | DX | .0330 M/S |
| Y | 59.14 M | DY | .05879 M/S | Y | 59.14 M | DY | .0588 M/S |
| Z | 31.76 M | DZ | .09961 M/S | Z | 31.76 M | DZ | .0996 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2693.66 | KM | ECC | .333794 | APF | 181.722 | DEG |
| LAN | 229.111 | DEG | INC | 12.0999 | TFP | -384.033 | SEC |
| RCA | 1794.53 | KM | PALT | 56.4400 | KM | PER | 209.088 |
| APD | 3592.78 | KM | AALT | 1854.69 | KM | TA | 336.910 |
| LAT | 4.38022 | DEG | LONG | 28.1762 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 972Y ITEM NO. 7

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 207, 09 HR, 12 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F48 TAPE NO. 732Y
 234 ITEM NO. 8
 5.2 EPOCH DAY ~~150~~, 1 ' 22 ' 0.000 GMT SEQ. NO. 8
 HR MIN SEC COMPUTER 6

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 646.65775 | KM | DX | -1.7603203 | KM/SEC |
| Y | 1520.2917 | KM | DY | .67830002 | KM/SEC |
| Z | 743.80579 | KM | DZ | -.18123450 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 22.53 | M | DX | .01632 | M/S | X | 22.53 | M | DX | .0163 | M/S |
| Y | 19.23 | M | DY | .02270 | M/S | Y | 19.23 | M | DY | .0227 | M/S |
| Z | 45.26 | M | DZ | .08527 | M/S | Z | 45.26 | M | DZ | .0853 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2693.57 | KM | ECC | .334054 | APF | 181.888 | DEG | |
| LAN | 225.181 | DEG | INC | 12.1141 | DEG | TFP | -267.646 | SEC |
| RCA | 1793.77 | KM | PALT | 55.6842 | KM | PER | 209.078 | MIN |
| APO | 3593.37 | KM | AALT | 1855.28 | KM | TA | 343.785 | DEG |
| LAT | 2.97678 | DEG | LONG | 31.1602 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 949.20

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 227Y ITEM NO. 8

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:

DAY 208 , 03 HR , 31 MIN

PREPARED BY:

GMT

J.E.HEDWALL 0000

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F50 TAPE NO. 732Y

5.2 EPOCH DAY ²³⁴ 150, 8 : 23 : 0.000 GMT
HR MIN SEC ITEM NO. 8
SEQ. NO. 8
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 327.10540 KM DX -1.8332734 KM/SEC
Y 1619.7784 KM DY .44397126 KM/SEC
Z 701.34907 KM DZ -.28972374 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 100.5 M DX .01886 M/S X 100.5 M DX .0189 M/S
Y 40.10 M DY .07496 M/S Y 40.10 M DY .0750 M/S
Z 70.05 M DZ .09694 M/S Z 70.05 M DZ .0969 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2693.60 KM ECC .334345 APF 182.046 DEG
LAN 221.267 DEG INC 12.1274 DEG TFP -91.7049 SEC
RCA 1793.01 KM PALT 54.9204 KM PER 209.082 MIN
APO 3594.20 KM AALT 1856.11 KM TA 354.407 DEG
LAT .744623 DEG LONG 37.7993 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 227Y ITEM NO. 8

5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 208, 03 HR, 35 MIN
PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST GMT

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A1 TAPE NO. 403Y
 234 ITEM NO. 9
 5.2 EPOCH DAY ~~150~~, 15, 22, 0.000 GMT SEQ. NO. 9
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 221.90895 | KM | DX | -1.8473075 | KM/SEC |
| Y | 1642.1162 | KM | DY | .36380386 | KM/SEC |
| Z | 684.02192 | KM | DZ | -.32331076 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 63.28 | M | DX | .01029 | M/S | X | 63.28 | M | DX | .0103 | M/S |
| Y | 18.90 | M | DY | .04655 | M/S | Y | 18.90 | M | DY | .0466 | M/S |
| Z | 34.20 | M | DZ | .05498 | M/S | Z | 34.20 | M | DZ | .0550 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2693.50 | KM | ECC | .334574 | APF | 182.100 | DEG | |
| LAN | 217.514 | DEG | INC | 12.1104 | DEG | TFP | -36.8063 | SEC |
| RCA | 1792.33 | KM | PALT | 54.2367 | KM | PER | 209.071 | MIN |
| APO | 3594.68 | KM | AALT | 1856.59 | KM | TA | 357.752 | DEG |
| LAT | .031008 | DEG | LONG | 37.3698 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 42381

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 243Y ITEM NO. 9

5.10 REMARKS: MAP TIME REPORT
 *EIGHT HARMONICS IN THIS SOLUTION *****

| | | |
|------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 208, 08 HR, 53 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A2 TAPE NO. 403Y
 234 ITEM NO. 9
 5.2 EPOCH DAY ~~150~~, 18 : 50 : 0.000 GMT SEQ. NO. 9
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 334.90275 | KM | DX | -1.8330338 | KM/SEC |
| Y | 1616.8739 | KM | DY | .44866907 | KM/SEC |
| Z | 702.58565 | KM | DZ | -.28775925 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|--------|----|------------|---|--------|----|-----------|
| X | 1013 M | DX | .14749 M/S | X | 1013 M | DX | .1475 M/S |
|---|--------|----|------------|---|--------|----|-----------|

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| Y | 237.0 M | DY | .71686 M/S | Y | 237.0 M | DY | .7169 M/S |
| Z | 171.0 M | DZ | .36533 M/S | Z | 171.0 M | DZ | .3653 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2693.69 | KM | ECC | .334761 | APF | 182.162 | DEG | |
| LAN | 215.603 | DEG | INC | 12.1234 | DEG | TFP | -99.0845 | SEC |
| RCA | 1791.95 | KM | PALT | 53.8592 | KM | PER | 209.092 | MIN |
| APO | 3595.43 | KM | AALT | 1857.34 | KM | TA | 353.951 | DEG |
| LAT | .815616 | DEG | LONG | 31.8032 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 243Y ITEM NO. 9

5.10 REMARKS: MAP TIME REPORT
 EIGHT HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|-------------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN (R) |
| DAY 208 , 09 HR , 00 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 1F84 | TAPE NO. 410Y |
| 235 | ITEM NO. 10 |
| 5.2 EPOCH DAY 151 , 1 : 44 : 0.000 GMT | SEQ. NO. 10 |
| HR MIN SEC | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|----------------|----------------------|
| X 768.39973 KM | DX -1.7210895 KM/SEC |
| Y 1469.2449 KM | DY .76303640 KM/SEC |
| Z 752.58884 KM | DZ -.14412158 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 25.66 M | DX .03828 M/S | X 25.66 M | DX .0383 M/S |
| Y 20.30 M | DY .05381 M/S | Y 20.30 M | DY .0538 M/S |
| Z 33.98 M | DZ .17635 M/S | Z 33.98 M | DZ .1764 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-----------------|------------------|------------------|
| SMA 2694.05 KM | ECC .335147 | APF 182.725 DEG |
| LAN 211.346 DEG | INC 12.2319 DEG | TFP -343.430 SEC |
| RCA 1791.15 KM | PALT 53.0573 KM | PER 209.134 MIN |
| APO 3596.95 KM | AALT 1858.86 KM | TA 339.229 DEG |
| LAT 3.76312 DEG | LONG 13.6844 DEG | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1081.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 659Y ITEM NO. 10

5.10 REMARKS: MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| DAY 209 , 03 HR , 44 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A3

TAPE NO. 410Y

5.2 EPOCH DAY ²³⁵~~151~~, 8 : 46 : 0.000 GMT
 HR MIN SEC

ITEM NO. 10
 SEQ. NO. 10
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 345.67747 | KM | DX | -1.8317058 | KM/SEC |
| Y | 1614.1952 | KM | DY | .45628075 | KM/SEC |
| Z | 700.99658 | KM | DZ | -.28954140 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 112.9 M | DX | .04057 M/S | X | 112.9 M | DX | .0406 M/S |
| Y | 44.78 M | DY | .09071 M/S | Y | 44.78 M | DY | .0907 M/S |
| Z | 75.84 M | DZ | .18000 M/S | Z | 75.84 M | DZ | .1800 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2693.74 | KM | ECC | .335333 | APF | 182.872 | DEG |
| LAN | 207.482 | DEG | INC | 12.2539 | TFP | -108.677 | SEC |
| RCA | 1790.44 | KM | PALT | 52.3511 | PER | 209.098 | MIN |
| APO | 3597.04 | KM | AALT | 1858.95 | TA | 353.357 | DEG |
| LAT | .799676 | DEG | LONG | 23.7976 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 659Y ITEM NO. 10

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION ** **

TIME OF REPORT:
 DAY 209 , 03 HR , 48 MIN

PREPARED BY: J.A.BEACON
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F102 TAPE NO. 881Y
 235 ITEM NO. 11
 5.2 EPOCH DAY ~~15~~, 16 ' 35 ' 0.000 GMT SEQ. NO. 11
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2515.9478 | KM | DX | .16669651 | KM/SEC |
| Y | -1020.3765 | KM | DY | -1.1706552 | KM/SEC |
| Z | 1020.4800 | KM | DZ | -.40269518 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 71.99 M | DX | .05306 M/S | X | 71.99 M | DX | .0531 M/S |
| Y | 112.9 M | DY | .09120 M/S | Y | 112.9 M | DY | .0912 M/S |
| Z | 263.7 M | DZ | .24377 M/S | Z | 263.7 M | DZ | .2438 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2693.44 | KM | ECC | .335317 | APF | 183.126 | DEG | |
| LAN | 203.091 | DEG | INC | 12.1954 | DEG | TFP | 2946.04 | SEC |
| RCA | 1790.28 | KM | PALT | 52.1925 | KM | PER | 209.063 | MIN |
| APO | 3596.59 | KM | AALT | 1858.50 | KM | TA | 121.616 | DEG |
| LAT | 350.004 | DEG | LONG | 148.447 | DEG | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 132.89

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 488Y ITEM NO. 11

5.10 REMARKS' MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT' | PREPARED BY' | J.E.HEDWALL 0000 |
| DAY 209 , 05 HR , 33 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F103

TAPE NO. 881Y

5.2 EPOCH DAY ²³⁵~~157~~, 22, 39, 0.000 GMT
HR MIN SEC

ITEM NO. 11

SEQ. NO. 11

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 680.55339 | KM | DX | -1.7529247 | KM/SEC |
| Y | 1505.8148 | KM | DY | .69859102 | KM/SEC |
| Z | 743.43875 | KM | DZ | -.17544005 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 184.3 | M | DX | .11698 | M/S | X | 184.3 | M | DX | .1170 | M/S |
| Y | 111.0 | M | DY | .20037 | M/S | Y | 111.0 | M | DY | .2004 | M/S |
| Z | 211.3 | M | DZ | .39244 | M/S | Z | 211.3 | M | DZ | .3924 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2694.18 | KM | ECC | .335850 | | APF | 183.147 | DEG |
| LAN | 199.817 | DEG | INC | 12.1902 | DEG | TFP | -298.726 | SEC |
| RCA | 1789.34 | KM | PALT | 51.2489 | KM | PER | 209.149 | MIN |
| APO | 3599.02 | KM | AALT | 1860.93 | KM | TA | 341.854 | DEG |
| LAT | 3.13274 | DEG | LONG | 5.14078 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 488Y ITEM NO. 11

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 209, 05 HR, 39 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-------------------------------|-----------------------|----------|--------|
| (5.1 O.D. IDENTIFICATION NO. | IA4 | TAPE NO. | 117Y |
| (| 150 236 | ITEM NO. | 12 |
| (5.2 EPOCH DAY | 150 , 9 | HR | 8 |
| (| | MIN | 30.000 |
| (| | SEC | GMT |
| (| | COMPUTER | G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|-----|-----------|----|----|------------|--------|
| (X | 421.10308 | KM | DX | -1.8208146 | KM/SEC |
| (Y | 1593.5268 | KM | DY | .50806521 | KM/SEC |
| (Z | 710.93426 | KM | DZ | -.26336775 | KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|-----|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| (X | 80.60 | M | DX | .02354 | M/S | X | 80.60 | M | DX | .0235 | M/S |
| (Y | 21.91 | M | DY | .05675 | M/S | Y | 21.91 | M | DY | .0567 | M/S |
| (Z | 25.22 | M | DZ | .10729 | M/S | Z | 25.22 | M | DZ | .1073 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-------|---------|-----|------|---------|-----|---------|----------|
| (SMA | 2694.35 | KM | ECC | .336141 | APF | 183.413 | DEG |
| (LAN | 194.014 | DEG | INC | 12.1440 | DEG | TFP | -157.253 |
| (RCA | 1788.67 | KM | PALT | 50.5798 | KM | PER | 209.169 |
| (APO | 3600.03 | KM | AALT | 1861.94 | KM | TA | 350.383 |
| (LAT | 1.30270 | DEG | LONG | 7.94737 | DEG | | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | | |
|------------------------|---|-----|---|-----|------|--------|
| (5.7 DATA ARC LENGTH: | 0 | HRS | 0 | MIN | SOS= | 3092.1 |
|------------------------|---|-----|---|-----|------|--------|

(5.8 DATA SUMMARY:

| (STA | DATA | START | STOP | NUMBER | STANDARD | |
|-------|--------|---------|---------|--------|-----------|-------|
| (NO. | TYPE | TIME | TIME | POINTS | DEVIATION | MEAN |
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 709Y ITEM NO. 12

| | |
|-----------------|---|
| (5.10 REMARKS: | MAP TIME REPORT |
| (| *****TEN HARMONICS IN THIS SOLUTION ***** |
| (| |
| (| |

| | | | |
|----------------------------|--------------|---------------|-----|
| (TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN | (R) |
| (DAY 210 , 03 HR , 50 MIN | GMT | O.D. ANALYST | |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F113 TAPE NO. 117Y

(ITEM NO. 12

(5.2 EPOCH DAY ~~150~~²³⁶, 16 ' 1 ' 30.000 GMT
(HR MIN SEC

SEQ. NO. 12
COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 950.26357 KM DX -1.6500951 KM/SEC
(Y 1380.8712 KM DY .88024825 KM/SEC
(Z 763.25865 KM DZ -.08009799 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 111.9 M DX .04567 M/S X 111.9 M DX .0457 M/S
(Y 53.51 M DY .06578 M/S Y 53.51 M DY .0658 M/S
(Z 39.04 M DZ .11103 M/S Z 39.04 M DZ .1110 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2694.46 KM ECC .336279 APF 183.509 DEG
(LAN 190.255 DEG INC 12.1695 DEG TFP -462.331 SEC
(RCA 1788.37 KM PALT 50.2774 KM PER 209.182 MIN
(APO 3600.55 KM AALT 1862.46 KM TA 332.207 DEG
(LAT 4.97364 DEG LONG 346.455 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 709Y ITEM NO. 12

(5.10 REMARKS: MAP TIME REPORT
(*****TEN HARMONICS IN THIS SOLUTION *****
(
(

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
(DAY 210 , 04 HR , 04 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 1F115 | TAPE NO. 757Y |
| (237 | ITEM NO. 13 |
| (5.2 EPOCH DAY 150 0 : 5 : 0.000 GMT | SEQ. NO. 13 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -2345.5156 KM | DX .40816848 KM/SEC |
| (Y -1620.5541 KM | DY -1.0450912 KM/SEC |
| (Z -1212.2367 KM | DZ -.29313444 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 35.59 M | DX .02115 M/S | X 35.59 M | DX .0212 M/S |
| (Y 80.43 M | DY .02023 M/S | Y 80.43 M | DY .0202 M/S |
| (Z 174.1 M | DZ .04627 M/S | Z 174.1 M | DZ .0463 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 2693.24 KM | ECC .335895 | APF 183.603 DEG |
| (LAN 185.934 DEG | INC 12.3285 DEG | TFP 3461.75 SEC |
| (RCA 1788.60 KM | PALT 50.5072 KM | PER 209.040 MIN |
| (APO 3597.89 KM | AALT 1859.80 KM | TA 132.916 DEG |
| (LAT 351.551 DEG | LONG 143.119 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2786.0

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 023Y ITEM NO. 13

(5.10 REMARKS: MAP TIME REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 210 , 07 HR , 34 MIN GMT | O.D. ANA. ST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F117

TAPE NO. 757Y

(~~237~~

ITEM NO. 13

(5.2 EPOCH DAY ~~237~~, 7, 14, 0.000 GMT

SEQ. NO. 13

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1997.7659 KM

DX .62451851 KM/SEC

(Y -2249.8556 KM

DY -.85484720 KM/SEC

(Z -1362.3476 KM

DZ -.16612112 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 59.62 M DX .02858 M/S X 59.62 M DX .0286 M/S

(Y 77.99 M DY .03387 M/S Y 77.99 M DY .0339 M/S

(Z 142.5 M DZ .06324 M/S Z 142.5 M DZ .0632 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2693.28 KM ECC .335916 APF 183.739 DEG

(LAN 182.026 DEG INC 12.3084 DEG TFP 4116.02 SEC

(RCA 1788.56 KM PALT 50.4743 KM PER 209.044 MIN

(APO 3598.00 KM AALT 1859.91 KM TA 145.421 DEG

(LAT 353.726 DEG LONG 151.769 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 023Y ITEM NO. 13

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION ***** ***)

(TIME OF REPORT:

PREPARED BY: J.E.HEDWALL 0000

(DAY 210, 07 HR, 39 MIN

GMT Q.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-------------------------------|---------------------|----------|-------|
| (5.1 O.D. IDENTIFICATION NO. | IA5 | TAPE NO. | 890Y |
| (| 237 | ITEM NO. | 14 |
| (5.2 EPOCH DAY | 150 , 13 | ' | 1 |
| (| HR | MIN | SEC |
| | | GMT | 0.000 |
| | | COMPUTER | B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|-----|-----------|----|----|------------|--------|
| (X | 390.14653 | KM | DX | -1.8273231 | KM/SEC |
| (Y | 1601.8518 | KM | DY | .48100844 | KM/SEC |
| (Z | 706.58183 | KM | DZ | -.27630724 | KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|-----|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| (X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| (Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| (Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-------|---------|-----|------|---------|-----|---------|----------|
| (SMA | 2694.34 | KM | ECC | .336406 | APF | 183.941 | DEG |
| (LAN | 178.761 | DEG | INC | 12.1636 | DEG | TFP | -149.707 |
| (RCA | 1787.95 | KM | PALT | 49.8586 | KM | PER | 209.168 |
| (APO | 3600.73 | KM | AALT | 1862.64 | KM | TA | 350.836 |
| (LAT | 1.09913 | DEG | LONG | 353.655 | DEG | | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | | |
|------------------------|---|-----|---|-----|------|--------|
| (5.7 DATA ARC LENGTH: | 0 | HRS | 0 | MIN | SOS= | .00000 |
|------------------------|---|-----|---|-----|------|--------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 134Y ITEM NO. 14

| | |
|-----------------|---|
| (5.10 REMARKS: | MAP TIME REPORT |
| (| ***TEN HARMONICS IN THIS SOLUTION ***** |

| | | | |
|-------------------|--------------------------|--------------|--------------|
| (TIME OF REPORT: | DAY 211 , 03 HR , 25 MIN | PREPARED BY: | J.A.BEACON |
| (| | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F134 TAPE NO. 259Y
(237 ITEM NO. 15
(5.2 EPOCH DAY ~~150~~, 19 ' 54 ' 0.000 GMT SEQ. NO. 15
(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 640.41283 KM DX -1.7696041 KM/SEC
(Y 1515.5948 KM DY .65733846 KM/SEC
(Z 737.60299 KM DZ -.19622576 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 51.67 M DX .02409 M/S X 51.67 M DX .0241 M/S
(Y 20.60 M DY .04056 M/S Y 20.60 M DY .0406 M/S
(Z 53.10 M DZ .10691 M/S Z 53.10 M DZ .1069 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2670.52 KM ECC .334013 APF 185.191 DEG
(LAN 175.069 DEG INC 12.2032 DEG TFP -310.284 SEC
(RCA 1778.53 KM PALT 40.4442 KM PER 206.401 MIN
(APO 3562.52 KM AALT 1824.43 KM TA 341.007 DEG
(LAT 2.89053 DEG LONG 341.567 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 943.87

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 560Y ITEM NO. 15

(5.10 REMARKS: MAP TIME REPORT
(*****TEN HARMONICS IN THIS SOLUTION *****
(
(

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
(DAY 211 , 05 HR , 40 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F135

TAPE NO. 259Y

(

ITEM NO. 15

(5.2 EPOCH DAY ~~150~~²³⁷, 23 ' 21 ' 0.000 GMT

SEQ. NO. 15

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 563.62651 KM DX -1.7914991 KM/SEC

(Y 1543.0298 KM DY .60109041 KM/SEC

(Z 728.59392 KM DZ -.22277316 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 115.8 M DX .02903 M/S X 115.8 M DX .0290 M/S

(Y 24.35 M DY .06419 M/S Y 24.35 M DY .0642 M/S

(Z 44.83 M DZ .12474 M/S Z 44.83 M DZ .1247 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2670.57 KM ECC .333992 APF 185.268 DEG

(LAN 173.175 DEG INC 12.1921 DEG TFP -268.408 SEC

(RCA 1778.62 KM PALT 40.5289 KM PER 206.406 MIN

(APO 3562.51 KM AALT 1824.42 KM TA 343.534 DEG

(LAT 2.35052 DEG LONG 342.223 DEG

(5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 560Y ITEM NO. 15

(5.10 REMARKS' MAP TIME REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

| TIME OF REPORT' | PREPARED BY' |
|------------------------------|----------------------------|
| DAY 211 , 05 HR , 45 MIN GMT | GEO.S.GOODWIN O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F136

TAPE NO. 259Y

(238

ITEM NO. 15

(5.2 EPOCH DAY ~~150~~, 3 ' 48 ' 0.000 GMT

SEQ. NO. 15

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -2287.5888 KM DX .42609219 KM/SEC

(Y -1628.0391 KM DY -1.0533513 KM/SEC

(Z -1193.9013 KM DZ -.29344495 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 63.77 M DX .03520 M/S X 63.77 M DX .0352 M/S

(Y 89.04 M DY .02699 M/S Y 89.04 M DY .0270 M/S

(Z 176.0 M DZ .02840 M/S Z 176.0 M DZ .0284 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2669.56 KM ECC .333599 APF 185.417 DEG

(LAN 170.730 DEG INC 12.1591 DEG TFP 3372.64 SEC

(RCA 1779.00 KM PALT 40.9059 KM PER 206.289 MIN

(APO 3560.12 KM AALT 1822.03 KM TA 131.813 DEG

(LAT 351.777 DEG LONG 128.608 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 560Y ITEM NO. 15

(5.10 REMARKS: MAP TIME REPORT

(~~TEN EIGHT~~ HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 211 , 05 HR , 50 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F137

TAPE NO. 660Y

(~~238~~

ITEM NO. 16

(5.2 EPOCH DAY ~~150~~ , 6 ' 14 ' 0.000 GMT

SEQ. NO. 16

HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 516.40480 KM

DX -1.8037952 KM/SEC

(Y 1559.3076 KM

DY .56461283 KM/SEC

(Z 721.79802 KM

DZ -.23805114 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 374.0 M

DX .09486 M/S

X 374.0 M

DX .0949 M/S

(Y 84.12 M

DY .24941 M/S

Y 84.12 M

DY .2494 M/S

(Z 91.76 M

DZ .27486 M/S

Z 91.76 M

DZ .2749 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2670.50 KM

ECC .333879

APF 185.518 DEG

(LAN 169.286 DEG

INC 12.1407 DEG

TFP -244.343 SEC

(RCA 1778.88 KM

PALT 40.7876 KM

PER 206.398 MIN

(APO 3562.13 KM

AALT 1824.04 KM

TA 344.997 DEG

(LAT 1.98625 DEG

LONG 340.009 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= -147.04

(5.8 DATA SUMMARY:

(STA DATA START STOP

NUMBER STANDARD

POINTS DEVIATION

MEAN

(

NO. TYPE

TIME

TIME

POINTS

DEVIATION

MEAN

(

0

000000

30/0000

30/0000

0

.0000

.0000

(5.9 RESIDUAL PLOTS: TAPE NO. 868Y

ITEM NO. 16

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT:

PREPARED BY:

J.E.HEDWALL 0000

(DAY 211 , 07 HR , 13 MIN

GMT

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F138 TAPE NO. 660Y
(238 ITEM NO. 16
(5.2 EPOCH DAY ~~150~~, 9 ' 41 ' 0.000 GMT SEQ. NO. 16
(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 438.14163 KM DX -1.8214257 KM/SEC
(Y 1582.7679 KM DY .50595907 KM/SEC
(Z 710.83592 KM DZ -.26423180 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 491.7 M DX .32710 M/S X 491.7 M DX .3271 M/S

(Y 131.7 M DY .52631 M/S Y 131.7 M DY .5263 M/S
(Z 212.5 M DZ .35359 M/S Z 212.5 M DZ .3536 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2670.57 KM ECC .333847 APF 185.614 DEG
(LAN 167.369 DEG INC 12.1249 DEG TFP -202.334 SEC
(RCA 1779.00 KM PALT 40.9145 KM PER 206.405 MIN
(APO 3562.13 KM AALT 1824.04 KM TA 347.555 DEG
(LAT 1.43149 DEG LONG 340.689 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 868Y ITEM NO. 16

(5.10 REMARKS: MAP TIME REPORT
(***TEN HARMONICS IN THIS SOLUTION *****
(
(

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
(DAY 211 , 07 HR , 23 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 1F139 TAPE NO. 136Y
 (238 ITEM NO. 17
 (5.2 EPOCH DAY ~~150~~, 16 ' 34 ' 0.000 GMT SEQ. NO. 17
 (HR MIN SEC COMPUTER B.

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 390.51253 KM DX -1.8305966 KM/SEC
 (Y 1596.1871 KM DY .46898652 KM/SEC
 (Z 703.64055 KM DZ -.28083097 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 44.35 M DX .01628 M/S X 44.35 M DX .0163 M/S
 (Y 14.86 M DY .03571 M/S Y 14.86 M DY .0357 M/S
 (Z 37.29 M DZ .05834 M/S Z 37.29 M DZ .0583 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2671.30 KM ECC .333908 APF 185.833 DEG
 (LAN 163.539 DEG INC 12.1290 DEG TFP -178.960 SEC
 (RCA 1779.33 KM PALT 41.2433 KM PER 206.491 MIN
 (APO 3563.27 KM AALT 1825.18 KM TA 348.986 DEG
 (LAT 1.08715 DEG LONG 338.474 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2913.8

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 725Y ITEM NO. 17

(5.10 REMARKS: MAP TIME REPORT
 (*****TEN HARMONICS IN THIS SOLUTION *****
 (

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
 (DAY 211 , 08 HR , 51 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 1F140 | TAPE NO. 136Y |
| (| ITEM NO. 17 |
| (5.2 EPOCH DAY 150 ²³⁸ , 20 ' 0 ' 0.000 GMT | SEQ. NO. 17 |
| (| COMPUTER B |
| | HR MIN SEC |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 421.25973 KM | DX -1.8245592 KM/SEC |
| (Y 1588.3910 KM | DY .49153250 KM/SEC |
| (Z 708.34209 KM | DZ -.27093373 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 86.52 M | DX .02156 M/S | X 86.52 M | DX .0216 M/S |
| (Y 21.88 M | DY .06227 M/S | Y 21.88 M | DY .0623 M/S |
| (Z 38.72 M | DZ .06422 M/S | Z 38.72 M | DZ .0642 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2671.20 KM | ECC .333806 | APF 185.890 DEG |
| (LAN 161.646 DEG | INC 12.1323 DEG | TFP -196.588 SEC |
| (RCA 1779.54 KM | PALT 41.4472 KM | PER 206.479 MIN |
| (APO 3562.86 KM | AALT 1824.77 KM | TA 347.912 DEG |
| (LAT 1.30033 DEG | LONG 335.585 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 725Y ITEM NO. 17

(5.10 REMARKS: MAP TIME REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

| | |
|----------------------------|----------------------------|
| (TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| (DAY 211 , 08 HR , 57 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 1A6 | TAPE NO. 136Y |
| (238 | ITEM NO. 17 |
| (5.2 EPOCH DAY 150 , 23 ' 31 ' 0.000 GMT | SEQ. NO. 17 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|---------------------------|-----------------------|
| (X -103.98607 KM | DX -1.8635844 KM/SEC |
| (Y 1671.3411 KM | DY .08828678 KM/SEC |
| (Z 608.18362 KM | DZ -0.43274423 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|---------------------|---------------|------------|--------------|
| (X 130.6 M | DX .01833 M/S | X 130.6 M | DX .0183 M/S |
|---------------------|---------------|------------|--------------|

| | | | |
|---------------------|---------------|------------|--------------|
| (Y 7.734 M | DY .09926 M/S | Y 7.734 M | DY .0993 M/S |
| (Z 33.64 M | DZ .07618 M/S | Z 33.64 M | DZ .0762 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|--------------------------|------------------|-----------------|
| (SMA 2670.87 KM | ECC .333652 | APF 185.998 DEG |
| (LAN 159.699 DEG | INC 12.1043 DEG | TFP 85.1242 SEC |
| (RCA 1779.73 KM | PALT 41.6360 KM | PER 206.440 MIN |
| (APO 3562.01 KM | AALT 1823.92 KM | TA 5.24899 DEG |
| (LAT 357.656 DEG | LONG 350.702 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|------------------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 725Y ITEM NO. 17

(5.10 REMARKS: MAP TIME REPORT
 (*****TEN HARMONICS IN THIS SOLUTION*****
 (

| | |
|-----------------------------------|-------------------------------------|
| (TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| (DAY 211 , 09 HR , 02 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 1F149 | TAPE NO. 136Y |
| (²³⁹ | ITEM NO. 17 |
| (5.2 EPOCH DAY 151 , 2 ' 53 ' 0.000 GMT | SEQ. NO. 17 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 372.94264 KM | DX -1.8332381 KM/SEC |
| (Y 1601.5126 KM | DY .45441295 KM/SEC |
| (Z 701.01307 KM | DZ -.28721673 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 168.5 M | DX .03186 M/S | X 168.5 M | DX .0319 M/S |
| (Y 37.97 M | DY .12247 M/S | Y 37.97 M | DY .1225 M/S |
| (Z 42.23 M | DZ .08208 M/S | Z 42.23 M | DZ .0821 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|-----------------|------------------|
| (SMA 2670.99 KM | ECC .333596 | APF 186.023 DEG |
| (LAN 157.841 DEG | INC 12.1301 DEG | TFP -171.914 SEC |
| (RCA 1779.96 KM | PALT 41.8680 KM | PER 206.454 MIN |
| (APO 3562.02 KM | AALT 1823.93 KM | TA 349.424 DEG |

| | |
|-------------------|------------------|
| (LAT .955766 DEG | LONG 333.389 DEG |
|-------------------|------------------|

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 725Y ITEM NO. 17

(5.10 REMARKS: MAP TIME REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

| | |
|----------------------------|----------------------------|
| (TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| (DAY 211 , 09 HR , 07 MIN | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F150

TAPE NO. 153Y

239

ITEM NO. 18

5.2 EPOCH DAY ~~151~~, 6 ' 18 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 18

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 511.28314 | KM | DX | -1.8045875 | KM/SEC |
| Y | 1563.2795 | KM | DY | .55616409 | KM/SEC |
| Z | 721.34750 | KM | DZ | -.23969111 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 238.0 | M | DX | .04096 | M/S | X | 238.0 | M | DX | .0410 | M/S |
| Y | 49.92 | M | DY | .13553 | M/S | Y | 49.92 | M | DY | .1355 | M/S |
| Z | 44.91 | M | DZ | .14779 | M/S | Z | 44.91 | M | DZ | .1478 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2670.03 | KM | ECC | .333262 | APF | 186.001 | DEG | |
| LAN | 156.023 | DEG | INC | 12.0820 | DEG | TFP | -248.573 | SEC |
| RCA | 1780.21 | KM | PALT | 42.1175 | KM | PER | 206.343 | MIN |
| APO | 3559.84 | KM | AALT | 1821.75 | KM | TA | 344.760 | DEG |
| LAT | 1.92574 | DEG | LONG | 326.986 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 873.27

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 653Y ITEM NO. 18

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 213, 03 HR, 27 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F151

TAPE NO. 153Y

5.2 EPOCH DAY ²³⁹~~151~~, 9 ' 46 ' 0.000 GMT
HR MIN SEC

ITEM NO. 18

SEQ. NO. 18

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 322.50498 | KM | DX | -1.8413832 | KM/SEC |
| Y | 1614.0398 | KM | DY | .41494021 | KM/SEC |
| Z | 693.13209 | KM | DZ | -.30204287 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 362.6 | M | DX | .03857 | M/S | X | 362.6 | M | DX | .0386 | M/S |
| Y | 61.17 | M | DY | .23283 | M/S | Y | 61.17 | M | DY | .2328 | M/S |
| Z | 40.86 | M | DZ | .18898 | M/S | Z | 40.86 | M | DZ | .1890 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2670.09 | KM | ECC | .333181 | APF | 186.096 | DEG | |
| LAN | 154.078 | DEG | INC | 12.0678 | DEG | TFP | -145.943 | SEC |
| RCA | 1780.46 | KM | PALT | 42.3749 | KM | PER | 206.350 | MIN |
| APO | 3559.71 | KM | AALT | 1821.62 | KM | TA | 351.020 | DEG |
| LAT | .602622 | DEG | LONG | 331.258 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 653Y ITEM NO. 18

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 213, 03 HR, 30 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F153

TAPE NO. 190Y

239

ITEM NO. 19

5.2 EPOCH DAY ~~151~~, 23 ' 30 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 19

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 442.97906 | KM | DX | -1.8193300 | KM/SEC |
| Y | 1585.6181 | KM | DY | .50275607 | KM/SEC |
| Z | 711.02450 | KM | DZ | -.26259089 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 43.87 M | DX | .01870 M/S | X | 43.87 M | DX | .0187 M/S |
| Y | 22.11 M | DY | .04748 M/S | Y | 22.11 M | DY | .0475 M/S |
| Z | 38.06 M | DZ | .03250 M/S | Z | 38.06 M | DZ | .0325 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2670.33 | KM | ECC | .332843 | APF | 186.474 | DEG |
| LAN | 146.351 | DEG | INC | 12.0435 | DEG | TFP | -214.811 |
| RCA | 1781.53 | KM | PALT | 43.4391 | KM | PER | 206.378 |
| APO | 3559.13 | KM | AALT | 1821.04 | KM | TA | 346.827 |
| LAT | 1.39465 | DEG | LONG | 319.799 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4393.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 533Y ITEM NO. 19

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:

PREPARED BY: GEO.S.GOODWIN

DAY 213 , 06 HR , 56 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A7

TAPE NO. 190Y

5.2 EPOCH DAY ²⁴⁰~~150~~, 6 ' 27 ' 30.000 GMT
 HR MIN SEC

ITEM NO. 19
 SEQ. NO. 19
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -108.45128 | KM | DX | -1.8621606 | KM/SEC |
| Y | 1673.9498 | KM | DY | .08027912 | KM/SEC |
| Z | 606.66659 | KM | DZ | -.43216241 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 136.9 M | DX | .01134 M/S | X | 136.9 M | DX | .0113 M/S |
| Y | 9.889 M | DY | .11625 M/S | Y | 9.889 M | DY | .1162 M/S |
| Z | 45.45 M | DZ | .04778 M/S | Z | 45.45 M | DZ | .0478 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2670.32 | KM | ECC | .332624 | APF | 186.686 | DEG |
| LAN | 142.428 | DEG | INC | 12.0130 | TFP | 81.1199 | SEC |
| RCA | 1782.10 | KM | PALT | 44.0142 | PER | 206.376 | MIN |
| APO | 3558.53 | KM | AALT | 1820.44 | TA | 4.99048 | DEG |
| LAT | 357.586 | DEG | LONG | 333.856 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 533Y ITEM NO. 19

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:
 DAY 213 , 06 HR , 59 MIN

PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F173

TAPE NO. 495Y

ITEM NO. 20

5.2 EPOCH DAY ²⁴⁰ ~~150~~, 13 : 21 : 0.000 GMT
HR MIN SEC

SEQ. NO. 20

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -216.34901 | KM | DX | -1.8546638 | KM/SEC |
| Y | 1677.0674 | KM | DY | -.00680649 | KM/SEC |
| Z | 578.81300 | KM | DZ | -.45830994 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 66.10 M | DX | .01187 M/S | X | 66.10 M | DX | .0119 M/S |
| Y | 9.437 M | DY | .07309 M/S | Y | 9.437 M | DY | .0731 M/S |
| Z | 40.79 M | DZ | .04960 M/S | Z | 40.79 M | DZ | .0496 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2669.97 | KM | ECC | .332385 | APF | 187.335 | DEG |
| LAN | 138.159 | DEG | INC | 11.8952 | DEG | TFP | 136.624 |
| RCA | 1782.51 | KM | PALT | 44.4209 | KM | PER | 206.336 |
| APO | 3557.43 | KM | AALT | 1819.34 | KM | TA | 8.39174 |
| LAT | 356.797 | DEG | LONG | 333.565 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3506.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 218Y ITEM NO. 20

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 214 , 06 HR , 10 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F174

TAPE NO. 495Y

5.2 EPOCH DAY ²⁴⁰~~150~~, 20 ' 5 ' 0.000 GMT
HR MIN SEC

ITEM NO. 20

SEQ. NO. 20

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 721.49906 | KM | DX | -1.7434859 | KM/SEC |
| Y | 1495.7904 | KM | DY | .69907691 | KM/SEC |
| Z | 740.92077 | KM | DZ | -.16701652 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 193.0 M | DX | .06949 M/S | X | 193.0 M | DX | .0695 M/S |
| Y | 89.49 M | DY | .14538 M/S | Y | 89.49 M | DY | .1454 M/S |
| Z | 62.60 M | DZ | .06877 M/S | Z | 62.60 M | DZ | .0688 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2670.87 | KM | ECC | .332373 | APF | 187.417 | DEG | |
| LAN | 134.379 | DEG | INC | 11.9472 | TFP | -375.109 | SEC | |
| RCA | 1783.15 | KM | PALT | 45.0573 | KM | PER | 206.441 | MIN |
| APO | 3558.60 | KM | AALT | 1820.51 | KM | TA | 337.233 | DEG |
| LAT | 3.14127 | DEG | LONG | 299.347 | DEG | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 218Y ITEM NO. 20

5.10 REMARKS' MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT'
DAY 214 , 06 HR , 14 MINPREPARED BY' J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1F175

TAPE NO. 654Y

ITEM NO. 21

5.2 EPOCH DAY ²⁴¹~~150~~, 3 : 5 : 0.000 GMT
HR MIN SEC

SEQ. NO. 21

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -99.080102 | KM | DX | -1.8623360 | KM/SEC |
| Y | 1676.0385 | KM | DY | .08332460 | KM/SEC |
| Z | 606.02499 | KM | DZ | -.42620391 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 64.81 M | DX | .01464 M/S | X | 64.81 M | DX | .0146 M/S |
| Y | 24.22 M | DY | .09127 M/S | Y | 24.22 M | DY | .0913 M/S |
| Z | 73.95 M | DZ | .05445 M/S | Z | 73.95 M | DZ | .0545 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2669.91 | KM | ECC | .331943 | APF | 187.604 | DEG |
| LAN | 130.437 | DEG | INC | 11.8968 | DEG | TFP | 72.2667 |
| RCA | 1783.65 | KM | PALT | 45.5650 | KM | PER | 206.330 |
| APO | 3556.17 | KM | AALT | 1818.08 | KM | TA | 4.43949 |
| LAT | 357.535 | DEG | LONG | 322.230 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 14604

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 601Y ITEM NO. 21

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:

DAY 214 , 05 HR , 30 MIN

PREPARED BY: GEO.S.GOODWIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A8.1

TAPE NO. 654Y

5.2 EPOCH DAY ²⁴¹~~150~~, 6 : 31 : 0.000 GMT
HR MIN SECITEM NO. 21
SEQ. NO. 21
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -70.232459 | KM | DX | -1.8633272 | KM/SEC |
| Y | 1674.9234 | KM | DY | .10526444 | KM/SEC |
| Z | 612.24474 | KM | DZ | -.41797373 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 118.9 M | DX | .01455 M/S | X | 118.9 M | DX | .0146 M/S |
| Y | 27.69 M | DY | .12863 M/S | Y | 27.69 M | DY | .1286 M/S |
| Z | 84.38 M | DZ | .05021 M/S | Z | 84.38 M | DZ | .0502 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2669.89 | KM | ECC | .331849 | APF | 187.711 | DEG | |
| LAN | 128.480 | DEG | INC | 11.8921 | TFP | 56.2463 | SEC | |
| RCA | 1783.89 | KM | PALT | 45.7990 | KM | PER | 206.327 | MIN |
| APO | 3555.89 | KM | AALT | 1817.80 | KM | TA | 3.45521 | DEG |
| LAT | 357.713 | DEG | LONG | 319.413 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 601Y ITEM NO. 21

5.10 REMARKS: MAP TIME REPORT

EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:
DAY 214 , 05 HR , 33 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A9.2A

241

TAPE NO. 654Y

ITEM NO. 21

5.2 EPOCH DAY ~~150~~, 9 ' 56 ' 0.000 GMT

HR MIN SEC

SEQ. NO. 21

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 70.378716 | KM | DX | -1.8631791 | KM/SEC |
| Y | 1663.2501 | KM | DY | .21357104 | KM/SEC |
| Z | 641.90691 | KM | DZ | -.37710161 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 173.2 | M | DX | .02083 | M/S | X | 173.2 | M | DX | .0208 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 42.00 | M | DY | .16653 | M/S | Y | 42.00 | M | DY | .1665 | M/S |
| Z | 95.55 | M | DZ | .05042 | M/S | Z | 95.55 | M | DZ | .0504 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2669.86 | KM | ECC | .331759 | | APF | 187.818 | DEG |
| LAN | 126.531 | DEG | INC | 11.8893 | DEG | IFP | -19.7129 | SEC |
| RCA | 1784.11 | KM | PALT | 46.0188 | KM | PER | 206.323 | MIN |
| APO | 3555.60 | KM | AALT | 1817.51 | KM | TA | 358.789 | DEG |
| LAT | 358.642 | DEG | LONG | 312.998 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN. SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 601Y ITEM NO. 21

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:

DAY 214, 05 HR, 36 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 1A9.2B

TAPE NO. 654Y

5.2 EPOCH DAY ²⁴¹~~150~~, 13 ' 22 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 21
 SEQ. NO. 21
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 99.032699 | KM | DX | -1.8619334 | KM/SEC |
| Y | 1660.1645 | KM | DY | .23519172 | KM/SEC |
| Z | 647.28407 | KM | DZ | -.36850903 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 225.8 | M | DX | .02426 | M/S | X | 225.8 | M | DX | .0243 | M/S |
| Y | 50.06 | M | DY | .20493 | M/S | Y | 50.06 | M | DY | .2049 | M/S |
| Z | 104.2 | M | DZ | .05860 | M/S | Z | 104.2 | M | DZ | .0586 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2669.82 | KM | ECC | .331674 | APF | 187.929 | DEG |
| LAN | 124.570 | DEG | INC | 11.8853 | TFP | -35.6314 | SEC |
| RCA | 1784.31 | KM | PALT | 46.2231 | PER | 206.319 | MIN |
| APO | 3555.33 | KM | AALT | 1817.24 | TA | 357.812 | DEG |

LAT 358.819 DEG LONG 310.189 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 601Y ITEM NO. 21

5.10 REMARKS: MAP TIME REPORT

*EIGHT HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 214 , 05 HR , 39 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION II EPOCH REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 11. 18. 13. 40. 0.000
 AGINJ+2 3466.79336548 -802.18753815 -497.79615402
 .26555611 .75371579 .51713578

5.1 O.D. IDENTIFICATION NO. 2P1 TAPE NO. 985Y
 5.2 EPOCH DAY ~~210~~³²², 13 : 40 : 0.000 GMT ITEM NO. 28
 HR MIN SEC SEQ. NO. 28
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3462.9813 | KM | DX | .26918885 | KM/SEC |
| Y | -815.07326 | KM | DY | .75273818 | KM/SEC |
| Z | -503.36763 | KM | DZ | .51668134 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 4.834 | M | DX | .00650 | M/S | X | 4.834 | M | DX | .0065 | M/S |
| Y | 173.4 | M | DY | .07363 | M/S | Y | 173.4 | M | DY | .0736 | M/S |
| Z | 286.8 | M | DZ | .11024 | M/S | Z | 286.8 | M | DZ | .1102 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.45 | KM | ECC | .336363 | APF | 164.519 | DEG |
| LAN | 237.679 | DEG | INC | 11.9324 | TFP | 6130.26 | SEC |
| RCA | 1784.82 | KM | PALT | 46.7291 | PER | 208.599 | MIN |
| APO | 3594.08 | KM | AALT | 1855.99 | TA | 178.063 | DEG |
| LAT | 356.452 | DEG | LONG | 220.615 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.13272369E-04 | C33 | -.57010668E-06 | C41 | -.51000000E-05 |
| C42 | -.74116346E-04 | C43 | -.34303048E-04 | C44 | +.27559097E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.22671840E-04 | S33 | -.56612472E-05 | S41 | -.10200000E-04 |
| S42 | -.25992095E-04 | S43 | +.82467346E-05 | S44 | -.31823756E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4862.1

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 832Y ITEM NO. 28

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 214, 08 HR, 03 MIN PREPARED BY: J.E.HEDWALL 00001WT
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 11. 19. 0. 0. 0.000
 AGINJ+2 3357.66101074 -1052.90242004 -663.41594696
 .38809790 .71945582 .49712093

5.1 O.D. IDENTIFICATION NO. 2S3 TAPE NO. 178Y

5.2 EPOCH DAY ³²³~~122~~, 0, 0, 0.000 GMT ITEM NO. 30
 HR MIN SEC SEQ. NO. 30
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3352.6505 | KM | DX | .39157037 | KM/SEC |
| Y | -1065.3867 | KM | DY | .71802260 | KM/SEC |
| Z | -668.80311 | KM | DZ | .49646965 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 7.203 M | DX | .00575 M/S | X | 7.203 M | DX | .0057 M/S |
| Y | 148.6 M | DY | .09747 M/S | Y | 148.6 M | DY | .0975 M/S |
| Z | 241.2 M | DZ | .14569 M/S | Z | 241.2 M | DZ | .1457 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2689.53 | KM | ECC | .336698 | APF | 165.152 | DEG |
| LAN | 231.491 | DEG | INC | 11.9666 | DEG | TFP | 5786.40 |
| RCA | 1783.97 | KM | PALT | 45.8768 | KM | PER | 208.607 |
| APO | 3595.08 | KM | AALT | 1856.99 | KM | TA | 172.829 |
| LAT | 355.542 | DEG | LONG | 209.906 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.15621438E-04 | C33 | +.38861404E-05 | C41 | -.51000000E-05 |
| C42 | +.16403767E-05 | C43 | -.89221608E-06 | C44 | +.38478837E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.27791257E-05 | S33 | -.22216256E-05 | S41 | -.10200000E-04 |
| S42 | -.10682629E-04 | S43 | -.34887413E-05 | S44 | +.10856878E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 564.12

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 363Y ITEM NO. 30

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION**

| | | |
|------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| DAY 214, 09 HR, 25 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|----------------|-----|----|-----|-------|
| AGINAT | 1. | 66. | 11. | 19. | 2. | 45. | 7.500 |
| AGINJ+2 | 1220.35098267 | -2267.71682739 | -1526.40348816 | | | | |
| | 1.19973050 | .08591063 | .07669025 | | | | |

5.1 O.D. IDENTIFICATION NO. 2P2

TAPE NO. 532Y

323

ITEM NO. 31

5.2 EPOCH DAY ~~122~~, 2, 45, 7.500 GMT
HR MIN SECSEQ. NO. ~~N.A.~~
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 1209.4510 | KM | DX | 1.2001637 | KM/SEC |
| Y | -2272.2763 | KM | DY | .08145510 | KM/SEC |
| Z | -1528.2974 | KM | DZ | .07474961 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2689.66 | KM | ECC | .336823 | APF | 164.928 | DEG |
| LAN | 230.260 | DEG | INC | 11.9326 | DEG | TFP | 3178.84 |
| RCA | 1783.72 | KM | PALT | 45.6341 | KM | PER | 208.624 |
| APO | 3595.61 | KM | AALT | 1857.52 | KM | TA | 127.161 |
| LAT | 348.955 | DEG | LONG | 162.789 | DEG | | |

5.6 LUNAR HARMONICS USED, LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.14232866E-05 | C33 | -.35905706E-05 | C41 | -.51000000E-05 |
| C42 | -.46818296E-04 | C43 | -.77669240E-05 | C44 | -.47337342E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.15864564E-04 | S33 | -.35281505E-05 | S41 | -.10200000E-04 |
| S42 | +.10828818E-04 | S43 | +.17408191E-04 | S44 | -.21078985E-05 |

5.7 DATA ARC LENGTH, 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS, ~~NOT AVAILABLE~~ ITEM 30.

5.10 REMARKS, EPOCH REPORT

TEN HARMONICS IN SOLUTION.

TIME OF REPORT
DAY 179, 07 HR, 10 MINPREPARED BY, J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 66. 11. 20. 0. 30. 0.000
 AGINJ+2 3530.98876953 -589.16282654 -343.00445938
 .16404753 .77276118 .52877788

5.1 O.D. IDENTIFICATION NO. 2P5 TAPE NO.
 324 ITEM NO. 324A

5.2 EPOCH DAY 1210, 0 30 0.000 GMT SEQ. NO. 324A
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3528.2167 KM DX .16777171 KM/SEC
 Y -602.28599 KM DY .77216212 KM/SEC
 Z -348.69093 KM DZ .52848449 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 2.589 M DX .00115 M/S X 2.589 M DX .0011 M/S
 Y 33.62 M DY .02326 M/S Y 33.62 M DY .0233 M/S
 Z 48.47 M DZ .03385 M/S Z 48.47 M DZ .0338 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.50 KM ECC .337494 APF 165.501 DEG
 LAN 218.051 DEG INC 11.9093 DEG TFP -6133.31 SEC
 RCA 1781.81 KM PALT 43.7211 KM PER 208.605 MIN
 APO 3597.20 KM AALT 1859.11 KM TA 181.890 DEG
 LAT 357.418 DEG LONG 205.705 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 -.98317452E-05 C33 +.81320228E-06 C41 -.51000000E-05
 C42 -.10388457E-04 C43 +.35097800E-05 C44 -.52416384E-06
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 +.23442347E-05 S33 -.33842257E-05 S41 -.10200000E-04
 S42 +.19697778E-05 S43 +.43425823E-05 S44 -.83396362E-07

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2494.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------------------|------------------|-------------------|-------------------|---------------|--------------------|-----------------|
| 7271251370 | **1.* | 1/5346 | 0/0904 | 1 | .2459 | 3217 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 32.

5.10 REMARKS: EPOCH REPORT
 10 HARMONICS IN SOLUTION.

TIME OF REPORT: DAY 178, 04 HR, 02 MIN PREPARED BY: G.S. GOODWIN 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|-----|---------------|----|-----|---------------|
| AGINAT | 1. | 66. | 11. | 21. | 0. | 50. | 0.000 |
| AGINJ+2 | 3536.77963257 | | | -573.11148071 | | | -327.13839722 |
| | .15847417 | | | .77069858 | | | .53233100 |

5.1 O.D. IDENTIFICATION NO. 256

TAPE NO. 938Y

5.2 EPOCH ~~0262266~~, 0 : 50 : 0.000 GMT
 DAY 325
 HR MIN SEC

ITEM NO. 33
 SEQ. NO. 33
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3534.0924 | KM | DX | .16219690 | KM/SEC |
| Y | -586.25948 | KM | DY | .77011894 | KM/SEC |
| Z | -332.83279 | KM | DZ | .53204858 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 9.665 M | DX | .00546 M/S | X | 9.665 M | DX | .0055 M/S |
| Y | 77.25 M | DY | .10965 M/S | Y | 77.25 M | DY | .1096 M/S |
| Z | 60.56 M | DZ | .15720 M/S | Z | 60.56 M | DZ | .1572 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2689.53 | KM | ECC | .338058 | APF | 166.450 | DEG |
| LAN | 204.167 | DEG | INC | 12.1382 | TFP | -6138.00 | SEC |
| RCA | 1780.31 | KM | PALT | 42.2198 | KM | PER | 208.607 |
| APO | 3598.74 | KM | AALT | 1860.65 | KM | TA | 181.818 |
| LAT | 357.549 | DEG | LONG | 192.689 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.15559047E-04 | C33 | +.14157955E-05 | C41 | -.51000000E-05 |
| C42 | -.21181566E-04 | C43 | +.11647554E-04 | C44 | -.18081627E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.46387094E-05 | S33 | -.30296424E-05 | S41 | -.10200000E-04 |
| S42 | +.18064920E-04 | S43 | +.12082331E-04 | S44 | +.56746077E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1328.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 727Y ITEM NO. 33

5.10 REMARKS: EPOCH REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 215, 04 HR, 52 MIN
 PREPARED BY: GEO. S. GOODWIN
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|---------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 66. | 11. | 21. | 14. | 30. | 0.000 |
| AGINJ+2 | 3272.40823364 | -1192.59477234 | -756.90400696 | .46656486 | .69079141 | .48295050 | |

5.1 O.D. IDENTIFICATION NO. 2S8 TAPE NO. 574Y

5.2 EPOCH ~~0131194~~ DAY 325, 14 : 30 : 0.000 GMT ITEM NO. 34
 HR MIN SEC SEQ. NO. 34
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3266.7265 | KM | DX | .46990855 | KM/SEC |
| Y | -1204.7686 | KM | DY | .68906602 | KM/SEC |
| Z | -762.15032 | KM | DZ | .48217298 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 11.56 | M | DX | .00482 | M/S | X | 11.56 | M | DX | .0048 | M/S |
| Y | 42.97 | M | DY | .06374 | M/S | Y | 42.97 | M | DY | .0637 | M/S |
| Z | 104.0 | M | DZ | .08662 | M/S | Z | 104.0 | M | DZ | .0866 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2689.50 | KM | ECC | .338259 | APF | 166.716 | DEG | |
| LAN | 196.664 | DEG | INC | 12.1170 | DEG | TFP | 5518.69 | SEC |
| RCA | 1779.75 | KM | PALT | 41.6599 | KM | PER | 208.604 | MIN |
| APO | 3599.24 | KM | AALT | 1861.15 | KM | TA | 168.752 | DEG |
| LAT | 355.000 | DEG | LONG | 172.615 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | -.82038078E-05 | C33 | +.18903241E-05 | C41 | -.510000000E-05 |
| C42 | -.46385292E-05 | C43 | +.60619570E-05 | C44 | -.18053382E-06 |
| S21 | -.411000000E-04 | S22 | -.57999998E-05 | S31 | +.170000000E-04 |
| S32 | -.20251432E-05 | S33 | -.15510922E-05 | S41 | -.102000000E-04 |
| S42 | +.56819922E-05 | S43 | +.31310543E-06 | S44 | +.46996514E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 829.95

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 953Y ITEM NO. 34

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 215, 06 HR, 22 MIN PREPARED BY: J.E.HEDWALL 0000(W)
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|--------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 66. | 11. | 21. | 18. | 50. | 0.000 |
| AGINJ+2 | 2918.99676514 | 1148.70594788 | 840.20973969 | .72945927 | .67907883 | .45067370 | |

5.1 O.D. IDENTIFICATION NO. 2P7A

TAPE NO.

5.2 EPOCH ~~0262266~~ DAY 325, 18 ' 50 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 35

SEQ. NO. 35

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 2924.5995 | KM | DX | -.72620142 | KM/SEC |
| Y | 1137.8730 | KM | DY | .68179747 | KM/SEC |
| Z | 835.45403 | KM | DZ | .45182901 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 5.743 | M | DX | .00427 | M/S | X | 5.743 | M | DX | .0043 | M/S |
| Y | 108.7 | M | DY | .03352 | M/S | Y | 108.7 | M | DY | .0335 | M/S |
| Z | 128.5 | M | DZ | .05687 | M/S | Z | 128.5 | M | DZ | .0569 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.35 | KM | ECC | .338400 | APF | 166.757 | DEG | |
| LAN | 194.316 | DEG | INC | 12.0146 | DEG | TFP | -3911.39 | SEC |
| RCA | 1779.27 | KM | PALT | 41.1820 | KM | PER | 208.587 | MIN |
| APO | 3599.42 | KM | AALT | 1861.33 | KM | TA | 217.991 | DEG |
| LAT | 4.99914 | DEG | LONG | 218.584 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | -.13402164E-04 | C33 | -.19114906E-05 | C41 | -.51000000E-05 |
| C42 | -.90364722E-05 | C43 | +.23365826E-04 | C44 | -.11408696E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.15593102E-04 | S33 | -.26019681E-05 | S41 | -.10200000E-04 |
| S42 | +.33471227E-04 | S43 | -.33279226E-05 | S44 | +.24747400E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2026.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 35.

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION**

| | | |
|--------------------------|-------------|--------------|
| TIME OF REPORT | PREPARED BY | J.A.BEACON |
| DAY 215 , 08 HR , 30 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|---------------|-----|-----|-----|-------|
| AGINAT | 1. | 66. | 11. | 22. | 11. | 27. | 0.000 |
| AGINJ+2 | 3416.22058105 | -937.50799561 | -573.91928101 | | | | |
| | .34110120 | .73279659 | .50600802 | | | | |

5.1 O.D. IDENTIFICATION NO. 2S10.2

TAPE NO. 953Y
 ITEM NO. 36
 SEQ. NO. N.A.
 COMPUTER B

5.2 EPOCH DAY ~~122~~, 11, 27, 0.000 GMT
 HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3411.7805 | KM | DX | .34463978 | KM/SEC |
| Y | -950.21410 | KM | DY | .73153673 | KM/SEC |
| Z | -579.40877 | KM | DZ | .50543299 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 3.632 M | DX | .00220 M/S | X | 3.632 M | DX | .0022 M/S |
| Y | 27.34 M | DY | .02383 M/S | Y | 27.34 M | DY | .0238 M/S |
| Z | 55.71 M | DZ | .03302 M/S | Z | 55.71 M | DZ | .0330 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.53 | KM | ECC | .338305 | APF | 167.206 | DEG |
| LAN | 185.133 | DEG | INC | 11.9254 | TFP | 5849.34 | SEC |
| RCA | 1779.65 | KM | PALT | 41.5609 | PER | 208.608 | MIN |
| APO | 3599.42 | KM | AALT | 1861.33 | TA | 173.808 | DEG |
| LAT | 356.145 | DEG | LONG | 166.528 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | -.18459967E-05 | C33 | -.41786639E-05 | C41 | -.510000000E-05 |
| C42 | -.61849112E-05 | C43 | +.25055659E-04 | C44 | +.13577447E-05 |
| S21 | -.411000000E-04 | S22 | -.57999998E-05 | S31 | +.170000000E-04 |
| S32 | +.35225117E-04 | S33 | -.82637767E-07 | S41 | -.102000000E-04 |
| S42 | +.45442742E-04 | S43 | -.13570928E-04 | S44 | +.28378356E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2593.9

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------------------|----------------------------|---------------------|-----------|---------------|--------------------|-------------------|
| 2133078154 | X(SPOE)12570045 | 12870236 | | 1 | .5935 | -.3848 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 36.

5.10 REMARKS: EPOCH REPORT 10 HARMONICS IN SOLUTION.

TIME OF REPORT: DAY 180, 03 HR, 26 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 11. 23. 1. 10. 0.000
 AGINJ+2 3110.05914307 -1392.61837769 -894.95217896
 .57837725 .64728040 .45452527

5.1 O.D. IDENTIFICATION NO. 2S11 TAPE NO. 800Y

327
 5.2 EPOCH DAY ~~210~~, 1 ' 10 ' 0.000 GMT ITEM NO. 37
 HR MIN SEC SEQ. NO. 37
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3103.4115 KM DX .58151279 KM/SEC
 Y -1404.1927 KM DY .64513873 KM/SEC
 Z -899.92993 KM DZ .45356847 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 29.96 M DX .01263 M/S X 29.96 M DX .0126 M/S
 Y 156.2 M DY .08462 M/S Y 156.2 M DY .0846 M/S
 Z 334.7 M DZ .10483 M/S Z 334.7 M DZ .1048 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.35 KM ECC .338206 APF 167.492 DEG
 LAN 177.601 DEG INC 12.0597 DEG TFP 5169.93 SEC
 RCA 1779.80 KM PALT 41.7081 KM PER 208.588 MIN
 APO 3598.91 KM AALT 1860.82 KM TA 163.323 DEG
 LAT 354.152 DEG LONG 148.957 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.207000000E-03 J30 -.445999999E-04 J40 -.209000000E-04
 C21 +.880000000E-05 C22 +.276000000E-04 C31 +.435000000E-04
 C32 +.27858256E-05 C33 -.29376608E-06 C41 -.510000000E-05
 C42 +.16218498E-06 C43 +.10071486E-04 C44 +.95018587E-06
 S21 -.411000000E-04 S22 -.57999998E-05 S31 +.170000000E-04
 S32 +.13312996E-04 S33 +.21608954E-06 S41 -.102000000E-04
 S42 +.18849984E-04 S43 -.87274303E-05 S44 +.11044999E-05

5.7 DATA ARC LENGTH: U HRS 0 MIN SOS= 585.18

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 717Y ITEM NO. 37

5.10 REMARKS: EPOCH REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 216 , 02 HR , 29 MIN PREPARED BY: GEO.S.GOODWIN
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|---------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 66. | 11. | 23. | 5. | 45. | 0.000 |
| AGINJ+2 | 2427.03753662 | 1521.57809448 | 1085.73674011 | .96989318 | .55452424 | .36000891 | |

5.1 O.D. IDENTIFICATION NO. 2P10A

TAPE NO. 747Y

327

ITEM NO. 38

5.2 EPOCH DAY 210 , 5 ' 45 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 38
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 2434.4276 | KM | DX | -.96724243 | KM/SEC |
| Y | 1512.5765 | KM | DY | .55813523 | KM/SEC |
| Z | 1081.7627 | KM | DZ | .36155717 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 7.033 M | DX | .00293 M/S | X | 7.033 M | DX | .0029 M/S |
| Y | 49.08 M | DY | .01684 M/S | Y | 49.08 M | DY | .0168 M/S |
| Z | 54.20 M | DZ | .03297 M/S | Z | 54.20 M | DZ | .0330 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2689.40 | KM | ECC | .338183 | APF | 167.600 | DEG |
| LAN | 175.046 | DEG | INC | 11.9679 | TFP | -3359.04 | SEC |
| RCA | 1779.89 | KM | PALT | 41.7999 | KM | PER | 208.593 |
| APO | 3598.91 | KM | AALT | 1860.82 | KM | TA | 228.859 |
| LAT | 7.07824 | DEG | LONG | 210.905 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | +.53802307E-05 | C33 | -.12264265E-05 | C41 | -.510000000E-05 |
| C42 | -.34420196E-05 | C43 | +.12217806E-04 | C44 | +.97934785E-06 |
| S21 | -.411000000E-04 | S22 | -.579999998E-05 | S31 | +.170000000E-04 |
| S32 | +.22346904E-04 | S33 | +.10973774E-05 | S41 | -.102000000E-04 |
| S42 | +.23400527E-04 | S43 | -.89191753E-05 | S44 | +.13024723E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 832.06

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 093Y ITEM NO. 38

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION**

TIME OF REPORT: DAY 216 , 04 HR , 42 MIN
PREPARED BY: J.E. REDWALL
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|----------------|-----------|-----|-----|---------------|-------|
| AGINAT | 1. | 66. | 11. | 23. | 22. | 10. | 0.000 |
| AGINJ+2 | 3368.11062622 | -1025.27458191 | | | | -629.77528381 | |
| | .39008210 | | .72016322 | | | .49770689 | |

5.1 O.D. IDENTIFICATION NO. 2S12

TAPE NO.

327

ITEM NO. 39

5.2 EPOCH DAY ~~210~~, 22 ' 10 ' 0.000 GMT

SEQ. NO. 39

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 3363.2543 | KM | DX | .39356009 | KM/SEC |
| Y | -1037.8041 | KM | DY | .71872192 | KM/SEC |
| Z | -635.18312 | KM | DZ | .49705186 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 9.271 M | DX | .00625 M/S | X | 9.271 M | DX | .0063 M/S |
| Y | 58.35 M | DY | .03068 M/S | Y | 58.35 M | DY | .0307 M/S |
| Z | 135.2 M | DZ | .03992 M/S | Z | 135.2 M | DZ | .0399 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.33 | KM | ECC | .337717 | APF | 168.116 | DEG |
| LAN | 165.841 | DEG | INC | 11.8588 | TFP | 5684.88 | SEC |
| RCA | 1781.10 | KM | PALT | 43.0072 | PER | 208.585 | MIN |
| APO | 3597.56 | KM | AALT | 1859.47 | TA | 171.302 | DEG |
| LAT | 355.857 | DEG | LONG | 145.663 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.23674940E-04 | C33 | +.13736154E-05 | C41 | -.51000000E-05 |
| C42 | +.88618938E-05 | C43 | +.29024694E-05 | C44 | +.10419551E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.14072510E-04 | S33 | +.37968551E-05 | S41 | -.10200000E-04 |
| S42 | +.18765849E-04 | S43 | -.11191703E-04 | S44 | +.10793635E-06 |

5.7 DATA ARC LENGTH: U HRS 0 MIN SOS= 1523.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 39.

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| DAY 216 , 06 HR , 40 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|---------------|------------|-----------|-----------|-------|
| AGINAT | 1. | 66. | 11. | 24. | 6. | 15. | 0.000 |
| AGINJ+2 | 1750.09786987 | 1812.58367920 | 1272.05470276 | 1.21623483 | .35311577 | .21701321 | |

5.1 O.D. IDENTIFICATION NO. 2P12A TAPE NO. 036Y

328

5.2 EPOCH DAY ~~210~~, 6 ' 15 ' 0.000 GMT ITEM NO. 40

HR MIN SEC SEQ. NO. 40

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 1758.8770 | KM | DX | -1.2145616 | KM/SEC |
| Y | 1806.1005 | KM | DY | .35764020 | KM/SEC |
| Z | 1269.1645 | KM | DZ | .21896666 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 9.554 | M | DX | .00205 | M/S | X | 9.554 | M | DX | .0021 | M/S |
| Y | 46.34 | M | DY | .01383 | M/S | Y | 46.34 | M | DY | .0138 | M/S |
| Z | 54.83 | M | DZ | .03215 | M/S | Z | 54.83 | M | DZ | .0322 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.39 | KM | ECC | .337547 | APF | 168.137 | DEG | |
| LAN | 161.467 | DEG | INC | 11.9533 | DEG | TFP | -2756.88 | SEC |
| RCA | 1781.60 | KM | PALT | 43.5057 | KM | PER | 208.592 | MIN |
| APO | 3597.19 | KM | AALT | 1859.10 | KM | TA | 242.527 | DEG |
| LAT | 9.21806 | DEG | LONG | 211.514 | DEG | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.10320771E-04 | C33 | +.16987327E-05 | C41 | -.51000000E-05 |
| C42 | -.17151320E-05 | C43 | +.34882240E-05 | C44 | +.16563692E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.69701017E-05 | S33 | +.13550669E-05 | S41 | -.10200000E-04 |
| S42 | +.49003550E-05 | S43 | -.30167849E-05 | S44 | +.37250131E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1806.1

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 729Y ITEM NO. 40

5.10 REMARKS: EPOCH REPORT *****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 216 , 08 HR , 17 MIN

PREPARED BY: GEO.S.GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2
 AGINAT 1. 66. 11. 24. 22. 30. 0.000
 AGINJ+2 3375.19515991 -1007.76770020 -610.47249603
 .38306918 .72358663 .49937705

5.1 O.D. IDENTIFICATION NO. 2513 TAPE NO.
 328 ITEM NO. 41 N/A
 5.2 EPOCH DAY 1210, 22, 30, 0.000 GMT SEQ. NO. 41 N/A
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3370.4341 KM DX .38656337 KM/SEC
 Y -1020.3222 KM DY .72216976 KM/SEC
 Z -615.89912 KM DZ .49873513 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 9.034 M DX .00629 M/S X 9.034 M DX .0063 M/S
 Y 61.41 M DY .02218 M/S Y 61.41 M DY .0222 M/S
 Z 139.7 M DZ .02826 M/S Z 139.7 M DZ .0283 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.22 KM ECC .336989 APF 168.845 DEG
 LAN 152.084 DEG INC 11.7884 DEG TFP 5690.57 SEC
 RCA 1782.98 KM PALT 44.8934 KM PER 208.572 MIN
 APO 3595.76 KM AALT 1857.37 KM TA 171.382 DEG
 LAT 356.037 DEG LONG 132.698 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.207000000E-03 J30 -.445999999E-04 J40 -.209000000E-04
 C21 +.880000000E-05 C22 +.276000000E-04 C31 +.435000000E-04
 C32 +.29952732E-04 C33 +.63889306E-05 C41 -.510000000E-05
 C42 +.15688839E-04 C43 -.28843080E-05 C44 -.73538896E-07
 S21 -.411000000E-04 S22 -.57999998E-05 S31 +.170000000E-04
 S32 -.86104944E-05 S33 +.37270999E-05 S41 -.102000000E-04
 S42 +.10399701E-04 S43 -.50164110E-05 S44 -.51007786E-06

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1074.0

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------------------|----------------|----------------------|---------------------|---------------|--------------------|------------------|
| 6851469208 | *0. | 5272/3655 | 194/4730 | 1 | .9227 | .8905 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 41.

5.10 REMARKS: EPOCH REPORT
 10 HARMONICS IN SOLUTION.

TIME OF REPORT: DAY 179, 09 HR, 34 MIN PREPARED BY: G.S.GOODWIN 0000
 GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 66. 11. 25. 12. 26. 0.000
 AGINJ+2 3416.58825684 -926.01846313 -540.15293884
 .34107639 .73722181 .50532349

(5.1 O.D. IDENTIFICATION NO. 2S15 TAPE NO. 799Y
 (329 ITEM NO. 42
 (5.2 EPOCH DAY ~~122~~, 12, 26, 0.000 GMT SEQ. NO. 42
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 3412.2446 KM DX .34463113 KM/SEC
 (Y -938.72855 KM DY .73596239 KM/SEC
 (Z -545.64380 KM DZ .50474719 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 4.553 M DX .00323 M/S X 4.553 M DX .0032 M/S
 (Y 42.29 M DY .01018 M/S Y 42.29 M DY .0102 M/S
 (Z 89.43 M DZ .01332 M/S Z 89.43 M DZ .0133 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2689.21 KM ECC .336546 APF 169.706 DEG
 (LAN 143.750 DEG INC 11.6051 DEG TFP 5798.65 SEC
 (RCA 1784.17 KM PALT 46.0777 KM PER 208.571 MIN
 (APO 3594.25 KM AALT 1856.16 KM TA 173.030 DEG
 (LAT 356.577 DEG LONG 126.818 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.207000000E-03 J30 -.445999999E-04 J40 -.209000000E-04
 C21 +.880000000E-05 C22 +.276000000E-04 C31 +.435000000E-04
 C32 +.565575111E-04 C33 +.153110000E-04 C41 -.510000000E-05
 C42 +.495492277E-04 C43 -.13355119E-04 C44 -.11810290E-05
 S21 -.411000000E-04 S22 -.579999998E-05 S31 +.170000000E-04
 S32 -.44630591E-04 S33 +.39010406E-05 S41 -.102000000E-04
 S42 +.11753861E-04 S43 -.31938272E-05 S44 -.14762836E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 11798

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 696Y ITEM NO. 42

(5.10 REMARKS: EPOCH REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 217, 04 HR, 41 MIN GMT O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION II MAP TIME REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2PI TAPE NO. 985Y
 322 ITEM NO. 28
 5.2 EPOCH DAY ~~210~~, 15 ' 24 ' 0.000 GMT SEQ. NO. 28
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1654.5724 | KM | DX | -.65836724 | KM/SEC |
| Y | 575.13327 | KM | DY | -1.4776950 | KM/SEC |
| Z | 365.86898 | KM | DZ | -1.0195794 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 6.177 M | DX | .01966 M/S | X | 6.177 M | DX | .0197 M/S |
| Y | 74.56 M | DY | .15313 M/S | Y | 74.56 M | DY | .1531 M/S |
| Z | 116.7 M | DZ | .23063 M/S | Z | 116.7 M | DZ | .2306 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.65 | KM | ECC | .336695 | APF | 164.822 | DEG | |
| LAN | 236.435 | DEG | INC | 11.9970 | DEG | TFP | -144.818 | SEC |
| RCA | 1784.06 | KM | PALT | 45.9709 | KM | PER | 208.622 | MIN |
| APO | 3595.25 | KM | AALT | 1857.16 | KM | TA | 351.104 | DEG |
| LAT | 4.86199 | DEG | LONG | 32.8390 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN. SOS= 4861.5

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 832Y ITEM NO. 28

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 214 , 08 HR , 06 MIN
 PREPARED BY: J.E.HEDWALL 0000(W)
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 G.D. IDENTIFICATION NO. 252A TAPE NO. 985Y
 322 ITEM NO. 28
 5.2 EPOCH DAY 214, 18 53 0.000 GMT SEQ. NO. 28
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1670.9868 | KM | DX | -.62086713 | KM/SEC |
| Y | 536.49477 | KM | DY | -1.4897830 | KM/SEC |
| Z | 338.87345 | KM | DZ | -1.0289610 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 17.30 | M | DX | .04703 | M/S | X | 17.30 | M | DX | .0470 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 89.78 | M | DY | .15221 | M/S | Y | 89.78 | M | DY | .1522 | M/S |
| Z | 126.7 | M | DZ | .22829 | M/S | Z | 126.7 | M | DZ | .2283 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.60 | KM | ECC | .336807 | APF | 164.973 | DEG | |
| LAN | 234.426 | DEG | INC | 12.0241 | DEG | TFP | -119.452 | SEC |
| RCA | 1783.72 | KM | PALT | 45.6318 | KM | PER | 208.616 | MIN |
| APO | 3595.47 | KM | AALT | 1857.38 | KM | TA | 352.655 | DEG |
| LAT | 4.54780 | DEG | LONG | 32.4980 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 832Y ITEM NO. 28

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:

DAY 214, 08 HR, 10 MIN

PREPARED BY:

J.E. HEDWALL 0000

G.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 252B TAPE NO. 985Y
 5.2 EPOCH DAY ³²² ~~210~~, 22, 22, 0.000 GMT ITEM NO. 28
 HR MIN SEC SEQ. NO. 28
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1686.4437 | KM | DX | -.58275804 | KM/SEC |
| Y | 497.43917 | KM | DY | -1.5010699 | KM/SEC |
| Z | 311.55311 | KM | DZ | -1.0370110 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 27.61 M | DX | .07662 M/S | X | 27.61 M | DX | .0766 M/S |
| Y | 111.5 M | DY | .15146 M/S | Y | 111.5 M | DY | .1515 M/S |
| Z | 139.7 M | DZ | .22592 M/S | Z | 139.7 M | DZ | .2259 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2689.54 | KM | ECC | .336924 | APF | 165.115 | DEG |
| LAN | 232.417 | DEG | INC | 12.0523 | TFP | -94.0348 | SEC |
| RCA | 1783.37 | KM | PALT | 45.2828 | PER | 208.610 | MIN |
| APO | 3595.72 | KM | AALT | 1857.63 | TA | 354.213 | DEG |

LAT 4.22712 DEG LONG 32.1636 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 832Y ITEM NO. 28

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 214, 08 HR, 14 MIN PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 253

TAPE NO. 178Y

323

ITEM NO. 30

5.2 EPOCH DAY ~~122~~, 2 : 54 : 0.000 GMT

SEQ. NO. 30

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 1814.6150 KM

DX 1.0664221 KM/SEC

Y -2173.9956 KM

DY .27864622 KM/SEC

Z -1451.7402 KM

DZ .20867485 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 30.78 M

DX .00851 M/S

X 30.78 M

DX .0085 M/S

Y 90.61 M

DY .10399 M/S

Y 90.61 M

DY .1040 M/S

Z 128.8 M

DZ .16065 M/S

Z 128.8 M

DZ .1607 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.63 KM

ECC .336813

APF 165.235 DEG

LAN 229.868 DEG

INC 11.9765 DEG

TFP 3711.54 SEC

RCA 1783.73 KM

PALT 45.6380 KM

PER 208.620 MIN

APU 3595.53 KM

AALT 1857.44 KM

TA 138.097 DEG

LAT 350.016 DEG

LONG 173.781 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 563.19

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 363Y ITEM NO. 30

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 214 , 09 HR , 28 MINPREPARED BY: J.A.BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 254

TAPE NO. 178Y

5.2 EPOCH DAY ³²³~~122~~, 6 ' 22 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 30
 SEQ. NO. 30
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 1780.1853 | KM | DX | 1.0755488 | KM/SEC |
| Y | -2182.0344 | KM | DY | .26773471 | KM/SEC |
| Z | -1458.1891 | KM | DZ | .20163110 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 66.25 M | DX | .01730 M/S | X | 66.25 M | DX | .0173 M/S |
| Y | 92.58 M | DY | .10428 M/S | Y | 92.58 M | DY | .1043 M/S |
| Z | 134.6 M | DZ | .16138 M/S | Z | 134.6 M | DZ | .1614 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.62 | KM | ECC | .336941 | APF | 165.312 | DEG |
| LAN | 227.934 | DEG | INC | 11.9874 | TFP | 3676.84 | SEC |
| RCA | 1783.38 | KM | PALT | 45.2875 | PER | 208.619 | MIN |
| APO | 3595.87 | KM | AALT | 1857.78 | TA | 137.433 | DEG |
| LAT | 349.939 | DEG | LONG | 171.256 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 363Y ITEM NO. 30

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A. BEACON |
| DAY 214 , 09 HR , 31 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P2

TAPE NO. 532Y

323

ITEM NO. 31

5.2 EPOCH DAY ~~122~~, 8 ' 48 ' 40.000 GMTSEQ. NO. ~~1111~~

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1716.8863 | KM | DX | -.49675618 | KM/SEC |
| Y | 410.01542 | KM | DY | -1.5260043 | KM/SEC |
| Z | 250.26530 | KM | DZ | -1.0495994 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.75 | KM | ECC | .337321 | APF | 165.247 | DEG | |
| LAN | 226.686 | DEG | INC | 11.9733 | DEG | TFP | -38.2594 | SEC |
| RCA | 1782.44 | KM | PALT | 44.3482 | KM | PER | 208.633 | MIN |
| APO | 3597.05 | KM | AALT | 1858.96 | KM | TA | 357.642 | DEG |
| LAT | 3.49953 | DEG | LONG | 29.9259 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS.

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 179 , 07 HR , 17 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P3A

TAPE NO. 532Y

5.2 EPOCH DAY ³²³~~122~~, 15 ' 43 ' 20.000 GMT
 HR MIN SEC

ITEM NO. 31
 SEQ. NO. ~~1111~~
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1626.9519 | KM | DX | -.70932331 | KM/SEC |
| Y | 631.17629 | KM | DY | -1.4592168 | KM/SEC |
| Z | 402.57009 | KM | DZ | -1.0099640 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2690.14 | KM | ECC | .337661 | APF | 165.468 | DEG | |
| LAN | 222.768 | DEG | INC | 12.0219 | DEG | TFP | -187.770 | SEC |
| RCA | 1781.78 | KM | PALT | 43.6913 | KM | PER | 208.678 | MIN |
| APO | 3598.49 | KM | AALT | 1860.40 | KM | TA | 348.456 | DEG |
| LAT | 5.25320 | DEG | LONG | 17.1891 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT
 10 HARMONICS.

TIME OF REPORT:
 DAY 179 , 07 HR , 22 MIN

PREPARED BY: J.E.HEDWALL 0100
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P3B

TAPE NO. 532Y

ITEM NO. 31

5.2 EPOCH DAY ~~122~~, 19 12 20.000 GMT
HR MIN SEC

SEQ. NO. N/A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1644.7361 | KM | DX | -.67245115 | KM/SEC |
| Y | 592.95043 | KM | DY | -1.4727211 | KM/SEC |
| Z | 376.04215 | KM | DZ | -1.0194565 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2690.11 | KM | ECC | .337774 | APF | 165.576 | DEG | |
| LAN | 220.805 | DEG | INC | 12.0412 | DEG | TFP | -162.637 | SEC |
| RCA | 1781.46 | KM | PALT | 43.3739 | KM | PER | 208.676 | MIN |
| APO | 3598.76 | KM | AALT | 1860.67 | KM | TA | 349.989 | DEG |
| LAT | 4.95055 | DEG | LONG | 16.8462 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 179 , 07 HR , 26 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P4

TAPE NO. 532Y

323
 5.2 EPOCH DAY ~~122~~, 22 ' 40 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 31
 SEQ. NO. ~~444~~
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1606.2727 | KM | DX | -.74691349 | KM/SEC |
| Y | 671.52731 | KM | DY | -1.4434736 | KM/SEC |
| Z | 430.45903 | KM | DZ | -1.0017570 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2690.35 | KM | ECC | .337941 | APF | 165.678 | DEG | |
| LAN | 218.853 | DEG | INC | 12.0617 | DEG | TFP | -217.348 | SEC |
| RCA | 1781.17 | KM | PALT | 43.0792 | KM | PER | 208.703 | MIN |
| APO | 3599.53 | KM | AALT | 1861.44 | KM | TA | 346.644 | DEG |

LAT 5.57003 DEG LONG 11.6981 DEG

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

5.10 REMARKS' MAP TIME REPORT
 10 HARMONICS.

TIME OF REPORT'
 DAY 179 , 07 HR , 29 MIN

PREPARED BY' J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P5

TAPE NO.

324
 5.2 EPOCH DAY 1210, 2 ' 11 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 324

SEQ. NO. N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1700.0458 | KM | DX | -.53902448 | KM/SEC |
| Y | 455.65173 | KM | DY | -1.5172170 | KM/SEC |
| Z | 280.42030 | KM | DZ | -1.0424080 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 2.469 M | DX | .00864 M/S | X | 2.469 M | DX | .0086 M/S |
| Y | 20.72 M | DY | .04691 M/S | Y | 20.72 M | DY | .0469 M/S |
| Z | 21.84 M | DZ | .06931 M/S | Z | 21.84 M | DZ | .0693 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2690.09 | KM | ECC | .337985 | APF | 165.569 | DEG |
| LAN | 217.091 | DEG | INC | 11.9155 | TFP | -72.3525 | SEC |
| RCA | 1780.88 | KM | PALT | 42.7921 | KM | PER | 208.673 |
| APO | 3599.30 | KM | AALT | 1861.21 | KM | TA | 355.535 |
| LAT | 3.83394 | DEG | LONG | 18.5742 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2494.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 178, 04 HR, 07 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---------------------------------------|-------------|
| 5.1 O.D. IDENTIFICATION NO. 255 | TAPE NO. |
| | ITEM NO. 32 |
| 5.2 EPOCH DAY 324 , 10 11 - 0.000 GMT | SEQ. NO. 32 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|---------------------|
| X 1827.5125 KM | DX 1.0661321 KM/SEC |
| Y -2165.0225 KM | DY .28219488 KM/SEC |
| Z -1443.4276 KM | DZ .21101708 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 34.81 M | DX .00889 M/S | X 34.81 M | DX .0089 M/S |
| Y 56.18 M | DY .02052 M/S | Y 56.18 M | DY .0205 M/S |
| Z 72.88 M | DZ .02805 M/S | Z 72.88 M | DZ .0281 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 2689.50 KM | ECC .337822 | APF 165.723 DEG |
| LAN 212.704 DEG | INC 11.9407 DEG | TFP 3697.73 SEC |
| RCA 1780.93 KM | PALT 42.8397 KM | PER 208.605 MIN |
| APO 3598.08 KM | AALT 1859.99 KM | TA 137.911 DEG |
| LAT 350.081 DEG | LONG 156.918 DEG | |

5.6 LUNAR HARMONICS USED- LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH- 0 HRS 0 MIN SOS= 43244

5.8 DATA SUMMARY-

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS- ~~NOT AVAILABLE~~

5.10 REMARKS- MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT- | PREPARED BY- | J.A.BEACON |
| DAY 261 , 06 HR , 21 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P6A

TAPE NO.

324
 5.2 EPOCH DAY 1210, 16 7 0.000 GMT
 HR MIN SEC

ITEM NO. 324
 SEQ. NO. N.A.
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1747.1296 | KM | DX | -.38092722 | KM/SEC |
| Y | 295.36008 | KM | DY | -1.5514403 | KM/SEC |
| Z | 170.43423 | KM | DZ | -1.0647332 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 14.73 | M | DX | .06769 | M/S | X | 14.73 | M | DX | .0677 | M/S |
| Y | 75.24 | M | DY | .04516 | M/S | Y | 75.24 | M | DY | .0452 | M/S |
| Z | 47.87 | M | DZ | .07104 | M/S | Z | 47.87 | M | DZ | .0710 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|---------|-----|
| SMA | 2690.05 | KM | ECC | .338341 | | APF | 165.861 | DEG |
| LAN | 209.407 | DEG | INC | 11.9558 | DEG | TFP | 27.7182 | SEC |
| RCA | 1779.90 | KM | PALT | 41.8062 | KM | PER | 208.668 | MIN |
| APO | 3600.20 | KM | AALT | 1862.11 | KM | TA | 1.71301 | DEG |
| LAT | 2.55495 | DEG | LONG | 17.2421 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.

TIME OF REPORT:
 DAY 179, 04 HR, 15 MIN

PREPARED BY: G.S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P6B TAPE NO.
 324 ITEM NO. 32***.

5.2 EPOCH DAY 179, 19 ' 36 ' 0.000 GMT SEQ. NO. N.A.
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1756.3112 | KM | DX | -.34074650 | KM/SEC |
| Y | 254.82120 | KM | DY | -1.5577219 | KM/SEC |
| Z | 142.63216 | KM | DZ | -1.0686942 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 14.66 | M | DX | .07579 | M/S | X | 14.66 | M | DX | .0758 | M/S |
| Y | 82.83 | M | DY | .04496 | M/S | Y | 82.83 | M | DY | .0450 | M/S |
| Z | 53.86 | M | DZ | .07073 | M/S | Z | 53.86 | M | DZ | .0707 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2690.04 | KM | ECC | .338412 | APF | 165.932 | DEG | |
| LAN | 207.490 | DEG | INC | 11.9645 | DEG | TFP | 52.6756 | SEC |
| RCA | 1779.70 | KM | PALT | 41.6068 | KM | PER | 208.667 | MIN |

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----|---------|-----|
| APO | 3600.38 | KM | AALT | 1862.29 | KM | TA | 3.25539 | DEG |
| LAT | 2.22886 | DEG | LONG | 16.9068 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT
 10 HARMONICS.

TIME OF REPORT: PREPARED BY: G. S. GOODWIN
 DAY 179, 04 HR, 18 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 256

TAPE NO. 938Y

DAY 325

ITEM NO. 33

5.2 EPOCH ~~0262266~~, 2 : 30 : 0.000 GMT

SEQ. NO. 33

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1665.4987 KM

DX -.61974251 KM/SEC

Y 542.72338 KM

DY -1.4887660 KM/SEC

Z 339.39686 KM

DZ -1.0357202 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 5.894 M

DX .01501 M/S

X 5.894 M

DX .0150 M/S

Y 23.73 M

DY .22211 M/S

Y 23.73 M

DY .2221 M/S

Z 31.44 M

DZ .32005 M/S

Z 31.44 M

DZ .3201 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2690.61 KM

ECC .338671

APF 166.566 DEG

LAN 203.153 DEG

INC 12.1600 DEG

TFP -136.825 SEC

RCA 1779.38 KM

PALT 41.2860 KM

PER 208.733 MIN

APO 3601.84 KM

AALT 1863.75 KM

TA 351.554 DEG

LAT 4.50222 DEG

LONG 1.71949 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 1323.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 727Y ITEM NO. 33

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:
DAY 215 , 04 HR , 55 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 257

TAPE NO. 938Y

DAY 325
 5.2 EPOCH ~~0262266~~, 9 27 0.000 GMT
 HR MIN SEC

ITEM NO. 33
 SEQ. NO. 33
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1660.5492 | KM | DX | -.62970392 | KM/SEC |
| Y | 554.01434 | KM | DY | -1.4850030 | KM/SEC |
| Z | 347.44838 | KM | DZ | -1.0344962 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 28.66 M | DX | .07200 M/S | X | 28.66 M | DX | .0720 M/S |
| Y | 85.14 M | DY | .21422 M/S | Y | 85.14 M | DY | .2142 M/S |
| Z | 51.56 M | DZ | .32574 M/S | Z | 51.56 M | DZ | .3257 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2690.57 | KM | ECC | .338782 | APF | 166.723 | DEG |
| LAN | 199.314 | DEG | INC | 12.1865 | TFP | -146.658 | SEC |
| RCA | 1779.05 | KM | PALT | 40.9624 | PER | 208.729 | MIN |
| APO | 3602.08 | KM | AALT | 1863.99 | TA | 350.947 | DEG |
| LAT | 4.60019 | DEG | LONG | 357.440 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| SIA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 727Y ITEM NO. 33

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT:
 DAY 215, 04 HR, 59 MIN

PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 259

TAPE NO. 574Y

5.2 EPOCH ~~0131194~~ ^{DAY 325} , 23 ' 23 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 34
 SEQ. NO. 34
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1718.3244 | KM | DX | -.47370603 | KM/SEC |
| Y | 395.77159 | KM | DY | -1.5300790 | KM/SEC |
| Z | 237.64661 | KM | DZ | -1.0598191 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 19.40 M | DX | .06985 M/S | X | 19.40 M | DX | .0699 M/S |
| Y | 83.65 M | DY | .12152 M/S | Y | 83.65 M | DY | .1215 M/S |
| Z | 42.19 M | DZ | .19224 M/S | Z | 42.19 M | DZ | .1922 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2690.67 | KM | ECC | .338942 | APF | 166.897 | DEG | |
| LAN | 191.784 | DEG | INC | 12.1248 | TFP | -46.5168 | SEC | |
| RCA | 1778.69 | KM | PALT | 40.5972 | KM | PER | 208.740 | MIN |
| APO | 3602.65 | KM | AALT | 1864.56 | KM | TA | 357.122 | DEG |
| LAT | 3.31509 | DEG | LONG | 356.142 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 953Y ITEM NO. 34

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
 DAY 215 , 06 HR , 28 MIN

PREPARED BY: J.E.HEDWALL 0000(W)
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P7A

TAPE NO.

ITEM NO. 35

5.2 EPOCH DAY ~~122~~, 2 52 0.000 GMT
HR MIN SEC

SEQ. NO. 35

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1730.3379 | KM | DX | -.43350404 | KM/SEC |
| Y | 355.96480 | KM | DY | -1.5401309 | KM/SEC |
| Z | 208.74778 | KM | DZ | -1.0631280 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 20.67 M | DX | .08460 M/S | X | 20.67 M | DX | .0846 M/S |
| Y | 91.02 M | DY | .09859 M/S | Y | 91.02 M | DY | .0986 M/S |
| Z | 55.50 M | DZ | .14809 M/S | Z | 55.50 M | DZ | .1481 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2690.96 | KM | ECC | .338994 | APF | 167.057 | DEG |
| LAN | 189.790 | DEG | INC | 12.0487 | DEG | TFP | -21.4597 |
| RCA | 1778.74 | KM | PALT | 40.6525 | KM | PER | 208.775 |
| APO | 3603.19 | KM | AALT | 1865.10 | KM | TA | 358.672 |
| LAT | 2.94957 | DEG | LONG | 355.821 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2006.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:

DAY 215 , 08 HR , 34 MIN

PREPARED BY:

GMT

J.A.BEACON

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P7B

TAPE NO.

5.2 EPOCH DAY ³²⁶~~122~~, 6 ' 21 ' 0.000 GMT
HR MIN SEC

ITEM NO. 35
SEQ. NO. 35
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1741.1942 | KM | DX | -.39308876 | KM/SEC |
| Y | 315.31467 | KM | DY | -1.5477311 | KM/SEC |
| Z | 180.76679 | KM | DZ | -1.0679618 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 26.72 M | DX | .11746 M/S | X | 26.72 M | DX | .1175 M/S |
| Y | 123.7 M | DY | .09791 M/S | Y | 123.7 M | DY | .0979 M/S |
| Z | 77.67 M | DZ | .14927 M/S | Z | 77.67 M | DZ | .1493 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2690.86 | KM | ECC | .338977 | APF | 167.135 | DEG | |
| LAN | 187.876 | DEG | INC | 12.0588 | DEG | TFP | 3.60647 | SEC |
| RCA | 1778.72 | KM | PALT | 40.6299 | KM | PER | 208.763 | MIN |
| APO | 3603.00 | KM | AALT | 1864.91 | KM | TA | .223174 | DEG |
| LAT | 2.62064 | DEG | LONG | 355.504 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 215 , 08 HR , 37 MIN

PREPARED BY: J.A.BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2S10.2

TAPE NO. 953Y

5.2 EPOCH DAY ³²⁶ ~~122~~, 13, 16, 0.000 GMT

ITEM NO. 36

HR MIN SEC

SEQ. NO. N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1679.3788 | KM | DX | -.58125870 | KM/SEC |
| Y | 510.60377 | KM | DY | -1.5040101 | KM/SEC |
| Z | 313.53618 | KM | DZ | -1.0379911 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 3.962 | M | DX | .01389 | M/S | X | 3.962 | M | DX | .0139 | M/S |
| Y | 26.73 | M | DY | .04776 | M/S | Y | 26.73 | M | DY | .0478 | M/S |
| Z | 27.16 | M | DZ | .06924 | M/S | Z | 27.16 | M | DZ | .0692 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2691.21 | KM | ECC | .338986 | APF | 167.377 | DEG | |
| LAN | 183.970 | DEG | INC | 11.9495 | DEG | TFP | -125.791 | SEC |
| RCA | 1778.92 | KM | PALT | 40.8334 | KM | PER | 208.803 | MIN |
| APO | 3603.49 | KM | AALT | 1865.40 | KM | TA | 352.229 | DEG |
| LAT | 4.13758 | DEG | LONG | 343.982 | DEG | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 2591.9

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~5.10 REMARKS' MAP TIME REPORT
10 HARMONICS.TIME OF REPORT'
DAY 180, 03 HR, 30 MINPREPARED BY' J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P8A

TAPE NO. 953Y

326

ITEM NO. 36

5.2 EPOCH DAY ~~122~~, 16, 48, 0.000 GMT
HR MIN SECSEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1767.6179 | KM | DX | -.27006818 | KM/SEC |
| Y | 192.58612 | KM | DY | -1.5675658 | KM/SEC |
| Z | 94.837142 | KM | DZ | -1.0745960 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 3.867 | M | DX | .03573 | M/S | X | 3.867 | M | DX | .0357 | M/S |
| Y | 42.31 | M | DY | .04949 | M/S | Y | 42.31 | M | DY | .0495 | M/S |
| Z | 24.57 | M | DZ | .07267 | M/S | Z | 24.57 | M | DZ | .0727 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2691.23 | KM | ECC | .338973 | APF | 167.475 | DEG | |
| LAN | 182.044 | DEG | INC | 11.9413 | DEG | TFP | 78.8311 | SEC |
| RCA | 1778.98 | KM | PALT | 40.8853 | KM | PER | 208.806 | MIN |
| APO | 3603.48 | KM | AALT | 1865.39 | KM | TA | 4.87415 | DEG |
| LAT | 1.57847 | DEG | LONG | 354.557 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 180, 03 HR, 35 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P8B

TAPE NO. 953Y

5.2 EPOCH DAY ³²⁶~~122~~, 20 17 0.000 GMT
HR MIN SECITEM NO. 36
SEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1774.2444 | KM | DX | -.22878863 | KM/SEC |
| Y | 151.10887 | KM | DY | -1.5713282 | KM/SEC |
| Z | 66.353230 | KM | DZ | -1.0767689 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 5.336 M | DX | .05373 M/S | X | 5.336 M | DX | .0537 M/S |
| Y | 60.01 M | DY | .04967 M/S | Y | 60.01 M | DY | .0497 M/S |
| Z | 35.63 M | DZ | .07289 M/S | Z | 35.63 M | DZ | .0729 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2691.08 | KM | ECC | .338904 | APF | 167.563 | DEG | |
| LAN | 180.118 | DEG | INC | 11.9513 | TFP | 104.067 | SEC | |
| RCA | 1779.07 | KM | PALT | 40.9753 | KM | PER | 208.789 | MIN |
| APO | 3603.10 | KM | AACT | 1865.01 | KM | TA | 6.43095 | DEG |
| LAT | 1.24158 | DEG | LONG | 354.241 | DEG | | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~5.10 REMARKS' MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 180 03 HR 39 MINPREPARED BY: J.E. MEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P8C

TAPE NO. 953Y

ITEM NO. 36

5.2 EPOCH DAY ³²⁶~~122~~, 23 ' 46 ' 0.000 GMT

SEQ. NO. N.A.

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1779.7896 KM

DX -.18745186 KM/SEC

Y 109.53433 KM

DY -1.5741291 KM/SEC

Z 37.780245 KM

DZ -1.0782512 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 5.531 M

DX .06780 M/S

X 5.531 M

DX .0678 M/S

Y 73.96 M

DY .04984 M/S

Y 73.96 M

DY .0498 M/S

Z 45.06 M

DZ .07293 M/S

Z 45.06 M

DZ .0729 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2690.94 KM

ECC .338826

APF 167.652 DEG

LAN 178.190 DEG

INC 11.9605 DEG

TFP 129.342 SEC

RCA 1779.18 KM

PALT 41.0884 KM

PER 208.772 MIN

APO 3602.70 KM

AALT 1864.61 KM

TA 7.98720 DEG

LAT .902910 DEG

LONG 353.924 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS* -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

10 HARMONICS

TIME OF REPORT:

PREPARED BY:

J.E.HEDWALL 0000

DAY 180, 03 HR, 42 MIN GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2511

TAPE NO. 800Y

ITEM NO. 37

327
 5.2 EPOCH DAY ~~210~~, 3 ' 8 ' 0.000 GMT
 HR MIN SEC

SEQ. NO. 37
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1589.7307 | KM | DX | -.76639389 | KM/SEC |
| Y | 706.61556 | KM | DY | -1.4321222 | KM/SEC |
| Z | 451.85938 | KM | DZ | -.99718685 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 7.704 M | DX | .01516 M/S | X | 7.704 M | DX | .0152 M/S |
| Y | 109.4 M | DY | .17420 M/S | Y | 109.4 M | DY | .1742 M/S |
| Z | 149.2 M | DZ | .25211 M/S | Z | 149.2 M | DZ | .2521 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2690.16 | KM | ECC | .338597 | APF | 167.588 | DEG |
| LAN | 176.425 | DEG | INC | 12.0718 | DEG | TFP | -264.382 |
| RCA | 1779.28 | KM | PALT | 41.1911 | KM | PER | 208.682 |
| APO | 3601.05 | KM | AALT | 1862.96 | KM | TA | 343.760 |
| LAT | 5.75522 | DEG | LONG | 328.309 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 547.23

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 717Y ITEM NO. 37

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:
 DAY 216 , 02 HR , 32 MIN

PREPARED BY: GEO.S.GOODWIN
 U.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|---|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 2P9 | TAPE NO. | 800Y |
| 5.2 EPOCH | ³²⁷ 1210 , 10 : 10 : 0.000 GMT | ITEM NO. | 37 |
| | HR MIN SEC | SEQ. NO. | 37 |
| | | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1753.8174 | KM | DX | -.33910485 | KM/SEC |
| Y | 265.56385 | KM | DY | -1.5558807 | KM/SEC |
| Z | 146.11489 | KM | DZ | -1.0729019 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 18.16 | M | DX | .07889 | M/S | X | 18.16 | M | DX | .0789 | M/S |
| Y | 129.1 | M | DY | .18514 | M/S | Y | 129.1 | M | DY | .1851 | M/S |
| Z | 46.54 | M | DZ | .28507 | M/S | Z | 46.54 | M | DZ | .2851 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2690.46 | KM | ECC | .338540 | APF | 167.753 | DEG | |
| LAN | 172.558 | DEG | INC | 12.0598 | DEG | TFP | 26.5680 | SEC |
| RCA | 1779.63 | KM | PALT | 41.5421 | KM | PER | 208.716 | MIN |
| APO | 3601.29 | KM | AALT | 1863.20 | KM | TA | 1.64243 | DEG |
| LAT | 2.20351 | DEG | LONG | 342.183 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 717Y ITEM NO. 37

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

| | | | |
|-----------------|--------------------------|--------------|-------------------|
| TIME OF REPORT: | DAY 216 , 02 HR , 36 MIN | PREPARED BY: | GEO.S.GOODWIN (W) |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P10A TAPE NO. 747Y
 327 ITEM NO. 38
 5.2 EPOCH DAY ~~210~~, 13 ' 35 ' 0.000 GMT SEQ. NO. 38
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1647.8792 | KM | DX | -.65345345 | KM/SEC |
| Y | 590.50362 | KM | DY | -1.4777331 | KM/SEC |
| Z | 369.26403 | KM | DZ | -1.0235376 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 42.87 | M | DX | .10269 | M/S | X | 42.87 | M | DX | .1027 | M/S |
| Y | 117.2 | M | DY | .06031 | M/S | Y | 117.2 | M | DY | .0603 | M/S |
| Z | 73.60 | M | DZ | .06718 | M/S | Z | 73.60 | M | DZ | .0672 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2690.10 | KM | ECC | .338366 | APF | 167.891 | DEG | |
| LAN | 170.595 | DEG | INC | 11.9926 | DEG | TFP | -187.371 | SEC |
| RCA | 1779.86 | KM | PALT | 41.7745 | KM | PER | 208.675 | MIN |
| APO | 3600.34 | KM | AALT | 1862.25 | KM | TA | 348.459 | DEG |
| LAT | 4.78127 | DEG | LONG | 327.406 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -344.27

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 093Y ITEM NO. 38

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 216 , 04 HR , 46 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P10B

TAPE NO. 747Y

5.2 EPOCH DAY ³²⁷~~210~~, 17 : 4 : 0.000 GMT
 HR MIN SEC

ITEM NO. 38

SEQ. NO. 38

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1665.2291 | KM | DX | -.61462295 | KM/SEC |
| Y | 550.73537 | KM | DY | -1.4908364 | KM/SEC |
| Z | 341.55932 | KM | DZ | -1.0317339 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 57.60 | M | DX | .14554 | M/S | X | 57.60 | M | DX | .1455 | M/S |
| Y | 161.0 | M | DY | .06749 | M/S | Y | 161.0 | M | DY | .0675 | M/S |
| Z | 99.62 | M | DZ | .07138 | M/S | Z | 99.62 | M | DZ | .0714 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2690.09 | KM | ECC | .338281 | APF | 167.979 | DEG | |
| LAN | 168.660 | DEG | INC | 11.9912 | DEG | TFP | -161.573 | SEC |
| RCA | 1780.08 | KM | PALT | 41.9896 | KM | PER | 208.673 | MIN |
| APO | 3600.09 | KM | AALT | 1862.00 | KM | TA | 350.041 | DEG |
| LAT | 4.45984 | DEG | LONG | 327.115 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 093Y ITEM NO. 38

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
 DAY 216 , 04 HR , 49 MIN

PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2512 TAPE NO. 995Y
~~328~~ ITEM NO. 39
 5.2 EPOCH DAY ~~1210~~, 0 ' 5 ' 0.000 GMT SEQ. NO. 39
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1769.0367 | KM | DX | -.26357558 | KM/SEC |
| Y | 192.24838 | KM | DY | -1.5685720 | KM/SEC |
| Z | 92.783202 | KM | DZ | -1.0726191 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 2.371 M | DX | .02120 M/S | X | 9.271 M | DX | .0063 M/S |
| Y | 40.10 M | DY | .06802 M/S | Y | 58.35 M | DY | .0307 M/S |
| Z | 41.55 M | DZ | .09805 M/S | Z | 135.2 M | DZ | .0399 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2690.27 | KM | ECC | .338139 | APF | 168.260 | DEG | |
| LAN | 164.678 | DEG | INC | 11.8631 | DEG | TFP | 70.0791 | SEC |
| RCA | 1780.59 | KM | PALT | 42.4964 | KM | PER | 208.694 | MIN |
| APO | 3599.96 | KM | AALT | 1861.87 | KM | IA | 4.32635 | DEG |
| LAT | 1.51997 | DEG | LONG | 337.421 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1523.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 585Y ITEM NO. 39

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| DAY 216 , 06 HR , 43 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P11A

TAPE NO. 995Y

328

 5.2 EPOCH DAY ~~210~~, 7 : 3 : 0.000 GMT
 HR MIN SEC

ITEM NO. 39

SEQ. NO. 39

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1781.5276 | KM | DX | -.17919899 | KM/SEC |
| Y | 107.18399 | KM | DY | -1.5754643 | KM/SEC |
| Z | 33.924746 | KM | DZ | -1.0752836 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 5.520 | M | DX | .06191 | M/S | X | 5.520 | M | DX | .0619 | M/S |
| Y | 80.25 | M | DY | .06812 | M/S | Y | 80.25 | M | DY | .0681 | M/S |
| Z | 44.48 | M | DZ | .10006 | M/S | Z | 44.48 | M | DZ | .1001 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2690.13 | KM | ECC | .337895 | APF | 168.459 | DEG | |
| LAN | 160.759 | DEG | INC | 11.8539 | DEG | TFP | 122.738 | SEC |
| RCA | 1781.15 | KM | PALT | 43.0567 | KM | PER | 208.678 | MIN |
| APO | 3599.11 | KM | AALT | 1861.02 | KM | TA | 7.56550 | DEG |
| LAT | .815935 | DEG | LONG | 336.868 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 585Y ITEM NO. 39

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

 TIME OF REPORT:
 DAY 216 , 06 HR , 47 MIN

 PREPARED BY: J.A.BEACON
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P12A

TAPE NO. 036Y

328

ITEM NO. 40

5.2 EPOCH DAY ~~1210~~, 13 ' 57 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 40

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1722.6055 KM

DX -.46055531 KM/SEC

Y 395.57671 KM

DY -1.5330401 KM/SEC

Z 233.16483 KM

DZ -1.0559225 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 43.85 M

DX .15523 M/S

X 43.85 M

DX .1552 M/S

Y 169.4 M

DY .05836 M/S

Y 169.4 M

DY .0584 M/S

Z 101.6 M

DZ .05684 M/S

Z 101.6 M

DZ .0568 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.72 KM

ECC .337592

APF 168.411 DEG

LAN 157.090 DEG

INC 11.9436 DEG

TFP -63.8568 SEC

RCA 1781.69 KM

PALT 43.6027 KM

PER 208.630 MIN

APO 3597.75 KM

AALT 1859.66 KM

TA 356.062 DEG

LAT 3.17566 DEG

LONG 321.883 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 798.97

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 729Y ITEM NO. 40

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:
DAY 216 , 08 HR , 21 MINPREPARED BY: GEO.S.GOODWIN
Q.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P12B

TAPE NO. 036Y

328
 5.2 EPOCH DAY ~~210~~, 17 : 26 : 0.000 GMT
 HR MIN SEC

ITEM NO. 40

SEC. NO. 40

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1734.9661 | KM | DX | -.41906469 | KM/SEC |
| Y | 353.67877 | KM | DY | -1.5419314 | KM/SEC |
| Z | 203.87445 | KM | DZ | -1.0608414 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 58.17 | M | DX | .22422 | M/S | X | 58.17 | M | DX | .2242 | M/S |
| Y | 239.7 | M | DY | .06536 | M/S | Y | 239.7 | M | DY | .0654 | M/S |
| Z | 146.7 | M | DZ | .05964 | M/S | Z | 146.7 | M | DZ | .0596 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.72 | KM | ECC | .337482 | APF | 168.508 | DEG | |
| LAN | 155.128 | DEG | INC | 11.9337 | DEG | TFP | -37.2337 | SEC |
| RCA | 1781.99 | KM | PALT | 43.8958 | KM | PER | 208.630 | MIN |
| APO | 3597.45 | KM | AALT | 1859.36 | KM | TA | 357.704 | DEG |
| LAT | 2.82484 | DEG | LONG | 321.627 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 729Y ITEM NO. 40

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 216 , 08 HR , 24 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2S13

TAPE NO.
ITEM NO. 4111115.2 EPOCH DAY ³²⁹ ~~122~~, 0 : 22 : 0.000 GMT
HR MIN SECSEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1705.4460 | KM | DX | -.51411645 | KM/SEC |
| Y | 454.75058 | KM | DY | -1.5211851 | KM/SEC |
| Z | 269.08741 | KM | DZ | -1.0444242 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 7.991 M | DX | .02775 M/S | X | 7.991 M | DX | .0278 M/S |
| Y | 58.19 M | DY | .04893 M/S | Y | 58.19 M | DY | .0489 M/S |
| Z | 59.37 M | DZ | .06611 M/S | Z | 59.37 M | DZ | .0661 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.84 | KM | ECC | .337270 | APF | 169.000 | DEG | |
| LAN | 150.932 | DEG | INC | 11.7984 | DEG | TFP | -103.662 | SEC |
| RCA | 1782.64 | KM | PALT | 44.5462 | KM | PER | 208.644 | MIN |
| APO | 3597.04 | KM | AALT | 1858.95 | KM | TA | 353.617 | DEG |
| LAT | 3.50222 | DEG | LONG | 313.895 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1070.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 179, 09 HR, 38 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2514

TAPE NO.

329

ITEM NO. 41 ~~111~~5.2 EPOCH DAY ~~173~~, 4 57 0.000 GMT
HR MIN SECSEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 2107.8530 | KM | DX | .99770200 | KM/SEC |
| Y | -2054.2785 | KM | DY | .36965528 | KM/SEC |
| Z | -1344.0941 | KM | DZ | .27394499 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 16.08 | M | DX | .00385 | M/S | X | 16.08 | M | DX | .0038 | M/S |
| Y | 79.60 | M | DY | .00680 | M/S | Y | 79.60 | M | DY | .0068 | M/S |
| Z | 140.4 | M | DZ | .01146 | M/S | Z | 140.4 | M | DZ | .0115 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|---------|-----|
| SMA | 2688.98 | KM | ECC | .336914 | | APF | 169.086 | DEG |
| LAN | 148.389 | DEG | INC | 11.7757 | DEG | TFP | 3883.29 | SEC |
| RCA | 1783.02 | KM | PALT | 44.9310 | KM | PER | 208.543 | MIN |
| APO | 3594.93 | KM | AALT | 1856.84 | KM | TA | 141.397 | DEG |
| LAT | 351.070 | DEG | LONG | 99.4750 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -13009

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 179, 09 HR, 43 MINPREPARED BY: G. S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P13A

TAPE NO.

329
 5.2 EPOCH DAY ~~122~~, 7 : 20 : 0.000 GMT
 HR MIN SEC

ITEM NO. ~~47~~ ~~47A~~
 SEQ. NO. N.A.
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1732.2808 | KM | DX | -.43105961 | KM/SEC |
| Y | 370.58400 | KM | DY | -1.5407034 | KM/SEC |
| Z | 210.17038 | KM | DZ | -1.0555665 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 4.795 M | DX | .02033 M/S | X | 4.795 M | DX | .0203 M/S |
| Y | 31.98 M | DY | .04677 M/S | Y | 31.98 M | DY | .0468 M/S |
| Z | 53.48 M | DZ | .06652 M/S | Z | 53.48 M | DZ | .0665 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2689.77 | KM | ECC | .337023 | APF | 169.235 | DEG |
| LAN | 146.960 | DEG | INC | 11.7853 | TFP | -49.7638 | SEC |
| RCA | 1783.26 | KM | PALT | 45.1671 | PER | 208.636 | MIN |
| APO | 3596.29 | KM | AALT | 1858.20 | TA | 356.935 | DEG |
| LAT | 2.79841 | DEG | LONG | 313.411 | | | DEG |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

10 HARMONICS.

TIME OF REPORT:
 DAY 179 , 09 HR , 46 MIN

PREPARED BY: G.S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 2P13B

329

TAPE NO.

ITEM NO. 41 N.A.

5.2 EPOCH DAY ~~122~~, 10, 49, 0.000 GMT
HR MIN SECSEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1743.9657 | KM | DX | -.38895702 | KM/SEC |
| Y | 328.02886 | KM | DY | -1.5489766 | KM/SEC |
| Z | 180.41176 | KM | DZ | -1.0600920 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 6.787 | M | DX | .02962 | M/S | X | 6.787 | M | DX | .0296 | M/S |
| Y | 38.77 | M | DY | .04690 | M/S | Y | 38.77 | M | DY | .0469 | M/S |
| Z | 53.33 | M | DZ | .06804 | M/S | Z | 53.33 | M | DZ | .0680 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.74 | KM | ECC | .336902 | APF | 169.355 | DEG | |
| LAN | 144.969 | DEG | INC | 11.7791 | DEG | TFP | -22.7153 | SEC |
| RCA | 1783.56 | KM | PALT | 45.4710 | KM | PER | 208.633 | MIN |

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----|---------|-----|
| APO | 3595.92 | KM | AALT | 1857.83 | KM | TA | 358.601 | DEG |
| LAT | 2.44125 | DEG | LONG | 313.172 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 179, 09 HR, 50 MINPREPARED BY: G. S. GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 2S15 TAPE NO. 799Y
 (329 ITEM NO. 42
 (5.2 EPOCH DAY ~~122~~, 14 15 0.000 GMT SEQ. NO. 42
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1668.1384 KM DX -.61143887 KM/SEC
 (Y 562.11765 KM DY -1.4928072 KM/SEC
 (Z 334.97458 KM DZ -1.0232764 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 7.691 M DX .02096 M/S X 7.691 M DX .0210 M/S
 (Y 44.49 M DY .02278 M/S Y 44.49 M DY .0228 M/S
 (Z 39.75 M DZ .02864 M/S Z 39.75 M DZ .0286 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2689.97 KM ECC .336827 APF 169.985 DEG
 (LAN 142.511 DEG INC 11.6331 DEG TFP -175.720 SEC
 (RCA 1783.91 KM PALT 45.8244 KM PER 208.659 MIN
 (APO 3596.03 KM AALT 1857.94 KM TA 349.215 DEG
 (LAT 4.10624 DEG LONG 302.103 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 11796

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| Q | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 696Y ITEM NO. 42

(5.10 REMARKS: MAP TIME REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 217, 04 HR, 48 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 2516 | TAPE NO. 799Y |
| (³²⁹ | ITEM NO. 42 |
| (5.2 EPOCH DAY 122 , 17 : 44 : 0.000 GMT | SEQ. NO. 42 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -1685.1061 KM | DX -.57068964 KM/SEC |
| (Y 520.29803 KM | DY -1.5055350 KM/SEC |
| (Z 305.58983 KM | DZ -1.0311154 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 15.72 M | DX .04458 M/S | X 15.72 M | DX .0446 M/S |
| (Y 65.66 M | DY .02526 M/S | Y 65.66 M | DY .0253 M/S |
| (Z 43.90 M | DZ .03139 M/S | Z 43.90 M | DZ .0314 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2689.91 KM | ECC .336706 | APF 170.133 DEG |
| (LAN 140.491 DEG | INC 11.6346 DEG | TFP -148.277 SEC |
| (RCA 1784.20 KM | PALT 46.1095 KM | PER 208.652 MIN |
| (APO 3595.61 KM | AALT 1857.52 KM | TA 350.894 DEG |
| (LAT 3.75946 DEG | LONG 301.881 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 696Y ITEM NO. 42

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

| | |
|----------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 217 , 04 HR , 53 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 2S17 | TAPE NO. 799Y |
| (<u>329</u> | ITEM NO. 42 |
| (5.2 EPOCH DAY 122 , 21 ' 12 ' 0.000 GMT | SEQ. NO. 42 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -1666.5682 KM | DX -.61572503 KM/SEC |
| (Y 568.31467 KM | DY -1.4904079 KM/SEC |
| (Z 337.76336 KM | DZ -1.0226269 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 26.15 M | DX .06497 M/S | X 26.15 M | DX .0650 M/S |
|-------------|---------------|-----------|--------------|

| | | | |
|-------------|---------------|-----------|--------------|
| (Y 85.97 M | DY .03011 M/S | Y 85.97 M | DY .0301 M/S |
| (Z 53.56 M | DZ .03333 M/S | Z 53.56 M | DZ .0333 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2689.79 KM | ECC .336569 | APF 170.282 DEG |
| (LAN 138.472 DEG | INC 11.6396 DEG | TFP -180.669 SEC |
| (RCA 1784.49 KM | PALT 46.3996 KM | PER 208.638 MIN |
| (APO 3595.09 KM | AALT 1857.00 KM | TA 348.919 DEG |
| (LAT 4.10826 DEG | LONG 298.065 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 696Y ITEM NO. 42

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

| | |
|----------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 217 , 04 HR , 58 MIN | GMT O.D. ANALYST |

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION III EPOCH REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314

| | | | | | | | |
|---------|---------------|---------------|---------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 67. | 2. | 14. | 18. | 20. | 0.000 |
| AGINJ+2 | 1032.55632019 | 3206.35900879 | 1220.85693359 | .84816168 | .15417223 | .41282558 | |

5.1 O.D. IDENTIFICATION NO. 3P1

TAPE NO. 663Y

045

ITEM NO. 47

5.2 EPOCH DAY -99, 18, 20, 0.000 GMT
 HR MIN SEC

SEQ. NO. N/A
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 1046.6832 | KM | DX | -.84689242 | KM/SEC |
| Y | 3202.4695 | KM | DY | .15739243 | KM/SEC |
| Z | 1219.0353 | KM | DZ | .41421390 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|------|---------|-----|------|---------|-----|---------|---------|
| SMA | 2689.21 | KM | ECC | .334048 | APF | 179.395 | DEG |
| LAN. | 231.220 | DEG | INC | 20.9104 | DEG | TFP | 5988.29 |
| RCA | 1790.88 | KM | PALT | 52.7937 | KM | PER | 208.570 |
| APO | 3587.53 | KM | AALT | 1849.44 | KM | TA | 175.901 |
| LAT | 358.323 | DEG | LONG | 226.824 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.87197751E-05 | C33 | +.22742430E-05 | C41 | -.51000000E-05 |
| C42 | +.20856716E-05 | C43 | +.65991005E-07 | C44 | -.48183171E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.58865984E-05 | S33 | +.83839113E-06 | S41 | -.10200000E-04 |
| S42 | +.10920075E-04 | S43 | +.16823811E-05 | S44 | -.31163722E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 47

5.10 REMARKS: EPOCH REPORT

10 HARMONICS IN SOLUTION.

TIME OF REPORT:

DAY 180, 09 HR, 21 MIN

PREPARED BY:

J.E.HEDWALL 0000

GMT

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 2. 15. 8. 10. 0.000
 AGINJ+2 1240.31968689 3155.56011963 1118.98588562
 .81721693 .23872110 .44481722

(5.1 O.D. IDENTIFICATION NO. 3P2A TAPE NO.
 (5.2 EPOCH DAY ⁰⁴⁶~~99~~, 8 10 0.000 GMT ITEM NO. 48
 (HR MIN SEC SEQ. NO. 48
 (COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X 1254.0856 KM DX -.81557546 KM/SEC
 (Y 3150.8816 KM DY .24182479 KM/SEC
 (Z 1116.8246 KM DZ .44615145 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X 6.785 M DX .00842 M/S X 6.785 M DX .0084 M/S
 (Y 35.12 M DY .02837 M/S Y 35.12 M DY .0284 M/S
 (Z 109.9 M DZ .02966 M/S Z 109.9 M DZ .0297 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)
 (SMA 2688.54 KM ECC .334478 APF 179.702 DEG
 (LAN 223.388 DEG INC 20.9546 DEG TFP 5732.78 SEC
 (RCA 1789.29 KM PALT 51.1964 KM PER 208.493 MIN
 (APO 3587.80 KM AALT 1849.71 KM TA 172.024 DEG
 (LAT 357.050 DEG LONG 215.655 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 +.16231797E-03 C33 -.11080578E-04 C41 -.51000000E-05
 C42 -.23494157E-04 C43 -.12513411E-04 C44 -.13888325E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 -.44091804E-04 S33 +.36891598E-04 S41 -.10200000E-04
 S42 +.96137404E-04 S43 +.75524786E-05 S44 -.29724554E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 15560

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 48.

(5.10 REMARKS: EPOCH REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT: DAY 217 , 07 HR , 18 MIN PREPARED BY: J.A.BEACON
 (O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 2. 15. 15. 8. 36.000
 AGINJ+2 1165.02047729 3174.03497314 1167.46084595
 .82820888 .20588041 .43543813

(5.1 O.D. IDENTIFICATION NO. 352 TAPE NO. 423Y
 (5.2 EPOCH DAY ⁰⁴⁶~~99~~, 15 ' 8 ' 36.000 GMT ITEM NO. 49
 (HR MIN SEC SEQ. NO. 49
 (COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X 1178.9370 KM DX -.82670693 KM/SEC
 (Y 3169.6426 KM DY .20902568 KM/SEC
 (Z 1165.4227 KM DZ .43679174 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X 7.463 M DX .02085 M/S X 7.463 M DX .0208 M/S
 (Y 77.28 M DY .06029 M/S Y 77.28 M DY .0603 M/S
 (Z 223.4 M DZ .06704 M/S Z 223.4 M DZ .0670 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)
 (SMA 2688.90 KM ECC .334699 APF 180.139 DEG
 (LAN 219.168 DEG INC 21.0832 DEG TFP 5823.85 SEC
 (RCA 1788.93 KM PALT 50.8381 KM PER 208.535 MIN
 (APO 3588.87 KM AALT 1850.78 KM TA 173.408 DEG
 (LAT 357.683 DEG LONG 213.143 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 +.80978559E-04 C33 -.27849777E-06 C41 -.51000000E-05
 C42 -.15327013E-04 C43 -.64203646E-05 C44 -.13473723E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 -.33693634E-04 S33 +.19452159E-04 S41 -.10200000E-04
 S42 +.53472934E-04 S43 +.59121025E-05 S44 -.17154891E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 6480.1

(5.8 DATA SUMMARY:
 (STA DATA START STOP NUMBER STANDARD
 (NO. TYPE TIME TIME POINTS DEVIATION MEAN
 (0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 122Y ITEM NO. 49

(5.10 REMARKS: EPOCH REPORT
 (*****TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
 (DAY 218 , 04 HR , 16 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 2. 16. 5. 0. 0.000
 AGINJ+2 1297.66802979 3137.49807739 1094.24124146
 .80647652 .26229857 .45407490

5.1 O.D. IDENTIFICATION NO. 3P3 TAPE NO. 041Y
 047 ITEM NO. 0050
 5.2 EPOCH DAY ~~91~~, 5 ' 0 ' 0.000 GMT SEQ. NO. 0050
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 1311.3256 KM DX -.80473060 KM/SEC
 Y 3132.6015 KM DY .26536199 KM/SEC
 Z 1091.9864 KM DZ .45539069 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S
 Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S
 Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.88 KM ECC .335224 APF 180.130 DEG
 LAN 211.663 DEG INC 21.0017 DEG TFP 5655.10 SEC
 RCA 1787.50 KM PALT 49.4133 KM PER 208.532 MIN
 APO 3590.26 KM AALT 1852.17 KM TA 170.825 DEG
 LAT 356.770 DEG LONG 203.210 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 +.63226757E-04 C33 +.10453539E-04 C41 -.51000000E-05
 C42 +.38195465E-05 C43 -.30770841E-05 C44 -.21215664E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 -.59706286E-04 S33 +.18852372E-04 S41 -.10200000E-04
 S42 +.52056319E-04 S43 +.91400223E-05 S44 -.96410783E-06

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= ~~.00000~~

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 50.

5.10 REMARKS: EPOCH REPORT.
 10 HARMONICS IN SOLUTION.

TIME OF REPORT: DAY 180 , 06 HR , 31 MIN PREPARED BY: G.S.GOODWIN 0000(B)
 GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 2. 16. 19. 0. 0.000
 AGINJ+2 1000.85996246 3206.32867432 1261.07766724
 .84831883 .13827976 .41335921

(5.1 O.D. IDENTIFICATION NO. 3P6 TAPE NO. 654Y
 (047 ITEM NO. 51
 (5.2 EPOCH DAY -91, 19 ' 0 ' 0.000 GMT SEQ. NO. 51
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X 1015.0559 KM DX -.84710858 KM/SEC
 (Y 3202.5593 KM DY .14150127 KM/SEC
 (Z 1259.3082 KM DZ .41474868 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X 10.61 M DX .01680 M/S X 10.61 M DX .0168 M/S
 (Y 33.36 M DY .03827 M/S Y 33.36 M DY .0383 M/S
 (Z 100.2 M DZ .04646 M/S Z 100.2 M DZ .0465 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)
 (SMA 2688.91 KM ECC .335820 APF 180.867 DEG
 (LAN 203.416 DEG INC 21.2988 DEG TFP 6003.60 SEC
 (RCA 1785.92 KM PALT 47.8331 KM PER 208.536 MIN
 (APO 3591.91 KM AALT 1853.82 KM TA 176.162 DEG
 (LAT 358.922 DEG LONG 200.648 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20700000E-03 J30 -.44599999E-04 J40 -.20900000E-04
 C21 +.88000000E-05 C22 +.27600000E-04 C31 +.43500000E-04
 C32 +.46167799E-04 C33 +.10500989E-04 C41 -.51000000E-05
 C42 -.31314849E-04 C43 -.43766411E-05 C44 -.31746547E-05
 S21 -.41100000E-04 S22 -.57999998E-05 S31 +.17000000E-04
 S32 -.40798489E-04 S33 +.15683239E-04 S41 -.10200000E-04
 S42 +.65359097E-04 S43 +.11894042E-04 S44 -.12421644E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 19429

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS: EPOCH REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (
 (

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 218, 08 HR, 56 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|---------------|-----|---------------|-----|-------|
| AGINAT | 1. | 67. | 2. | 17. | 16. | 15. | 0.000 |
| AGINJ+2 | -285.05329514 | | 3054.62734985 | | 1697.83778381 | | |
| | .90277297 | | -.35524676 | | .17846750 | | |

5.1 O.D. IDENTIFICATION NO. 3S10

TAPE NO. 046Y

5.2 EPOCH DAY ⁰⁴⁹ ~~90~~, 16 ' 15 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 52
 SEQ. NO. 52
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -270.69986 | KM | DX | -.90381587 | KM/SEC |
| Y | 3055.7379 | KM | DY | -.35182269 | KM/SEC |
| Z | 1698.1888 | KM | DZ | .17996575 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 11.89 M | DX | .01644 M/S | X | 11.89 M | DX | .0164 M/S |
| Y | 52.96 M | DY | .02594 M/S | Y | 52.96 M | DY | .0259 M/S |
| Z | 100.3 M | DZ | .03175 M/S | Z | 100.3 M | DZ | .0317 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2688.80 | KM | ECC | .336673 | APF | 181.093 | DEG |
| LAN | 191.802 | DEG | INC | 21.2483 | DEG | TFP | -5084.25 |
| RCA | 1783.56 | KM | PALT | 45.4655 | KM | PER | 208.523 |
| APO | 3594.05 | KM | AALT | 1855.96 | KM | TA | 198.060 |
| LAT | 6.82882 | DEG | LONG | 209.739 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.26057862E-04 | C33 | +.13868651E-04 | C41 | -.51000000E-05 |
| C42 | -.22346288E-04 | C43 | +.73290620E-05 | C44 | -.40106929E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.48266278E-04 | S33 | +.96938235E-05 | S41 | -.10200000E-04 |
| S42 | +.92769814E-04 | S43 | +.15048566E-04 | S44 | +.22393250E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 16704

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 080Y

ITEM NO. 52

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
 DAY 220, 04 HR, 16 MIN

PREPARED BY:
 GMT

J.A. BEACON
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|--------------|---------------|---------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 67. | 2. | 18. | 5. | 50. | 0.000 |
| AGINJ+2 | 733.68212891 | 3237.21563721 | 1380.17742920 | .87627210 | .03898822 | .36726048 | |

5.1 O.D. IDENTIFICATION NO. 3P7A

TAPE NO. 089Y
ITEM NO. 53

5.2 EPOCH DAY ~~90~~, 5, 50, 0.000 GMT
HR MIN SEC

SEQ. NO. 53+
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 748.19717 | KM | DX | -.87551339 | KM/SEC |
| Y | 3234.4600 | KM | DY | .04231640 | KM/SEC |
| Z | 1378.8452 | KM | DZ | .36869885 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 11.33 | M | DX | .01224 | M/S | X | 11.33 | M | DX | .0122 | M/S |
| Y | 9.818 | M | DY | .02170 | M/S | Y | 9.818 | M | DY | .0217 | M/S |
| Z | 26.85 | M | DZ | .03122 | M/S | Z | 26.85 | M | DZ | .0312 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.81 | KM | ECC | .336966 | APF | 181.257 | DEG | |
| LAN | 184.442 | DEG | INC | 20.9968 | DEG | TFP | -6234.39 | SEC |
| RCA | 1782.77 | KM | PALT | 44.6829 | KM | PER | 208.524 | MIN |
| APO | 3594.85 | KM | AALT | 1856.76 | KM | TA | 180.323 | DEG |
| LAT | .566075 | DEG | LONG | 185.918 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.12321519E-05 | C33 | +.18504884E-04 | C41 | -.51000000E-05 |
| C42 | +.16957080E-04 | C43 | +.95667209E-05 | C44 | -.90660749E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.60797080E-04 | S33 | +.71006460E-06 | S41 | -.10200000E-04 |
| S42 | +.45498876E-04 | S43 | +.47830171E-05 | S44 | +.24914653E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 5704.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------------------|--------------------------|----------------------|-----------|---------------|--------------------|------------------|
| 6986873333 | U051X21274810 | 1947/1919 | | 1 | .7760 | .5463 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 53.

5.10 REMARKS: EPOCH REPORT

10 HARMONICS IN SOLUTION.

TIME OF REPORT:
DAY 181, 06 HR, 17 MIN

PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|---------------|-----|---------------|-----|-------|
| AGINAT | 1. | 67. | 2. | 19. | 6. | 30. | 0.000 |
| AGINJ+2 | -393.88016510 | | 3019.27560425 | | 1720.85133362 | | |
| | .89715146 | | -.38876531 | | .15560326 | | |

5.1 O.D. IDENTIFICATION NO. 3S18 TAPE NO. 601Y

5.2 EPOCH DAY ⁰⁵⁰~~90~~, 6 ' 30 ' 0.000 GMT
 HR MIN SEC ITEM NO. 55
 SEQ. NO. 55
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -379.61667 | KM | DX | -.89835927 | KM/SEC |
| Y | 3020.7993 | KM | DY | -.38536181 | KM/SEC |
| Z | 1721.3832 | KM | DZ | .15709406 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 10.56 | M | DX | .01421 | M/S | X | 10.56 | M | DX | .0142 | M/S |
| Y | 24.95 | M | DY | .01966 | M/S | Y | 24.95 | M | DY | .0197 | M/S |
| Z | 45.16 | M | DZ | .03221 | M/S | Z | 45.16 | M | DZ | .0322 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2688.93 | KM | ECC | .337032 | APF | 182.044 | DEG |
| LAN | 170.727 | DEG | INC | 21.0756 | DEG | TFP | -5019.89 |
| RCA | 1782.67 | KM | PALT | 44.5830 | KM | PER | 208.538 |
| APO | 3595.18 | KM | AALT | 1857.09 | KM | TA | 199.081 |
| LAT | 7.44647 | DEG | LONG | 190.553 | DEG | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | -.23980147E-05 | C33 | +.31912060E-05 | C41 | -.510000000E-05 |
| C42 | +.62421902E-05 | C43 | +.39659233E-05 | C44 | +.50199001E-06 |
| S21 | -.411000000E-04 | S22 | -.579999998E-05 | S31 | +.170000000E-04 |
| S32 | -.53093718E-05 | S33 | -.49110730E-06 | S41 | -.102000000E-04 |
| S42 | +.12714326E-04 | S43 | -.23719847E-05 | S44 | +.83930556E-06 |

5.7 DATA ARC LENGTH 0 HRS 0 MIN SOS= 1599.3

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS TAPE NO. 339Y ITEM NO. 55

5.10 REMARKS EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION**

TIME OF REPORT DAY 220 , 08 HR , 06 MIN
 PREPARED BY J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|---------------|-----|---------------|-----|-------|
| AGINAT | 1. | 67. | 2. | 19. | 20. | 30. | 0.000 |
| AGINJ+2 | -722.08085632 | | 2849.44839478 | | 1773.67591858 | | |
| | .87086861 | | -.51713613 | | .08331892 | | |

5.1 O.D. IDENTIFICATION NO. 3522 TAPE NO. 532Y

050

5.2 EPOCH DAY ~~90~~, 20, 30, 0.000 GMT ITEM NO. 56

| | | | | | |
|--|----|-----|-----|--|----------|
| | HR | MIN | SEC | | COMPUTER |
| | | | | | G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -708.36834 | KM | DX | -.87268177 | KM/SEC |
| Y | 2852.2177 | KM | DY | -.51383298 | KM/SEC |
| Z | 1774.7543 | KM | DZ | .08477164 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 35.71 M | DX | .03341 M/S | X | 35.71 M | DX | .0334 M/S |
| Y | 49.23 M | DY | .04325 M/S | Y | 49.23 M | DY | .0433 M/S |
| Z | 93.58 M | DZ | .08106 M/S | Z | 93.58 M | DZ | .0811 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2688.97 | KM | ECC | .336812 | APF | 182.380 | DEG |
| LAN | 163.013 | DEG | INC | 21.3638 | TFP | -4666.44 | SEC |
| RCA | 1783.29 | KM | PALT | 45.2006 | KM | PER | 208.542 |
| APO | 3594.64 | KM | AALT | 1856.55 | KM | TA | 204.852 |
| LAT | 9.59592 | DEG | LONG | 188.620 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.13784660E-04 | C33 | -.16460790E-05 | C41 | -.51000000E-05 |
| C42 | +.43732861E-04 | C43 | +.86902987E-05 | C44 | +.44926990E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.16937757E-04 | S33 | +.52303439E-05 | S41 | -.10200000E-04 |
| S42 | +.66825613E-04 | S43 | -.15873029E-04 | S44 | +.10045257E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 22762

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 474Y ITEM NO. 56

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 221, 06 HR, 11 MIN

PREPARED BY: J.A. BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|---------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 67. | 2. | 20. | 3. | 20. | 0.000 |
| AGINJ+2 | -357.71807861 | 3037.18768311 | 1716.42845154 | .89889613 | -.37100605 | .16445716 | |

5.1 O.D. IDENTIFICATION NO. 3S23 TAPE NO. 795Y
051 ITEM NO. 57
5.2 EPOCH DAY ~~91~~ , 3 , 20 , 0.000 GMT SEQ. NO. 57
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -343.39104 | KM | DX | -.90002239 | KM/SEC |
| Y | 3038.5746 | KM | DY | -.36759499 | KM/SEC |
| Z | 1716.9002 | KM | DZ | .16595051 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 21.16 | M | DX | .01688 | M/S | X | 21.16 | M | DX | .0169 | M/S |
| Y | 25.67 | M | DY | .02175 | M/S | Y | 25.67 | M | DY | .0217 | M/S |
| Z | 51.55 | M | DZ | .04329 | M/S | Z | 51.55 | M | DZ | .0433 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.96 | KM | ECC | .336578 | APF | 182.548 | DEG | |
| LAN | 159.217 | DEG | INC | 21.0275 | DEG | TFP | -5088.73 | SEC |
| RCA | 1783.91 | KM | PALT | 45.8215 | KM | PER | 208.541 | MIN |
| APO | 3594.00 | KM | AALT | 1855.91 | KM | TA | 197.998 | DEG |
| LAT | 7.23455 | DEG | LONG | 178.499 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.14430435E-04 | C33 | +.89714986E-06 | C41 | -.51000000E-05 |
| C42 | +.22835677E-04 | C43 | +.67865314E-05 | C44 | +.25775845E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.14418165E-04 | S33 | +.33923893E-05 | S41 | -.10200000E-04 |
| S42 | +.41240223E-04 | S43 | -.96162216E-05 | S44 | +.81977129E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 7890.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 797Y ITEM NO. 57

5.10 REMARKS: EPOCH REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 221 , 08 HR , 05 MIN PREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|---------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 2. | 20. | 10. | 45. | 0.000 |
| AGINJ+2 | -1717.97091675 | 1925.13192749 | 1678.75119019 | .64519075 | -.94368949 | -.23473243 | |

5.1 O.D. IDENTIFICATION NO. 3P9A

TAPE NO. 216Y

5.2 EPOCH DAY ⁰⁵¹ ~~91~~, 10, 45, 0.000 GMT
 HR MIN SEC

ITEM NO. 58
 SEQ. NO. 58
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1707.9037 | KM | DX | -.64914476 | KM/SEC |
| Y | 1931.6760 | KM | DY | -.94124728 | KM/SEC |
| Z | 1681.5041 | KM | DZ | -.23363437 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 29.66 | M | DX | .01816 | M/S | X | 29.66 | M | DX | .0182 | M/S |
| Y | 36.33 | M | DY | .02332 | M/S | Y | 36.33 | M | DY | .0233 | M/S |
| Z | 73.42 | M | DZ | .04579 | M/S | Z | 73.42 | M | DZ | .0458 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.76 | KM | ECC | .336414 | APF | 182.799 | DEG | |
| LAN | 155.012 | DEG | INC | 20.9647 | DEG | TFP | -3409.68 | SEC |
| RCA | 1784.23 | KM | PALT | 46.1357 | KM | PER | 208.519 | MIN |
| APO | 3593.30 | KM | AALT | 1855.21 | KM | TA | 227.935 | DEG |
| LAT | 16.0818 | DEG | LONG | 203.812 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.16482249E-04 | C33 | +.15879316E-05 | C41 | -.51000000E-05 |
| C42 | +.31226793E-04 | C43 | +.16556360E-05 | C44 | +.22029048E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | +.11065252E-04 | S33 | +.46925278E-05 | S41 | -.10200000E-04 |
| S42 | +.31826982E-04 | S43 | -.10374332E-04 | S44 | -.57271010E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 3153.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 146Y

ITEM NO. 58

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION**

TIME OF REPORT:
 DAY 221, 09 HR, 49 MIN

PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 2. 20. 17. 45. 0.000
 AGINJ+2 -1836.88598633 1747.88272095 1625.13697815
 .58880226 -1.00048898 -.29085946

5.1 O.D. IDENTIFICATION NO. 3S25 TAPE NO. 193Y

5.2 EPOCH DAY ⁰⁵¹ ~~91~~, 17 : 45 : 0.000 GMT ITEM NO. 59
 HR MIN SEC SEQ. NO. 59
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1827.5763 | KM | DX | -.59306455 | KM/SEC |
| Y | 1754.8773 | KM | DY | -.99826147 | KM/SEC |
| Z | 1628.0926 | KM | DZ | -.28985189 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 73.60 M | DX | .02613 M/S | X | 73.60 M | DX | .0261 M/S |
| Y | 70.62 M | DY | .03962 M/S | Y | 70.62 M | DY | .0396 M/S |
| Z | 159.4 M | DZ | .08360 M/S | Z | 159.4 M | DZ | .0836 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.66 | KM | ECC | .336162 | APF | 183.221 | DEG | |
| LAN | 150.865 | DEG | INC | 20.7186 | DEG | TFP | -3230.21 | SEC |
| RCA | 1784.84 | KM | PALT | 46.7451 | KM | PER | 208.507 | MIN |
| APO | 3592.49 | KM | AALT | 1854.40 | KM | TA | 231.744 | DEG |
| LAT | 16.8383 | DEG | LONG | 204.009 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | +.301941500E-04 | C33 | +.588058490E-05 | C41 | -.510000000E-05 |
| C42 | +.663221570E-04 | C43 | -.416006490E-05 | C44 | +.232287800E-05 |
| S21 | -.411000000E-04 | S22 | -.579999980E-05 | S31 | +.170000000E-04 |
| S32 | +.358996720E-05 | S33 | +.661903080E-05 | S41 | -.102000000E-04 |
| S42 | +.399595830E-04 | S43 | -.137821160E-04 | S44 | -.251316350E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 8368.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 141Y ITEM NO. 59

5.10 REMARKS: EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 222, 04 HR, 43 MIN
 PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|-------------|----|---------------|----|---------------|-------|
| AGINAT | 1. | 67. | 2. | 21. | 7. | 0. | 0.000 |
| AGINJ+2 | | 50.95712471 | | 3165.37597656 | | 1629.92942810 | |
| | | .90856279 | | -.21064567 | | .24610106 | |

5.1 O.D. IDENTIFICATION NO. 3P10

TAPE NO.
ITEM NO. 60 HTR.

05Z

5.2 EPOCH DAY ~~90~~, 7 ' 0 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 60 HTR.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 65.629502 | KM | DX | -.90894902 | KM/SEC |
| Y | 3165.2092 | KM | DY | -.20719366 | KM/SEC |
| Z | 1629.7268 | KM | DZ | .24760105 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 16.41 M | DX | .01763 M/S | X | 16.41 M | DX | .0176 M/S |
| Y | 27.18 M | DY | .02049 M/S | Y | 27.18 M | DY | .0205 M/S |
| Z | 54.97 M | DZ | .04750 M/S | Z | 54.97 M | DZ | .0475 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2688.91 | KM | ECC | .335424 | APF | 183.489 | DEG |
| LAN | 143.517 | DEG | INC | 20.8035 | DEG | TFP | -5569.15 |
| RCA | 1786.98 | KM | PALT | 48.8922 | KM | PER | 208.535 |
| APO | 3590.83 | KM | AALT | 1852.74 | KM | TA | 190.499 |
| LAT | 4.92509 | DEG | LONG | 156.626 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.15033 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.207000000E-03 | J30 | -.445999999E-04 | J40 | -.209000000E-04 |
| C21 | +.880000000E-05 | C22 | +.276000000E-04 | C31 | +.435000000E-04 |
| C32 | +.647268999E-04 | C33 | +.15300208E-04 | C41 | -.510000000E-05 |
| C42 | +.61848971E-04 | C43 | -.80737044E-05 | C44 | -.11995367E-06 |
| S21 | -.411000000E-04 | S22 | -.579999998E-05 | S31 | +.170000000E-04 |
| S32 | -.38392739E-05 | S33 | +.13309778E-04 | S41 | -.102000000E-04 |
| S42 | +.35957811E-04 | S43 | -.51789686E-05 | S44 | -.25562572E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 16983

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------------------|-------------------|--------------------|-------------------|---------------|--------------------|------------------|
| 6462525954 | *G(*)* | 51/4151 | 2/5026 | 0 | .6814 | .6048 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE

ITEM No. 60.

5.10 REMARKS: EPOCH REPORT

10 HARMONICS IN SOLUTION.

TIME OF REPORT:
DAY 181, 04 HR, 27 MIN

PREPARED BY: G.S.GOODWIN 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100814-2

5.1 O.D. IDENTIFICATION NO. 3P11

TAPE NO. Rev. Ltr. A

ITEM NO. 61A

5.2 EPOCH DAY 52 , 20 10 0.000 GMT
 HR MIN SEC

SEQ. NO. 61A
 COMPUTER B.

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 2140.4271 | KM | DX | -.55386921 | KM/SEC |
| Y | 2523.2368 | KM | DY | .68425743 | KM/SEC |
| Z | 500.87824 | KM | DZ | .57559859 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 23.59 M | DX | .00484 M/S | X | 23.59 M | DX | .0048 M/S |
| Y | 38.84 M | DY | .00116 M/S | Y | 38.84 M | DY | .0012 M/S |
| Z | 92.51 M | DZ | .00396 M/S | Z | 92.51 M | DZ | .0040 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2688.28 | KM | ECC | .334867 | APF | 184.339 | DEG |
| LAN | 135.622 | DEG | INC | 20.6472 | DEG | TFP | 4304.62 |
| RCA | 1788.06 | KM | PALT | 49.9745 | KM | PER | 208.463 |
| APD | 3588.50 | KM | AALT | 1850.41 | KM | TA | 148.911 |
| LAT | 350.868 | DEG | LONG | 110.370 | DEG | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 16 HRS 40 MIN SOS= 8544.4

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~ARE~~ AVAILABLE

5.10 REMARKS EPOCH REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT PREPARED BY J.A.BEACON

DAY 344 , 02 HR , 20 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|---------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 67. | 2. | 22. | 7. | 0. | 0.000 |
| AGINJ+2 | 1060.35118103 | 3178.53466797 | 1239.66058350 | .83983043 | .18095542 | .42774711 | |

5.1 O.D. IDENTIFICATION NO. 3P12C

TAPE NO. 415Y

5.2 EPOCH DAY ⁰⁵³~~90~~, 7 : 0 : 0.000 GMT
 HR MIN SEC

ITEM NO. 62

SEQ. NO. 62

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 1074.4248 | KM | DX | -.83843328 | KM/SEC |
| Y | 3174.5348 | KM | DY | .18414927 | KM/SEC |
| Z | 1237.7911 | KM | DZ | .42912275 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 25.76 M | DX | .02122 M/S | X | 25.76 M | DX | .0212 M/S |
| Y | 74.97 M | DY | .01224 M/S | Y | 74.97 M | DY | .0122 M/S |
| Z | 181.2 M | DZ | .04756 M/S | Z | 181.2 M | DZ | .0476 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2688.64 | KM | ECC | .334098 | APF | 183.735 | DEG |
| LAN | 130.364 | DEG | INC | 21.0233 | TFP | 5782.62 | SEC |
| RCA | 1790.37 | KM | PALT | 52.2836 | KM | PER | 208.505 |
| APO | 3586.91 | KM | AALT | 1848.82 | KM | TA | 172.780 |
| LAT | 358.750 | DEG | LONG | 127.110 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.83453656E-04 | C33 | +.21066456E-04 | C41 | -.51000000E-05 |
| C42 | +.19443921E-04 | C43 | -.20462553E-05 | C44 | -.10890382E-06 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.17213846E-04 | S33 | +.92680354E-05 | S41 | -.10200000E-04 |
| S42 | +.43854642E-04 | S43 | -.17077112E-05 | S44 | -.94760263E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 8994.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 183Y ITEM NO. 62

5.10 REMARKS: EPOCH REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 222, 06 HR, 33 MIN
 PREPARED BY: GEO.S.GOODWIN
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|--------------|-----------|-----------|-----------|-------|
| AGINAT | 1. | 67. | 2. | 22. | 20. | 40. | 0.000 |
| AGINJ+2 | 1707.47077942 | 2901.25064087 | 869.66646576 | .71417477 | .46185719 | .52249831 | |

5.1 O.D. IDENTIFICATION NO. 3530 TAPE NO. 233Y

5.2 EPOCH DAY ⁰⁵³ ~~90~~, 20, 40, 0.000 GMT ITEM NO. 63

HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 1719.8807 | KM | DX | -.71155819 | KM/SEC |
| Y | 2894.7888 | KM | DY | .46457650 | KM/SEC |
| Z | 866.74141 | KM | DZ | .52365621 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 50.37 | M | DX | .01841 | M/S | X | 50.37 | M | DX | .0184 | M/S |
| Y | 120.4 | M | DY | .00493 | M/S | Y | 120.4 | M | DY | .0049 | M/S |
| Z | 288.9 | M | DZ | .02061 | M/S | Z | 288.9 | M | DZ | .0206 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2688.26 | KM | ECC | .333392 | APF | 184.893 | DEG |
| LAN | 121.818 | DEG | INC | 20.7310 | TFP | 4953.20 | SEC |
| RCA | 1792.01 | KM | PALT | 53.9246 | PER | 208.460 | MIN |
| APO | 3584.50 | KM | AALT | 1846.41 | TA | 159.741 | DEG |
| LAT | 354.618 | DEG | LONG | 107.404 | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20700000E-03 | J30 | -.44599999E-04 | J40 | -.20900000E-04 |
| C21 | +.88000000E-05 | C22 | +.27600000E-04 | C31 | +.43500000E-04 |
| C32 | +.48838133E-04 | C33 | +.16518615E-04 | C41 | -.51000000E-05 |
| C42 | +.36006178E-04 | C43 | -.23558344E-05 | C44 | -.13757952E-05 |
| S21 | -.41100000E-04 | S22 | -.57999998E-05 | S31 | +.17000000E-04 |
| S32 | -.38188417E-04 | S33 | -.16475639E-06 | S41 | -.10200000E-04 |
| S42 | +.71647680E-05 | S43 | +.33973705E-05 | S44 | -.24291255E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3975.0

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 616Y ITEM NO. 63

5.10 REMARKS: EPOCH REPORT
TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 222, 08 HR, 23 MIN PREPARED BY: J.A. BEACON O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION III MAP TIME REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P1

TAPE NO. 663Y

5.2 EPOCH DAY ⁰⁴⁶ ~~90~~, 9 : 59 : 0.000 GMT
HR MIN SECITEM NO. 47
SEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -807.86245 | KM | DX | 1.6287504 | KM/SEC |
| Y | -1542.3067 | KM | DY | -.44729905 | KM/SEC |
| Z | -470.13011 | KM | DZ | -.87236333 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.27 | KM | ECC | .334715 | APF | 179.689 | DEG | |
| LAN | 222.387 | DEG | INC | 20.9441 | DEG | TFP | -237.181 | SEC |
| RCA | 1789.13 | KM | PALT | 51.0393 | KM | PER | 208.577 | MIN |
| APO | 3589.40 | KM | AALT | 1851.31 | KM | TA | 345.551 | DEG |
| LAT | 5.22510 | DEG | LONG | 28.5640 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 180, 09 HR, 27 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S1

TAPE NO. 663Y

ITEM NO. 47

5.2 EPOCH DAY ⁰⁴⁶ ~~90~~, 10 ' 3 ' 0.000 GMT
HR MIN SEC

SEQ. NO. N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -400.54817 | KM | DX | 1.7522020 | KM/SEC |
| Y | -1611.3668 | KM | DY | -.12457567 | KM/SEC |
| Z | -666.38086 | KM | DZ | -.75594889 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | .0000 M | DX | .00000 M/S | X | .0000 M | DX | .0000 M/S |
| Y | .0000 M | DY | .00000 M/S | Y | .0000 M | DY | .0000 M/S |
| Z | .0000 M | DZ | .00000 M/S | Z | .0000 M | DZ | .0000 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2688.99 | KM | ECC | .334646 | APF | 179.684 | DEG |
| LAN | 222.351 | DEG | INC | 20.9433 | TFP | 2.88516 | SEC |
| RCA | 1789.13 | KM | PALT | 51.0431 | PER | 208.546 | MIN |
| APO | 3588.86 | KM | AALT | 1850.77 | TA | .176694 | DEG |
| LAT | .049682 | DEG | LONG | 42.2214 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 180, 09 HR, 32 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 3P2A | TAPE NO. 757Y |
| (046 | ITEM NO. 48 |
| (5.2 EPOCH DAY 99 , 13, 31, 0.000 GMT | SEQ. NO. 48 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -458.94858 KM | DX 1.7404459 KM/SEC |
| (Y -1605.1937 KM | DY -.16980707 KM/SEC |
| (Z -642.92810 KM | DZ -.77412777 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 69.40 M | DX .02617 M/S | X 69.40 M | DX .0262 M/S |
| (Y 25.00 M | DY .06649 M/S | Y 25.00 M | DY .0665 M/S |
| (Z 60.29 M | DZ .05722 M/S | Z 60.29 M | DZ .0572 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2688.63 KM | ECC .334686 | APF 179.933 DEG |
| (LAN 220.241 DEG | INC 20.9326 DEG | TFP -31.0671 SEC |
| (RCA 1788.78 KM | PALT 50.6949 KM | PER 208.504 MIN |
| (APO 3588.48 KM | AALT 1850.39 KM | TA 358.097 DEG |
| (LAT .703749 DEG | LONG 38.4010 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 15516

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 064Y ITEM NO. 48

(5.10 REMARKS: MAP TIME REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (

| | | |
|--------------------------|--------------|--------------|
| (TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| (DAY 217, 07 HR, 26 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 3P2B | TAPE NO. 757Y |
| (046 | ITEM NO. 48 |
| (5.2 EPOCH DAY 20 , 17 ' 0 ' 0.000 GMT | SEQ. NO. 48 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -411.56333 KM | DX 1.7504902 KM/SEC |
| (Y -1608.3933 KM | DY -.13137341 KM/SEC |
| (Z -664.90250 KM | DZ -.76001147 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|------------|---------------|----------|--------------|
| (X 1603 M | DX .32717 M/S | X 1603 M | DX .3272 M/S |
|------------|---------------|----------|--------------|

| | | | |
|-------------|---------------|-----------|--------------|
| (Y 74.56 M | DY 1.2344 M/S | Y 74.56 M | DY 1.234 M/S |
| (Z 681.9 M | DZ .48506 M/S | Z 681.9 M | DZ .4851 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2688.52 KM | ECC .334800 | APF 180.073 DEG |
| (LAN 218.207 DEG | INC 20.9734 DEG | TFP -4.14465 SEC |
| (RCA 1788.41 KM | PALT 50.3151 KM | PER 208.491 MIN |
| (APO 3588.64 KM | AALT 1850.55 KM | TA 359.746 DEG |
| (LAT .064894 DEG | LONG 38.0380 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 064Y ITEM NO. 48

(5.10 REMARKS: MAP TIME REPORT
 (*****TEN HARMONICS IN THIS SOLUTION *****
 (

| | |
|----------------------------|-------------------------|
| (TIME OF REPORT: | PREPARED BY: J.A.BEACON |
| (DAY 217 , 07 HR , 37 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 352 TAPE NO. 423Y
 (046 ITEM NO. 49
 (5.2 EPOCH DAY ~~90~~, 20 49 0.000 GMT SEQ. NO. 49
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1584.6595 KM DX 1.2544006 KM/SEC
 (Y -872.47597 KM DY 1.1173781 KM/SEC
 (Z -1082.8562 KM DZ .07653796 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 80.29 M DX .03809 M/S X 80.29 M DX .0381 M/S
 (Y 129.9 M DY .02682 M/S Y 129.9 M DY .0268 M/S
 (Z 175.9 M DZ .03192 M/S Z 175.9 M DZ .0319 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2689.55 KM ECC .335117 APF 180.235 DEG
 (LAN 216.000 DEG INC 21.1304 DEG TFP 1222.72 SEC
 (RCA 1788.24 KM PALT 50.1463 KM PER 208.610 MIN
 (APO 3590.86 KM AALT 1852.77 KM TA 66.7231 DEG
 (LAT 340.626 DEG LONG 101.487 DEG

(5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -2010.3

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 122Y ITEM NO. 49

(5.10 REMARKS' MAP TIME REPORT
 (*****TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT' PREPARED BY' GEO.S.GOODWIN
 (DAY 218 , 04 HR , 21 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 3S3 TAPE NO. 423Y

(ITEM NO. 49

(5.2 EPOCH DAY ⁰⁴⁶ ~~29~~, 23 ' 58 ' 0.000 GMT SEQ. NO. 49

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -315.30407 KM DX 1.7667165 KM/SEC

(Y -1611.3536 KM DY -.05218763 KM/SEC

(Z -708.65356 KM DZ -.73183361 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 132.2 M DX .05347 M/S X 132.2 M DX .0535 M/S

(Y 57.53 M DY .12162 M/S Y 57.53 M DY .1216 M/S

(Z 122.7 M DZ .13000 M/S Z 122.7 M DZ .1300 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2688.82 KM ECC .335145 APF 180.423 DEG

(LAN 214.100 DEG INC 21.1317 DEG TFP 49.6919 SEC

(RCA 1787.68 KM PALT 49.5894 KM PER 208.526 MIN

(APO 3589.97 KM AALT 1851.88 KM TA 3.04683 DEG

(LAT 358.750 DEG LONG 37.3366 DEG

(5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 122Y ITEM NO. 49

(5.10 REMARKS' MAP TIME REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT' | PREPARED BY' | GEO.S.GOODWIN |
| DAY 218 , 04 HR , 26 MIN | GMT | O.D. ANALYST |

03407703

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 354

TAPE NO. ~~3605/J~~

5.2 EPOCH DAY 47 , 3 - 24 - 0.000 GMT
 HR MIN SEC

ITEM NO. ~~48~~
 SEQ. NO. 49
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -581.02963 | KM | DX | 1.7078742 | KM/SEC |
| Y | -1586.7745 | KM | DY | -.26070926 | KM/SEC |
| Z | -590.78653 | KM | DZ | -.81820350 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 174.1 | M | DX | .07759 | M/S | X | 174.1 | M | DX | .0776 | M/S |
| Y | 53.03 | M | DY | .14607 | M/S | Y | 53.03 | M | DY | .1461 | M/S |
| Z | 113.1 | M | DZ | .14966 | M/S | Z | 113.1 | M | DZ | .1497 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.07 | KM | ECC | .335329 | APF | 180.545 | DEG | |
| LAN | 212.142 | DEG | INC | 21.1758 | DEG | TFP | -103.721 | SEC |
| RCA | 1787.34 | KM | PALT | 49.2525 | KM | PER | 208.554 | MIN |
| APO | 3590.79 | KM | AALT | 1852.70 | KM | TA | 353.643 | DEG |
| LAT | 2.09624 | DEG | LONG | 26.7203 | DEG | | | |

5.6 LUNAR HARMONICS USED- LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH- 0 HRS 0 MIN SOS= 6545.5

5.8 DATA SUMMARY-

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS- ~~NOT AVAILABLE~~

5.10 REMARKS- MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT-
 DAY 261 , 07 HR , 05 MIN

PREPARED BY- J.A. BEACON
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P3

TAPE NO. 041Y

5.2 EPOCH DAY ⁰⁴⁷~~91~~, 6 : 50 : 0.000 GMT

ITEM NO. 0050

SEQ. NO. 0050

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -835.50011 | KM | DX | 1.6184828 | KM/SEC |
| Y | -1531.6305 | KM | DY | -.46667598 | KM/SEC |
| Z | -457.84879 | KM | DZ | -.88083521 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2689.60 | KM | ECC | .335610 | APF | 180.204 | DEG | |
| LAN | 210.598 | DEG | INC | 20.9824 | TFP | -256.726 | SEC | |
| RCA | 1786.95 | KM | PALT | 48.8559 | KM | PER | 208.616 | MIN |
| APO | 3592.26 | KM | AALT | 1854.17 | KM | TA | 344.341 | DEG |
| LAT | 5.47565 | DEG | LONG | 16.1235 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT.
10 HARMONICS.TIME OF REPORT:
DAY 180, 06 HR, 36 MINPREPARED BY: G.S.G. (B)
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|-------------------|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 3P4 | TAPE NO. | 041Y |
| | 047 | ITEM NO. | 0050 |
| 5.2 EPOCH DAY | 91, 10, 21, 0.000 | SEQ. NO. | 0050 |
| | HR MIN SEC | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -589.59807 | KM | DX | 1.7076889 | KM/SEC |
| Y | -1585.5939 | KM | DY | -.27085158 | KM/SEC |
| Z | -583.78951 | KM | DZ | -.81638949 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2689.26 | KM | ECC | .335701 | APF | 180.306 | DEG |
| LAN | 208.598 | DEG | INC | 21.0065 | DEG | TFP | -109.593 |
| RCA | 1786.47 | KM | PALT | 48.3837 | KM | PER | 208.577 |
| APO | 3592.05 | KM | AALT | 1853.96 | KM | TA | 353.278 |
| LAT | 2.29569 | DEG | LONG | 22.6055 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT.
10 HARMONICS.

TIME OF REPORT: DAY 180, 06 HR, 40 MIN
PREPARED BY: G. S. G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P5A TAPE NO. 041Y
 5.2 EPOCH DAY ⁰⁴⁷ ~~91~~, 13 : 49 : 0.000 GMT ITEM NO. 0050
 HR MIN SEC SEQ. NO. 0050
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -644.59635 | KM | DX | 1.6906591 | KM/SEC |
| Y | -1575.5286 | KM | DY | -.31366497 | KM/SEC |
| Z | -557.58418 | KM | DZ | -.83313324 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.30 | KM | ECC | .335867 | APF | 180.417 | DEG | |
| LAN | 206.623 | DEG | INC | 21.0390 | DEG | TFP | -142.575 | SEC |
| RCA | 1786.05 | KM | PALT | 47.9619 | KM | PER | 208.581 | MIN |
| APO | 3592.55 | KM | AALT | 1854.46 | KM | TA | 351.259 | DEG |
| LAT | 2.97940 | DEG | LONG | 18.8467 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT.
 10 HARMONICS.

TIME OF REPORT: DAY 180 ; 06 HR , 44 MIN PREPARED BY: G. S. G.
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 3P5B | TAPE NO. 041Y |
| 047 | ITEM NO. 0050 |
| 5.2 EPOCH DAY 91 , 17, 19, 0.000 GMT | SEQ. NO. 0050 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -494.49697 KM | DX 1.7334312 KM/SEC |
| Y -1597.2083 KM | DY -.19362980 KM/SEC |
| Z -629.23286 KM | DZ -.78937259 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X .0000 M | DX .00000 M/S | X .0000 M | DX .0000 M/S |
| Y .0000 M | DY .00000 M/S | Y .0000 M | DY .0000 M/S |
| Z .0000 M | DZ .00000 M/S | Z .0000 M | DZ .0000 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|-----------------|------------------|
| SMA 2689.10 KM | ECC .335952 | APF 180.523 DEG |
| LAN 204.634 DEG | INC 21.0684 DEG | TFP -55.5458 SEC |
| RCA 1785.69 KM | PALT 47.6003 KM | PER 208.558 MIN |

| | | |
|-----------------|------------------|----------------|
| APO 3592.51 KM | AALT 1854.42 KM | TA 356.588 DEG |
| LAT 1.03829 DEG | LONG 21.9372 DEG | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT.
10 HARMONICS.

| | |
|------------------------|-----------------------|
| TIME OF REPORT: | PREPARED BY: G. S. G. |
| DAY 180, 06 HR, 47 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 3P6 TAPE NO. 654Y
 (047 ITEM NO. 51
 (5.2 EPOCH DAY ~~91~~, 20 ' 47 ' 0.000 GMT SEQ. NO. 51
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -549.99725 KM DX 1.7170979 KM/SEC
 (Y -1588.4265 KM DY -.23213762 KM/SEC
 (Z -607.21312 KM DZ -.81300237 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 13.77 M DX .03721 M/S X 13.77 M DX .0372 M/S
 (Y 15.30 M DY .06940 M/S Y 15.30 M DY .0694 M/S
 (Z 44.51 M DZ .09448 M/S Z 44.51 M DZ .0945 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2689.51 KM ECC .336229 APF 181.011 DEG
 (LAN 202.334 DEG INC 21.3161 DEG TFP -88.9072 SEC
 (RCA 1785.22 KM PALT 47.1295 KM PER 208.606 MIN
 (APO 3593.81 KM AALT 1855.72 KM TA 354.538 DEG
 (LAT 1.61643 DEG LONG 18.1865 DEG

(5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 19427

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS' MAP TIME REPORT
 (***TEN HARMONICS IN THIS SOLUTION *****
 (

(TIME OF REPORT' PREPARED BY' J.E.HEDWALL 0000
 (DAY 218 , 09 HR , 02 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 355

TAPE NO. 654Y

(5.2 EPOCH DAY ⁰⁴⁸ ~~90~~, 0 : 17 : 0.000 GMT
HR MIN SEC

ITEM NO. 51

SEQ. NO. 51

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -397.16341 KM DX 1.7525938 KM/SEC

(Y -1602.8608 KM DY -.10965972 KM/SEC

(Z -677.18108 KM DZ -.76621709 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 51.41 M DX .04347 M/S X 51.41 M DX .0435 M/S

(Y 22.79 M DY .05387 M/S Y 22.79 M DY .0539 M/S

(Z 42.78 M DZ .10115 M/S Z 42.78 M DZ .1012 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2689.24 KM ECC .336322 APF 181.112 DEG

(LAN 200.354 DEG INC 21.3862 DEG TFP -1.54700 SEC

(RCA 1784.79 KM PALT 46.6993 KM PER 208.574 MIN

(APO 3593.69 KM AALT 1855.60 KM TA 359.905 DEG

(LAT 359.629 DEG LONG 21.3008 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

| TIME OF REPORT: | PREPARED BY: |
|--------------------------|--------------------------------------|
| DAY 218 , 09 HR , 06 MIN | J.E.HEDWALL 0000 GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 357 TAPE NO. 654Y

(ITEM NO. 51

(5.2 EPOCH DAY ~~90~~⁰⁴⁸, 7 10 0.000 GMT SEQ. NO. 51

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -810.22741 KM DX 1.6255782 KM/SEC

(Y -1535.3087 KM DY -.43471211 KM/SEC

(Z -474.73616 KM DZ -.89117031 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 109.6 M DX .07773 M/S X 109.6 M DX .0777 M/S

(Y 31.25 M DY .06380 M/S Y 31.25 M DY .0638 M/S

(Z 43.53 M DZ .11967 M/S Z 43.53 M DZ .1197 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2690.07 KM ECC .336804 APF 181.326 DEG

(LAN 196.475 DEG INC 21.5420 DEG TFP -246.974 SEC

(RCA 1784.04 KM PALT 45.9523 KM PER 208.670 MIN

(APO 3596.09 KM AALT 1858.00 KM TA 344.886 DEG

(LAT 5.02041 DEG LONG 3.61659 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS: MAP TIME REPORT

(*****TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|--------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 000010 |
| DAY 218 , 09 HR , 16 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 358

TAPE NO. 654Y

(048

ITEM NO. 51

(5.2 EPOCH DAY ~~90~~, 10 ' 45 ' 0.000 GMT

SEQ. NO. 51

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -140.78264 KM DX 1.7848320 KM/SEC

(Y -1601.8020 KM DY .09537190 KM/SEC

(Z -783.70647 KM DZ -.68072234 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 164.5 M DX .04530 M/S X 164.5 M DX .0453 M/S

(Y 25.18 M DY .08740 M/S Y 25.18 M DY .0874 M/S

(Z 46.16 M DZ .13201 M/S Z 46.16 M DZ .1320 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2688.80 KM ECC .336618 APF 181.435 DEG

(LAN 194.468 DEG INC 21.6092 DEG TFP 140.307 SEC

(RCA 1783.70 KM PALT 45.6132 KM PER 208.523 MIN

(APO 3593.90 KM AALT 1855.81 KM TA 8.62198 DEG

(LAT 356.313 DEG LONG 23.8307 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

(STA DATA START STOP NUMBER STANDARD

(NO. TYPE TIME TIME POINTS DEVIATION MEAN

(0 00000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

(TIME OF REPORT:

(DAY 218 , 09 HR , 20 MIN

PREPARED BY: J.E.HEDWALL 0000(B)

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 3S9 TAPE NO. 654Y

(⁰⁴⁸ ITEM NO. 51(5.2 EPOCH DAY ~~90~~, 14 ' 11 ' 0.000 GMT SEQ. NO. 51

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -408.81960 KM DX 1.7484248 KM/SEC

(Y -1600.0028 KM DY -.11191214 KM/SEC

(Z -673.49263 KM DZ -.77802068 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 184.9 M DX .06967 M/S X 184.9 M DX .0697 M/S

(Y 28.71 M DY .10450 M/S Y 28.71 M DY .1045 M/S

(Z 53.33 M DZ .14067 M/S Z 53.33 M DZ .1407 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2689.30 KM ECC .336846 APF 181.561 DEG

(LAN 192.552 DEG INC 21.6915 DEG TFP -12.6780 SEC

(RCA 1783.42 KM PALT 45.3298 KM PER 208.581 MIN

(APO 3595.18 KM AALT 1857.09 KM TA 359.219 DEG

(LAT 359.712 DEG LONG 13.2765 DEG

(5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STATION NO. | DATA TYPE | START TIME | STOP TIME | NUMBER OF POINTS | STANDARD DEVIATION | MEAN |
|-------------|-----------|------------|-----------|------------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 541Y ITEM NO. 51

(5.10 REMARKS: MAP TIME REPORT

(***TEN HARMONICS IN THIS SOLUTION *****

| TIME OF REPORT: | PREPARED BY: |
|------------------------------|-------------------------------------|
| DAY 218 , 09 HR , 25 MIN GMT | J.E.HEDWALL 0000(8) O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3510 TAPE NO. 046Y

ITEM NO. 52

5.2 EPOCH DAY ~~90~~⁰⁴⁸, 21 ' 8 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 52

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -415.30046 | KM | DX | 1.7511996 | KM/SEC |
| Y | -1599.9516 | KM | DY | -.12256815 | KM/SEC |
| Z | -667.67611 | KM | DZ | -.77174550 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 39.57 M | DX | .04041 M/S | X | 39.57 M | DX | .0404 M/S |
| Y | 10.17 M | DY | .04813 M/S | Y | 10.17 M | DY | .0481 M/S |
| Z | 20.43 M | DZ | .09410 M/S | Z | 20.43 M | DZ | .0941 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.62 | KM | ECC | .337210 | APF | 181.364 | DEG | |
| LAN | 188.958 | DEG | INC | 21.3655 | DEG | TFP | -17.1401 | SEC |
| RCA | 1782.65 | KM | PALT | 44.5593 | KM | PER | 208.618 | MIN |
| APO | 3596.58 | KM | AALT | 1858.49 | KM | IA | 358.944 | DEG |
| LAT | 359.888 | DEG | LONG | 9.24434 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 16688

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 080Y ITEM NO. 52

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:

DAY 220 , 04 HR , 19 MIN

PREPARED BY:

GMT

J.A.BEACON

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S11

TAPE NO. 046Y

5.2 EPOCH DAY ⁰⁴⁴~~90~~, 0 ' 34 ' 0.000 GMT
HR MIN SEC

ITEM NO. 52

SEQ. NO. 52

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -675.24450 | KM | DX | 1.6792950 | KM/SEC |
| Y | -1565.5907 | KM | DY | -.32722737 | KM/SEC |
| Z | -544.54514 | KM | DZ | -.85351016 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 67.54 | M | DX | .05356 | M/S | X | 67.54 | M | DX | .0536 | M/S |
| Y | 12.37 | M | DY | .05076 | M/S | Y | 12.37 | M | DY | .0508 | M/S |
| Z | 27.94 | M | DZ | .10162 | M/S | Z | 27.94 | M | DZ | .1016 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.86 | KM | ECC | .337370 | APF | 181.473 | DEG | |
| LAN | 187.041 | DEG | INC | 21.4628 | DEG | TFP | -169.734 | SEC |
| RCA | 1782.38 | KM | PALT | 44.2903 | KM | PER | 208.646 | MIN |
| APO | 3597.34 | KM | AALT | 1859.25 | KM | TA | 349.564 | DEG |
| LAT | 3.26763 | DEG | LONG | 358.692 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 080Y ITEM NO. 52

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 220 , 04 HR , 23 MINPREPARED BY: J.A.BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S13 TAPE NO. 046Y
049 ITEM NO. 52
 5.2 EPOCH DAY ~~90~~, 4 ' 2 ' 0.000 GMT SEQ. NO. 52
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -727.14665 | KM | DX | 1.6599805 | KM/SEC |
| Y | -1554.8024 | KM | DY | -.36666463 | KM/SEC |
| Z | -517.51221 | KM | DZ | -.86992569 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 96.10 | M | DX | .06547 | M/S | X | 96.10 | M | DX | .0655 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 19.31 | M | DY | .06253 | M/S | Y | 19.31 | M | DY | .0625 | M/S |
| Z | 44.76 | M | DZ | .10732 | M/S | Z | 44.76 | M | DZ | .1073 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.92 | KM | ECC | .337470 | APF | 181.589 | DEG | |
| LAN | 185.113 | DEG | INC | 21.5526 | DEG | TFP | -202.362 | SEC |
| RCA | 1782.15 | KM | PALT | 44.0624 | KM | PER | 208.653 | MIN |
| APO | 3597.68 | KM | AALT | 1859.59 | KM | TA | 347.570 | DEG |
| LAT | 3.96178 | DEG | LONG | 355.015 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 080Y ITEM NO. 52

5.10 REMARKS: MAP TIME REPORT
 *****TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON |
| DAY 220 , 04 HR , 26 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P7A

TAPE NO. 089Y

5.2 EPOCH DAY ⁰⁴⁹ ~~90~~, 7 : 31 : 0.000 GMT
HR MIN SECITEM NO. 53
SEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -680.49372 | KM | DX | 1.6832011 | KM/SEC |
| Y | -1564.4517 | KM | DY | -.33778115 | KM/SEC |
| Z | -541.63818 | KM | DZ | -.84158324 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 16.65 M | DX | .02637 M/S | X | 16.65 M | DX | .0264 M/S |
| Y | 4.858 M | DY | .04196 M/S | Y | 4.858 M | DY | .0420 M/S |
| Z | 8.220 M | DZ | .06524 M/S | Z | 8.220 M | DZ | .0652 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2690.26 | KM | ECC | .337580 | APF | 181.348 | DEG |
| LAN | 183.451 | DEG | INC | 20.9920 | TFP | -174.263 | SEC |
| RCA | 1782.08 | KM | PALT | 43.9906 | PER | 208.693 | MIN |
| APO | 3598.44 | KM | AALT | 1860.35 | TA | 349.284 | DEG |
| LAT | 3.34302 | DEG | LONG | 354.695 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5704.0

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 181, 06 HR, 23 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P7B

TAPE NO. 089Y

ITEM NO. 53

5.2 EPOCH DAY ~~90~~, 11 ' 0 ' 0.000 GMT
HR MIN SEC

SEQ. NO. N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -631.25625 | KM | DX | 1.6994262 | KM/SEC |
| Y | -1573.6237 | KM | DY | -.29740123 | KM/SEC |
| Z | -565.98389 | KM | DZ | -.82857512 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 57.40 | M | DX | .03521 | M/S | X | 57.40 | M | DX | .0352 | M/S |
| Y | 5.996 | M | DY | .05545 | M/S | Y | 5.996 | M | DY | .0555 | M/S |
| Z | 27.87 | M | DZ | .06973 | M/S | Z | 27.87 | M | DZ | .0697 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2690.17 | KM | ECC | .337625 | | APF | 181.461 | DEG |
| LAN | 181.519 | DEG | INC | 21.0284 | DEG | TFP | -146.663 | SEC |
| RCA | 1781.90 | KM | PALT | 43.8089 | KM | PER | 208.682 | MIN |
| APO | 3598.43 | KM | AALT | 1860.34 | KM | TA | 350.972 | DEG |
| LAT | 2.70845 | DEG | LONG | 354.450 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 181, 06 HR, 26 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S14

TAPE NO. 089Y

5.2 EPOCH DAY ⁰⁴⁹ ~~90~~, 14 : 27 : 0.000 GMT
 HR MIN SEC

ITEM NO. 53
 SEQ. NO. N.A.
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -783.25430 | KM | DX | 1.6443844 | KM/SEC |
| Y | -1541.1819 | KM | DY | -.41679488 | KM/SEC |
| Z | -488.77623 | KM | DZ | -.87036698 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 94.65 M | DX | .05125 M/S | X | 94.65 M | DX | .0513 M/S |
| Y | 19.24 M | DY | .07814 M/S | Y | 19.24 M | DY | .0781 M/S |
| Z | 51.37 M | DZ | .07309 M/S | Z | 51.37 M | DZ | .0731 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2690.06 | KM | ECC | .337637 | APF | 181.571 | DEG | |
| LAN | 179.603 | DEG | INC | 21.0693 | TFP | -238.980 | SEC | |
| RCA | 1781.79 | KM | PALT | 43.7044 | KM | PER | 208.669 | MIN |
| APO | 3598.32 | KM | AALT | 1860.23 | KM | TA | 345.338 | DEG |
| LAT | 4.67034 | DEG | LONG | 347.360 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT
 10 HARMONICS.

TIME OF REPORT:
 DAY 181, 06 HR, 30 MIN

PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 3S15 049 | TAPE NO. 089Y |
| | ITEM NO. 53 |
| 5.2 EPOCH DAY 90 , 17 ' 57 ' 0.000 GMT | SEQ. NO. N.A. |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -634.14231 KM | DX 1.6981113 KM/SEC |
| Y -1573.1539 KM | DY -.29704406 KM/SEC |
| Z -564.73052 KM | DZ -.83092817 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 135.5 M | DX .05643 M/S | X 135.5 M | DX .0564 M/S |
| Y 18.72 M | DY .10760 M/S | Y 18.72 M | DY .1076 M/S |
| Z 65.94 M | DZ .08170 M/S | Z 65.94 M | DZ .0817 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|-----------------|------------------|
| SMA 2689.98 KM | ECC .337640 | APF 181.693 DEG |
| LAN 177.665 DEG | INC 21.1026 DEG | TFP -151.513 SEC |
| RCA 1781.73 KM | PALT 43.6444 KM | PER 208.660 MIN |

| | | |
|-----------------|------------------|----------------|
| APO 3598.23 KM | AALT 1860.14 KM | TA 350.673 DEG |
| LAT 2.74142 DEG | LONG 350.538 DEG | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

5.10 REMARKS' MAP TIME REPORT
10 HARMONICS.

| | |
|------------------------------|-------------------------------|
| TIME OF REPORT' | PREPARED BY' J.E.HEDWALL 0000 |
| DAY 181 , 06 HR , 33 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3516

TAPE NO. 201Y
 ITEM NO. 54 ~~23~~
 SEQ. NO. ~~229~~
 COMPUTER G

5.2 EPOCH DAY ~~56~~, 050, 0 ' 56 ' 0.000 GMT
 HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -428.91153 | KM | DX | 1.7517961 | KM/SEC |
| Y | -1598.8854 | KM | DY | -.13134368 | KM/SEC |
| Z | -659.99380 | KM | DZ | -.77030392 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 93.64 M | DX | .06049 M/S | X | 93.64 M | DX | .0605 M/S |
| Y | 4.260 M | DY | .09416 M/S | Y | 4.260 M | DY | .0942 M/S |
| Z | 41.44 M | DZ | .14009 M/S | Z | 41.44 M | DZ | .1401 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2690.00 | KM | ECC | .337620 | APF | 181.877 | DEG |
| LAN | 173.821 | DEG | INC | 21.2031 | TFP | -35.4940 | SEC |
| RCA | 1781.80 | KM | PALT | 43.7128 | KM | PER | 208.663 |
| APC | 3598.19 | KM | AALT | 1860.10 | KM | TA | 357.811 |
| LAT | .112874 | DEG | LONG | 353.530 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2994.0

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 400Y ITEM NO. ~~300000~~

5.10 REMARKS: MAP TIME REPORT
 *****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 220, 06 HR, 01 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S17

TAPE NO. 201Y

5.2 EPOCH DAY ⁰⁵⁰ ~~20~~, 4 : 27 : 0.000 GMT
 HR MIN SEC

ITEM NO. 54
 SEQ. NO. ~~189-15~~
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -164.17776 | KM | DX | 1.7902522 | KM/SEC |
| Y | -1602.9524 | KM | DY | .07656871 | KM/SEC |
| Z | -768.35052 | KM | DZ | -.67763454 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 138.1 | M | DX | .05624 | M/S | X | 93.64 | M | DX | .0605 | M/S |
| Y | 13.63 | M | DY | .11516 | M/S | Y | 4.260 | M | DY | .0942 | M/S |
| Z | 51.86 | M | DZ | .14888 | M/S | Z | 41.44 | M | DZ | .1401 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2689.94 | KM | ECC | .337577 | APF | 181.985 | DEG | |
| LAN | 171.880 | DEG | INC | 21.2051 | DEG | TFP | 112.182 | SEC |
| RCA | 1781.88 | KM | PALT | 43.7895 | KM | PER | 208.656 | MIN |
| APO | 3598.00 | KM | AALT | 1859.91 | KM | TA | 6.91146 | DEG |
| LAT | 356.793 | DEG | LONG | .182919 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 400Y ITEM NO. ~~000000~~

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 220, 06 HR, 04 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3518 TAPE NO. 601Y
 050 ITEM NO. 55
 5.2 EPOCH DAY ~~90~~, 7, 53, 0.000 GMT SEQ. NO. 55
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -431.67991 | KM | DX | 1.7528373 | KM/SEC |
| Y | -1598.4987 | KM | DY | -.13391521 | KM/SEC |
| Z | -659.71272 | KM | DZ | -.76695941 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 13.97 | M | DX | .02810 | M/S | X | 13.97 | M | DX | .0281 | M/S |
| Y | 7.928 | M | DY | .04272 | M/S | Y | 7.928 | M | DY | .0427 | M/S |
| Z | 12.39 | M | DZ | .07051 | M/S | Z | 12.39 | M | DZ | .0705 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.79 | KM | ECC | .337517 | APF | 182.104 | DEG | |
| LAN | 169.931 | DEG | INC | 21.0743 | DEG | TFP | -39.4538 | SEC |
| RCA | 1781.94 | KM | PALT | 43.8532 | KM | PER | 208.639 | MIN |
| APO | 3597.64 | KM | AALT | 1859.55 | KM | TA | 357.567 | DEG |
| LAT | .118283 | DEG | LONG | 349.624 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1599.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 339Y ITEM NO. 55

5.10 REMARKS: MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 220, 08 HR, 09 MIN
 PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|--|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 3519 | TAPE NO. | 601Y |
| 5.2 EPOCH | DAY ⁰⁵⁰ 99 , 11 ' 23 ' 0.000 GMT | ITEM NO. | 55 |
| | HR MIN SEC | SEQ. NO. | 55 |
| | | COMPUTER | G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -273.54719 | KM | DX | 1.7801901 | KM/SEC |
| Y | -1604.9256 | KM | DY | -.00899091 | KM/SEC |
| Z | -726.18842 | KM | DZ | -.71301287 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 54.48 M | DX | .02973 M/S | X | 54.48 M | DX | .0297 M/S |
| Y | 7.865 M | DY | .06068 M/S | Y | 7.865 M | DY | .0607 M/S |
| Z | 26.87 M | DZ | .07298 M/S | Z | 26.87 M | DZ | .0730 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.77 | KM | ECC | .337465 | APP | 182.199 | DEG |
| LAN | 167.994 | DEG | INC | 21.0777 | TFP | 48.7521 | SEC |
| RCA | 1782.07 | KM | PALT | 43.9755 | PER | 208.636 | MIN |
| APO | 3597.47 | KM | AALT | 1859.38 | TA | 3.00597 | DEG |
| LAT | 358.130 | DEG | LONG | 352.853 | | | |

5.6 LUNAR HARMONICS USED¹ LRC II/II MODIFIED

5.7 DATA ARC LENGTH¹ 0 HRS 0 MIN SOS² -.0E+

5.8 DATA SUMMARY¹

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS¹ TAPE NO. 339Y ITEM NO. 55

5.10 REMARKS¹ MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|-----------------------------|--------------------------|------------------|
| TIME OF REPORT ¹ | PREPARED BY ¹ | J.E.HEDWALL 0000 |
| DAY 220 , 08 HR , 12 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3521 TAPE NO. 601Y
 050 ITEM NO. 55
 5.2 EPOCH DAY ~~98~~, 18 ' 18 ' 0.000 GMT SEQ. NO. 55
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -486.91036 | KM | DX | 1.7401655 | KM/SEC |
| Y | -1593.9149 | KM | DY | -.17532598 | KM/SEC |
| Z | -636.00760 | KM | DZ | -.78414984 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 134.3 | M | DX | .04409 | M/S | X | 134.3 | M | DX | .0441 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 9.695 | M | DY | .11580 | M/S | Y | 9.695 | M | DY | .1158 | M/S |
| Z | 64.89 | M | DZ | .08126 | M/S | Z | 64.89 | M | DZ | .0813 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.59 | KM | ECC | .337293 | APF | 182.376 | DEG | |
| LAN | 164.162 | DEG | INC | 21.0889 | DEG | TFP | -74.5688 | SEC |
| RCA | 1782.41 | KM | PALT | 44.3228 | KM | PER | 208.615 | MIN |
| APO | 3596.78 | KM | AALT | 1858.69 | KM | TA | 355.405 | DEG |
| LAT | .798134 | DEG | LONG | 342.092 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 339Y ITEM NO. 55

5.10 REMARKS: MAP TIME REPORT
 *****TEN HARMONICS IN THIS SOLUTION *****

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 220 , 08 HR , 23 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S21.5 TAPE NO. 601Y

050
5.2 EPOCH DAY ~~90~~, 19 ' 21 ' 0.000 GMT
HR MIN SEC ITEM NO. 55
SEQ. NO. 55
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 2430.9026 KM DX -.34630482 KM/SEC
Y 2047.6811 KM DY .88446389 KM/SEC
Z 97.687632 KM DZ .59824593 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 51.18 M DX .03241 M/S X 51.18 M DX .0324 M/S
Y 89.02 M DY .03101 M/S Y 89.02 M DY .0310 M/S
Z 99.80 M DZ .02195 M/S Z 99.80 M DZ .0219 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.75 KM ECC .336889 APF 182.397 DEG
LAN 163.610 DEG INC 21.0912 DEG TFP 3705.27 SEC
RCA 1782.94 KM PALT 44.8493 KM PER 208.517 MIN
APO 3594.56 KM AALT 1856.47 KM TA 138.016 DEG

LAT 346.743 DEG LONG 125.960 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 339Y ITEM NO. 55

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 220 , 08 HR , 25 MIN
PREPARED BY: J.E.HEDWALL 0000
GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S22 TAPE NO. 532Y

5.2 EPOCH DAY ⁰⁵⁰ ~~90~~, 21 ' 45 ' 0.000 GMT
 HR MIN SEC ITEM NO. 56
 SEQ. NO. 56
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -641.74017 | KM | DX | 1.6927882 | KM/SEC |
| Y | -1573.1412 | KM | DY | -.29299080 | KM/SEC |
| Z | -562.71202 | KM | DZ | -.83918299 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 29.48 M | DX | .06437 M/S | X | 29.48 M | DX | .0644 M/S |
| Y | 35.14 M | DY | .08432 M/S | Y | 35.14 M | DY | .0843 M/S |
| Z | 65.99 M | DZ | .15846 M/S | Z | 65.99 M | DZ | .1585 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2689.49 | KM | ECC | .337184 | APF | 182.497 | DEG |
| LAN | 162.212 | DEG | INC | 21.4042 | TFP | -165.858 | SEC |
| RCA | 1782.64 | KM | PALT | 44.5454 | PER | 208.603 | MIN |
| APO | 3596.34 | KM | AALT | 1858.25 | TA | 349.804 | DEG |
| LAT | 2.80219 | DEG | LONG | 335.039 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 22755

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 474Y ITEM NO. 56

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

| | | |
|--------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.A. BEACON |
| DAY 221 , 06 HR , 14 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3520 TAPE NO. 532Y
051 ITEM NO. 56
5.2 EPOCH DAY ~~21~~, 1 12 0.000 GMT SEQ. NO. 56
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -791.78717 | KM | DX | 1.6372214 | KM/SEC |
| Y | -1541.7995 | KM | DY | -.41069918 | KM/SEC |
| Z | -485.27673 | KM | DZ | -.88059621 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 50.17 | M | DX | .06441 | M/S | X | 50.17 | M | DX | .0644 | M/S |
| Y | 42.90 | M | DY | .08655 | M/S | Y | 42.90 | M | DY | .0866 | M/S |
| Z | 78.75 | M | DZ | .15353 | M/S | Z | 78.75 | M | DZ | .1535 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2689.21 | KM | ECC | .337017 | APF | 182.571 | DEG |
| LAN | 160.298 | DEG | INC | 21.4625 | TFP | -256.840 | SEC |
| RCA | 1782.90 | KM | PALT | 44.8069 | PER | 208.570 | MIN |
| APO | 3595.51 | KM | AALT | 1857.42 | TA | 344.274 | DEG |
| LAT | 4.77664 | DEG | LONG | 328.027 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 474Y ITEM NO. 56

5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: PREPARED BY: J.A.BEACON
DAY 221, 06 HR, 17 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P8 TAPE NO. 532Y
 5.2 EPOCH DAY ^{OSI} ~~91~~, 4 : 44 : 0.000 GMT ITEM NO. 56
 HR MIN SEC SEQ. NO. 56
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -435.29680 KM DX 1.7471101 KM/SEC
 Y -1598.8741 KM DY -.12660943 KM/SEC
 Z -660.24588 KM DZ -.77807441 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 73.68 M DX .06834 M/S X 73.68 M DX .0683 M/S
 Y 28.05 M DY .10486 M/S Y 28.05 M DY .1049 M/S

Z 54.73 M DZ .16268 M/S Z 54.73 M DZ .1627 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.18 KM ECC .336911 APF 182.652 DEG
 LAN 158.346 DEG INC 21.4998 DEG TFP -47.9040 SEC
 RCA 1783.17 KM PALT 45.0758 KM PER 208.567 MIN
 APO 3595.19 KM AALT 1857.10 KM TA 357.050 DEG
 LAT .109186 DEG LONG 338.069 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 474Y ITEM NO. 56

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT: DAY 221 , 06 HR , 20 MIN PREPARED BY: J.A.BEACON (B)
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3523

TAPE NO. 795Y

051

ITEM NO. 57

5.2 EPOCH DAY ~~4~~, 8, 13, 0.000 GMT
HR MIN SECSEQ. NO. 57
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -382.23056 | KM | DX | 1.7624953 | KM/SEC |
| Y | -1602.4623 | KM | DY | -.09039468 | KM/SEC |
| Z | -683.35651 | KM | DZ | -.74836631 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 57.68 M | DX | .03336 M/S | X | 21.16 M | DX | .0169 M/S |
| Y | 18.11 M | DY | .05904 M/S | Y | 25.67 M | DY | .0217 M/S |
| Z | 29.64 M | DZ | .08042 M/S | Z | 51.55 M | DZ | .0433 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.27 | KM | ECC | .336833 | APF | 182.727 | DEG | |
| LAN | 156.430 | DEG | INC | 21.0753 | DEG | TFP | -18.8191 | SEC |
| RCA | 1783.43 | KM | PALT | 45.3430 | KM | PER | 208.577 | MIN |
| APO | 3595.10 | KM | AALT | 1857.01 | KM | IA | 358.841 | DEG |
| LAT | 359.436 | DEG | LONG | 337.893 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 7886.2

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 797Y ITEM NO. 57

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT:

PREPARED BY: GEO. S. GOODWIN

DAY 221, 08 HR, 08 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3524

TAPE NO. 795Y

5.2 EPOCH DAY ⁰⁵¹~~91~~, 11 : 42 : 0.000 GMT
HR MIN SEC

ITEM NO. 57

SEQ. NO. 57

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -328.71262 | KM | DX | 1.7714165 | KM/SEC |
| Y | -1604.7148 | KM | DY | -.04749099 | KM/SEC |
| Z | -706.22084 | KM | DZ | -.73043741 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 94.39 M | DX | .03460 M/S | X | 21.16 M | DX | .0169 M/S |
| Y | 17.27 M | DY | .08366 M/S | Y | 25.67 M | DY | .0217 M/S |
| Z | 30.61 M | DZ | .08218 M/S | Z | 51.55 M | DZ | .0433 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2689.14 | KM | ECC | .336680 | APF | 182.813 | DEG |
| LAN | 154.492 | DEG | INC | 21.0973 | TFP | 10.5611 | SEC |
| RCA | 1783.76 | KM | PALT | 45.6718 | KM | PER | 208.563 |
| APO | 3594.53 | KM | AALT | 1856.44 | KM | TA | .650205 |
| LAT | 358.754 | DEG | LONG | 337.723 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 797Y ITEM NO. 57

5.10 REMARKS: MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT:
DAY 221, 08 HR, 11 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P9A TAPE NO. 216Y
 OS1 ITEM NO. 58
 5.2 EPOCH DAY ~~91~~, 15, 10, 0.000 GMT SEQ. NO. 58
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -381.17928 | KM | DX | 1.7632715 | KM/SEC |
| Y | -1602.5687 | KM | DY | -.08912603 | KM/SEC |
| Z | -685.61466 | KM | DZ | -.74515717 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 57.34 | M | DX | .03827 | M/S | X | 29.66 | M | DX | .0182 | M/S |
| Y | 21.75 | M | DY | .06145 | M/S | Y | 36.33 | M | DY | .0233 | M/S |
| Z | 44.54 | M | DZ | .09452 | M/S | Z | 73.42 | M | DZ | .0458 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.25 | KM | ECC | .336558 | APF | 182.983 | DEG | |
| LAN | 152.475 | DEG | INC | 21.0040 | DEG | TFP | -19.8985 | SEC |
| RCA | 1784.16 | KM | PALT | 46.0694 | KM | PER | 208.575 | MIN |
| APO | 3594.34 | KM | AALT | 1856.25 | KM | TA | 358.775 | DEG |
| LAT | 359.370 | DEG | LONG | 334.116 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3153.2

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 146Y ITEM NO. 58

5.10 REMARKS: MAP TIME REPORT
 TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 221, 09 HR, 53 MIN
 PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P9B TAPE NO. 216Y
051 ITEM NO. 58

5.2 EPOCH DAY ~~01~~, 18, 39, 0.000 GMT SEQ. NO. 58
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -327.07412 KM DX 1.7722187 KM/SEC
Y -1604.8281 KM DY -.04586377 KM/SEC
Z -708.65984 KM DZ -.72696555 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 5547 M DX .99933 M/S X 5547 M DX .9993 M/S

Y 95.49 M DY 4.3840 M/S Y 95.49 M DY 4.384 M/S
Z 2158 M DZ 1.8791 M/S Z 2158 M DZ 1.879 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2689.14 KM ECC .336392 APF 183.067 DEG
LAN 150.534 DEG INC 21.0251 DEG TFP 9.87704 SEC
RCA 1784.53 KM PALT 46.4433 KM PER 208.562 MIN
APO 3593.74 KM AALT 1855.65 KM TA .607629 DEG
LAT 358.683 DEG LONG 333.964 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 146Y ITEM NO. 58

5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 221, 09 HR, 59 MIN
PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P9C TAPE NO. 216Y
 OSI ITEM NO. 58
 5.2 EPOCH DAY ~~91~~, 22, 8, 0.000 GMT SEQ. NO. 58
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -272.53694 KM DX 1.7797454 KM/SEC
 Y -1605.7417 KM DY -.00246290 KM/SEC
 Z -731.23901 KM DZ -.70809465 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 829459 M DX 121.03 M/S X 829459 M DX 121.0 M/S
 Y 22082 M DY 650.43 M/S Y 22082 M DY 650.4 M/S
 Z 317899 M DZ 291.71 M/S Z 317899 M DZ 291.7 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2689.02 KM ECC .336220 APF 183.153 DEG
 LAN 148.592 DEG INC 21.0457 DEG TFP 39.7441 SEC
 RCA 1784.92 KM PALT 46.8287 KM PER 208.549 MIN
 APU 3593.13 KM AALT 1655.04 KM TA 2.44374 DEG
 LAT 357.993 DEG LONG 333.818 DEG

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA | DATA | START | STOP | NUMBER | STANDARD |
|-----|------|-------|------|--------|----------|
|-----|------|-------|------|--------|----------|

| NO. | TYPE | TIME | TIME | POINTS | DEVIATION | MEAN |
|-----|--------|---------|---------|--------|-----------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 146Y ITEM NO. 58

5.10 REMARKS: MAP TIME REPORT
 *****TEN HARMONICS IN THIS SOLUTION *****

TIME OF REPORT: DAY 221, 10 HR, 06 MIN PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|------------------------------------|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 3525 | TAPE NO. | 193Y |
| | 052 | ITEM NO. | 59 |
| 5.2 EPOCH DAY | 99 , 1 ' 33 ' 0.000 GMT | SEQ. NO. | 59 |
| | HR MIN SEC | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -638.05912 | KM | DX | 1.6999447 | KM/SEC |
| Y | -1573.8451 | KM | DY | -.29069622 | KM/SEC |
| Z | -574.55190 | KM | DZ | -.81960711 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 127.9 M | DX | .08097 M/S | X | 127.9 M | DX | .0810 M/S |
| Y | 55.55 M | DY | .12327 M/S | Y | 55.55 M | DY | .1233 M/S |
| Z | 106.9 M | DZ | .17711 M/S | Z | 106.9 M | DZ | .1771 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2689.23 | KM | ECC | .336098 | APF | 183.515 | DEG |
| LAN | 146.396 | DEG | INC | 20.8477 | DEG | TFP | -170.001 |
| RCA | 1785.39 | KM | PALT | 47.2951 | KM | PER | 208.573 |
| APO | 3593.07 | KM | AALT | 1854.98 | KM | TA | 349.579 |
| LAT | 2.45234 | DEG | LONG | 319.939 | DEG | | |

5.6 LUNAR HARMONICS USED' LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 8158.4

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 141Y ITEM NO. 59

5.10 REMARKS' MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

| | | |
|------------------------------|----------------|------------------|
| TIME OF REPORT: | - PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 222 , 04 HR , 48 MIN GMT | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|-----------------------------------|----------|-------------|
| 5.1 O.D. IDENTIFICATION NO. | 3S26 | TAPE NO. | 193Y |
| | 052 | ITEM NO. | 59 |
| 5.2 EPOCH | DAY 90 , 5 ' 1 ' 0.000 | GMT | SEQ. NO. 59 |
| | HR MIN SEC | | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | | | |
|----|------------|--------|--|--|--|--|--|
| X | -686.80470 | KM | | | | | |
| | | | | | | | |
| DX | 1.6830006 | KM/SEC | | | | | |
| Y | -1565.4071 | KM | | | | | |
| | | | | | | | |
| DY | -.32772736 | KM/SEC | | | | | |
| Z | -551.01506 | KM | | | | | |
| | | | | | | | |
| DZ | -.83441468 | KM/SEC | | | | | |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 19964 M | DX | 7.1179 M/S | X | 19964 M | DX | 7.118 M/S |
|---|---------|----|------------|---|---------|----|-----------|

| | | | | | | | |
|---|--------|----|------------|---|--------|----|-----------|
| Y | 3328 M | DY | 15.748 M/S | Y | 3328 M | DY | 15.75 M/S |
| Z | 9569 M | DZ | 5.4290 M/S | Z | 9569 M | DZ | 5.429 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2689.10 | KM | ECC | .335905 | | APF | 183.592 | DEG |
| LAN | 144.470 | DEG | INC | 20.8978 | DEG | TFP | -199.682 | SEC |
| RCA | 1785.82 | KM | PALT | 47.7302 | KM | PER | 208.558 | MIN |
| APO | 3592.38 | KM | AALT | 1854.29 | KM | TA | 347.778 | DEG |
| LAT | 3.06808 | DEG | LONG | 316.400 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 141Y ITEM NO. 59

5.10 REMARKS: MAP TIME REPORT
TEN HARMONICS IN THIS SOLUTION **

| | | | |
|-----------------|--------------------------|--------------|------------------|
| TIME OF REPORT: | DAY 222 , 04 HR , 54 MIN | PREPARED BY: | J.E.HEDWALL 0000 |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P10

TAPE NO.

5.2 EPOCH DAY ⁰⁵² ~~90~~, 11 ' 58 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 60

SEQ. NO. ~~1111~~

COMPUTER 5

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -681.42760 | KM | DX | 1.6844557 | KM/SEC |
| Y | -1567.5567 | KM | DY | -.32232488 | KM/SEC |
| Z | -554.19617 | KM | DZ | -.83214048 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|--------|---|----|--------|-----|
| X | 768.5 | M | DX | .33320 | M/S | X | 100000 | M | DX | 10.000 | M/S |
| Y | 59.68 | M | DY | .56763 | M/S | Y | 100000 | M | DY | 10.000 | M/S |
| Z | 351.9 | M | DZ | .24934 | M/S | Z | 100000 | M | DZ | 10.000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2689.17 | KM | ECC | .335555 | APF | 183.693 | DEG | |
| LAN | 140.658 | DEG | INC | 20.8960 | DEG | TFP | -198.137 | SEC |
| RCA | 1786.80 | KM | PALT | 48.7137 | KM | PER | 208.566 | MIN |
| APO | 3591.53 | KM | AALT | 1853.44 | KM | TA | 347.883 | DEG |
| LAT | 2.99525 | DEG | LONG | 312.781 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 181, 04 HR, 47 MINPREPARED BY: G.S.G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3527

TAPE NO.

052

ITEM NO. 60

5.2 EPOCH DAY ~~90~~, 15 : 30 : 0.000 GMTSEQ. NO. ~~1111~~

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -314.07351 | KM | DX | 1.7741201 | KM/SEC |
| Y | -1605.8112 | KM | DY | -.03309552 | KM/SEC |
| Z | -719.19771 | KM | DZ | -.71709002 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 1829 M | DX | .31282 M/S | X | 1829 M | DX | .3128 M/S |
| Y | 67.76 M | DY | 1.5475 M/S | Y | 67.76 M | DY | 1.547 M/S |
| Z | 612.8 M | DZ | .59122 M/S | Z | 612.8 M | DZ | .5912 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2689.09 | KM | ECC | .335359 | APF | 183.771 | DEG |
| LAN | 138.700 | DEG | INC | 20.9307 | DEG | TFP | 12.6869 |
| RCA | 1787.28 | KM | PALT | 49.1897 | KM | PER | 208.557 |
| APO | 3590.90 | KM | AALT | 1852.81 | KM | TA | .778388 |
| LAT | 358.376 | DEG | LONG | 322.951 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 181, 05 HR, 00 MINPREPARED BY: G.S.G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3528

TAPE NO.

5.2 EPOCH DAY ⁰⁵² ~~98~~, 18 : 57 : 0.000 GMT

ITEM NO. 60

SEQ. NO. ~~NA~~

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -469.13517 | KM | DX | 1.7437090 | KM/SEC |
| Y | -1597.9521 | KM | DY | -.15307239 | KM/SEC |
| Z | -654.09969 | KM | DZ | -.77001805 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 262.9 M | DX | .06678 M/S | X | 262.9 M | DX | .0668 M/S |
| Y | 19.61 M | DY | .20060 M/S | Y | 19.61 M | DY | .2006 M/S |
| Z | 130.0 M | DZ | .11696 M/S | Z | 130.0 M | DZ | .1170 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2689.02 | KM | ECC | .335163 | APF | 183.825 | DEG |
| LAN | 136.790 | DEG | INC | 20.9783 | TFP | -75.9660 | SEC |
| RCA | 1787.76 | KM | PALT | 49.6692 | PER | 208.548 | MIN |
| APO | 3590.28 | KM | AALT | 1852.19 | TA | 355.344 | DEG |
| LAT | .297451 | DEG | LONG | 316.014 | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS = -.00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~5.10 REMARKS: MAP TIME REPORT
10 HARMONICS.TIME OF REPORT:
DAY 181, 05 HR, 10 MINPREPARED BY: G. S. G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100814-2
Rev. Ltr. A

5.1 O.D. IDENTIFICATION NO. 3P11

TAPE NO.
ITEM NO. N.A.

5.2 EPOCH DAY 52 , 22 27 0.000 GMT
HR MIN SEC

SEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -306.62047 | KM | DX | 1.7781411 | KM/SEC |
| Y | -1604.3012 | KM | DY | -.02903653 | KM/SEC |
| Z | -728.35757 | KM | DZ | -.70491274 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 5.410 M | DX | .01734 M/S | X | 5.410 M | DX | .0173 M/S |
| Y | 15.43 M | DY | .01510 M/S | Y | 15.43 M | DY | .0151 M/S |
| Z | 32.11 M | DZ | .04477 M/S | Z | 32.11 M | DZ | .0448 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2689.03 | KM | ECC | .334961 | APF | 184.455 | DEG |
| LAN | 134.263 | DEG | INC | 20.6551 | TFP | 16.1147 | SEC |
| RCA | 1788.31 | KM | PALT | 50.2231 | PER | 208.550 | MIN |
| APU | 3589.76 | KM | AALT | 1851.67 | TA | .987685 | DEG |
| LAT | 358.083 | DEG | LUNG | 319.377 | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 2 HRS 13 MIN SOS= -15221

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~NOT~~ AVAILABLE

5.10 REMARKS MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT

PREPARED BY

J.A.BEACON

DAY 344 , 02 HR , 23 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2-100814-2

Rev. Itr. A

5.1 O.D. IDENTIFICATION NO. 3P12B2

TAPE NO.

ITEM NO. N.A.

5.2 EPOCH DAY 53 , 1 54 0.000 GMT
HR MIN SEC

SEQ. NO. N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -460.71387 | KM | DX | 1.7488794 | KM/SEC |
| Y | -1596.8492 | KM | DY | -.14606454 | KM/SEC |
| Z | -665.28803 | KM | DZ | -.75723876 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 6.163 | M | DX | .01714 | M/S | X | 6.163 | M | DX | .0171 | M/S |
| Y | 16.69 | M | DY | .01338 | M/S | Y | 16.69 | M | DY | .0134 | M/S |
| Z | 36.11 | M | DZ | .04251 | M/S | Z | 36.11 | M | DZ | .0425 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|------|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.94 | KM | ECC | .334725 | APF | 184.525 | DEG | |
| ✓LAN | 132.341 | DEG | INC | 20.6750 | DEG | TFP | -71.4697 | SEC |
| RCA | 1788.88 | KM | PALT | 50.7947 | KM | PER | 208.539 | MIN |
| APD | 3589.00 | KM | AALT | 1850.91 | KM | TA | 355.624 | DEG |
| LAT | 359.947 | DEG | LONG | 312.480 | DEG | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 3 HRS 24 MIN SOS= -.0E+

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMRER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~ARE~~ AVAILABLE

5.10 REMARKS MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT

PREPARED BY

J.A.BEACON

DAY 344 , 02 HR , 26 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P12A

TAPE NO.
ITEM NO. N.A.
SEQ. NO. N.A.
COMPUTER B

5.2 EPOCH DAY 53 , 5 22 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -508.15291 | KM | DX | 1.7371192 | KM/SEC |
| Y | -1592.6516 | KM | DY | -.18432035 | KM/SEC |
| Z | -645.26778 | KM | DZ | -.77257886 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 6.091 M | DX | .01721 M/S | X | 6.091 M | DX | .0172 M/S |
| Y | 17.06 M | DY | .01258 M/S | Y | 17.06 M | DY | .0126 M/S |
| Z | 37.43 M | DZ | .04187 M/S | Z | 37.43 M | DZ | .0419 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2688.83 | KM | ECC | .334487 | APF | 184.601 | DEG |
| LAN | 130.389 | DEG | INC | 20.6927 | TFP | -99.0515 | SEC |
| RCA | 1789.45 | KM | PALT | 51.3635 | PER | 208.527 | MIN |
| APD | 3588.22 | KM | AALT | 1850.13 | TA | 353.941 | DEG |
| LAT | .514886 | DEG | LONG | 309.026 | | | DEG |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 3 HRS 25 MIN SOS= -.0E+

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~NOT~~ AVAILABLE

5.10 REMARKS MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT

PREPARED BY

J.A.BEACON

DAY 344 , 02 HR , 29 MIN

GMT

D.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P1281

TAPE NO.
ITEM NO. N.A.
SEQ. NO. N.A.
COMPUTER B

5.2 EPOCH DAY 53 , 8 52 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -345.19075 KM DX 1.7705293 KM/SEC
Y -1604.1483 KM DY -.05674234 KM/SEC
Z -715.35927 KM DZ -.71857361 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 4.211 M DX .01776 M/S X 4.211 M DX .0178 M/S
Y 15.90 M DY .01358 M/S Y 15.90 M DY .0136 M/S
Z 33.54 M DZ .04484 M/S Z 33.54 M DZ .0448 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2688.81 KM ECC .334273 APF 184.686 DEG
LAN 128.418 DEG INC 20.7062 DEG TFP -6.67256 SEC
RCA 1790.01 KM PALT 51.9228 KM PER 208.524 MIN
APO 3587.61 KM AALT 1849.52 KM TA 359.592 DEG
LAT 358.489 DEG LONG 312.421 DEG

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 3 HRS 27 MIN SDS= -.0E+

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~NOT~~ AVAILABLE

5.10 REMARKS MAP TIME REPORT
*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT PREPARED BY J.A.BEACON 0000

DAY 344 , 02 HR , 32 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3P12C

TAPE NO.
ITEM NO. N.A.
SEQ. NO. N.A.
COMPUTER B

5.2 EPOCH DAY 53 , 12 21 0.000 GMT
HR MIN SEC

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -286.72340 | KM | DX | 1.7789458 | KM/SEC |
| Y | -1605.4979 | KM | DY | -.01086285 | KM/SEC |
| Z | -739.52534 | KM | DZ | -.69810820 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 3.564 M | DX | .01799 M/S | X | 3.564 M | DX | .0180 M/S |
| Y | 15.52 M | DY | .01384 M/S | Y | 15.52 M | DY | .0138 M/S |
| Z | 32.10 M | DZ | .04589 M/S | Z | 32.10 M | DZ | .0459 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2688.74 | KM | ECC | .334051 | APF | 184.769 | DEG |
| LAN | 126.455 | DEG | INC | 20.7212 | TFP | 25.8527 | SEC |
| RCA | 1790.56 | KM | PALT | 52.4740 | PER | 208.516 | MIN |
| APO | 3586.92 | KM | AALT | 1848.83 | TA | 1.58094 | DEG |
| LAT | 357.757 | DEG | LONG | 312.398 | | | |

5.6 LUNAR HARMONICS USED LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH 3 HRS 25 MIN SOS= -.0E+

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|--------|
| 62 | CC3 | 52/2010 | 53/0017 | 319 | .3155 | .0364 |
| 41 | CC3 | 53/1151 | 53/1249 | 54 | .5977 | -.2990 |
| 12 | CC3 | 53/0125 | 53/1048 | 557 | .2933 | .0032 |

5.9 RESIDUAL PLOTS ~~NOT~~ AVAILABLE

5.10 REMARKS MAP TIME REPORT

*****TEN HARMONICS IN THIS SOLUTION*****

TIME OF REPORT

PREPARED BY

J.A.BEACON

DAY 344 , 02 HR , 35 MIN GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 3S29 | TAPE NO. 415Y |
| 053 | ITEM NO. 62 |
| 5.2 EPOCH DAY 96 , 15 ' 46 ' 0.000 GMT | SEQ. NO. 62 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -644.67216 KM | DX 1.6925234 KM/SEC |
| Y -1578.9787 KM | DY -.28797584 KM/SEC |
| Z -573.43506 KM | DZ -.82348017 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|----------|---------------|----------|--------------|
| X 2520 M | DX .80657 M/S | X 2520 M | DX .8066 M/S |
|----------|---------------|----------|--------------|

| | | | |
|-----------|---------------|-----------|--------------|
| Y 341.4 M | DY 1.9433 M/S | Y 341.4 M | DY 1.943 M/S |
| Z 1156 M | DZ .63418 M/S | Z 1156 M | DZ .6342 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|------------------|
| SMA 2688.35 KM | ECC .333770 | APF 183.918 DEG |
| LAN 125.428 DEG | INC 21.0462 DEG | TFP -180.561 SEC |
| RCA 1791.06 KM | PALT 52.9672 KM | PER 208.470 MIN |
| APO 3585.63 KM | AALT 1847.54 KM | TA 348.997 DEG |
| LAT 2.53877 DEG | LONG 298.811 DEG | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 183Y ITEM NO. 62

5.10 REMARKS: MAP TIME REPORT
 *****TEN HARMONICS IN THIS SOLUTION *****

| | |
|--------------------------|----------------------------|
| TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| DAY 222 , 06 HR , 42 MIN | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S30

TAPE NO. 233Y

ITEM NO. 63

5.2 EPOCH DAY ~~40~~ 22 42 0.000 GMT
HR MIN SEC

SEQ. NO. 63

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -735.09882 | KM | DX | 1.6651335 | KM/SEC |
| Y | -1558.1640 | KM | DY | -.35776068 | KM/SEC |
| Z | -541.65141 | KM | DZ | -.83960204 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 41.31 M | DX | .05623 M/S | X | 41.31 M | DX | .0562 M/S |
| Y | 56.56 M | DY | .03099 M/S | Y | 56.56 M | DY | .0310 M/S |
| Z | 158.0 M | DZ | .09912 M/S | Z | 158.0 M | DZ | .0991 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2688.37 | KM | ECC | .333364 | APF | 184.983 | DEG | |
| LAN | 120.620 | DEG | INC | 20.7612 | DEG | TFP | -234.074 | SEC |
| RCA | 1792.17 | KM | PALT | 54.0759 | KM | PER | 208.473 | MIN |
| APD | 3584.58 | KM | AALT | 1846.49 | KM | TA | 345.781 | DEG |
| LAT | 3.26136 | DEG | LONG | 291.975 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 3938.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 616Y ITEM NO. 63

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT:
DAY 222 , 08 HR , 26 MINPREPARED BY: J.A.BEACON
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 3S31 TAPE NO. 233Y

5.2 EPOCH DAY ⁰⁵⁺~~90~~, 2 ' 10 ' 0.000 GMT
 HR MIN SEC ITEM NO. 63
 SEQ. NO. 63
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -778.00705 | KM | DX | 1.6484974 | KM/SEC |
| Y | -1548.8777 | KM | DY | -.39043995 | KM/SEC |
| Z | -520.52861 | KM | DZ | -.85103635 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 100.4 M | DX | .07686 M/S | X | 100.4 M | DX | .0769 M/S |
| Y | 51.53 M | DY | .07871 M/S | Y | 51.53 M | DY | .0787 M/S |
| Z | 183.3 M | DZ | .10699 M/S | Z | 183.3 M | DZ | .1070 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2688.33 | KM | ECC | .333143 | APF | 185.050 | DEG | |
| LAN | 118.668 | DEG | INC | 20.7723 | TFP | -260.206 | SEC | |
| RCA | 1792.73 | KM | PALT | 54.6385 | KM | PER | 208.468 | MIN |
| APO | 3583.92 | KM | AALT | 1845.83 | KM | TA | 344.221 | DEG |
| LAT | 3.78563 | DEG | LONG | 288.622 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 11/11 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 616Y ITEM NO. 63

5.10 REMARKS: MAP TIME REPORT

TEN HARMONICS IN THIS SOLUTION **

TIME OF REPORT: DAY 222 , .08 HR , 30 MIN
 PREPARED BY: J.A.BEACON
 GMT O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION IV EPOCH REPORTS

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 5. 11. 15. 0. 0.000
 AGINJ+2 -892.34405518 1911.93257141 -5567.80780029
 .89874013 -.19576007 .05944863

(5.1 O.D. IDENTIFICATION NO. 4ORB6 TAPE NO. 546Y
 (131 ITEM NO. 65
 (5.2 EPOCH DAY ~~113~~ , 15 , 0 , 0.000 GMT SEQ. NO. ~~65~~
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X -894.28480 KM DX .89808173 KM/SEC
 (Y 1915.1586 KM DY -.19919802 KM/SEC
 (Z -5566.3876 KM DZ .05795992 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X 105.8 M DX .00344 M/S X 105.8 M DX .0034 M/S
 (Y 20.92 M DY .00727 M/S Y 20.92 M DY .0073 M/S
 (Z 29.33 M DZ .01659 M/S Z 29.33 M DZ .0166 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OPDATE)
 (SMA 6149.91 KM ECC .276339 APF .802980 DEG
 (LAN 91.5856 DEG INC 85.0105 DEG TFP -8133.72 SEC
 (RCA 4450.45 KM PALT 2712.36 KM PER 721.305 MIN
 (APO 7849.37 KM AALT 6111.28 KM TA 260.418 DEG
 (LAT 280.089 DEG LONG 300.972 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 121.45

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 65

(5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: DAY 220 , 07 HR , 13 MIN. PREPARED BY: J.E.HEDWALL 0000 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|---------------|----|---------------|----|----------------|-------|
| AGINAT | 1. | 67. | 5. | 12. | 3. | 0. | 0.000 |
| AGINJ+2 | | -935.82642365 | | 1919.19953918 | | -5566.16009521 | |
| | | .89836726 | | -.19405397 | | .05298220 | |

5.1 O.D. IDENTIFICATION NO. 4ORB7

TAPE NO. 316Y

132

ITEM NO. 66

5.2 EPOCH DAY 114, 3 0 0.000 GMT

SEQ. NO. 000000

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -937.73649 | KM | DX | .89770455 | KM/SEC |
| Y | 1922.5931 | KM | DY | -.19749118 | KM/SEC |
| Z | -5564.6675 | KM | DZ | .05149384 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 110.6 | M | DX | .00518 | M/S | X | 110.6 | M | DX | .0052 | M/S |
| Y | 6.916 | M | DY | .00756 | M/S | Y | 6.916 | M | DY | .0076 | M/S |
| Z | 41.54 | M | DZ | .01765 | M/S | Z | 41.54 | M | DZ | .0177 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6149.91 | KM | ECC | .276344 | APF | .640343 | DEG |
| LAN | 84.9732 | DEG | INC | 84.9984 | DEG | TFP | -8163.17 |
| RCA | 4450.42 | KM | PALT | 2712.33 | KM | PER | 721.306 |
| APO | 7849.41 | KM | AALT | 6111.32 | KM | TA | 260.166 |
| LAT | 280.456 | DEG | LONG | 293.283 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 126.08

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 466Y

ITEM NO. 000000 66

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 199, 09 HR, 26 MIN

PREPARED BY: G.S. GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

AGINAT 1. 67. 5. 12. 15. 0. 0.000
AGINJ+2 -979.80921173 1928.93786621 -5563.19012451
.89794164 -.19238257 .04641106

(5.1 O.D. IDENTIFICATION NO. 4ORBB

TAPE NO. 849Y

(132

ITEM NO. 67

(5.2 EPOCH DAY 114 , 15 ' 0 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 67
COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -981.67692 KM DX .89727431 KM/SEC
(Y 1932.5008 KM DY -.19581885 KM/SEC
(Z -5561.6243 KM DZ .04492313 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 275.4 M DX .00589 M/S X 275.4 M DX .0059 M/S
(Y 7.671 M DY .01852 M/S Y 7.671 M DY .0185 M/S
(Z 52.21 M DZ .03952 M/S Z 52.21 M DZ .0395 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6149.79 KM ECC .276403 APF .475638 DEG
(LAN 78.3592 DEG INC 85.0112 DEG TFP -8192.62 SEC
(RCA 4449.97 KM PALT 2711.88 KM PER 721.285 MIN
(APO 7849.62 KM AALT 6111.53 KM TA 259.907 DEG
(LAT 280.823 DEG LONG 285.527 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

RE 6378.14948 KE 398601.277 KM 4902.58002
J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 25.701

(5.8 DATA SUMMARY:

(STA DATA START STOP NUMBER STANDARD
(NO. TYPE TIME TIME POINTS DEVIATION MEAN
(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 67

(5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
(DAY 220 , 08 HR , 59 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

AGINAT 1. 67. 5. 13. 3. 0. 0.000
 AGINJ+2 -1025.11231995 1941.41809082 -5559.55151367
 .89734645 -.19068379 .03968923

5.1 O.D. IDENTIFICATION NO. 4ORB9 TAPE NO. 891Y
 133 ITEM NO. 68
 5.2 EPOCH DAY ~~115~~, 3, 0, 0.000 GMT SEQ. NO. 68
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1026.9260 KM DX .89667434 KM/SEC
 Y 1945.1555 KM DY -.19411852 KM/SEC
 Z -5557.9103 KM DZ .03820201 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S
 Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S
 Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 6149.57 KM ECC .276561 APF .333708 DEG
 LAN 71.7443 DEG INC 85.0481 DEG TFP -8225.01 SEC
 RCA 4448.84 KM PALT 2710.75 KM PER 721.247 MIN
 APO 7850.31 KM AALT 6112.22 KM TA 259.610 DEG
 LAT 281.198 DEG LONG 277.700 DEG

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. ITEM NO. 68

5.10 REMARKS: EPOCH REPORT.

TIME OF REPORT: DAY 199, 02 HR, 49 MIN GMT PREPARED BY: G.S.GOODWIN O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 1003:4 2
 AGINAT I. 67. 5. 13. 15. 0. 0.000
 AGINJ#2 -1071.99426270 1957.14669800 -5555.82647705
 .89646439 -.18894431 .03278045

(5.1 O.D. IDENTIFICATION NO. 40RB10 TAPE NO. 022Y
 (133 ITEM NO. 69
 (5.2 EPOCH DAY 115, 15, 0, 0.000 GMT SEQ. NO. 69
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1073.7414 KM DX .89578733 KM/SEC
 (Y 1961.0644 KM DY -.19237641 KM/SEC
 (Z -5554.1077 KM DZ .03129442 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 557.2 M DX .00924 M/S X 557.2 M DX .0092 M/S
 (Y 125.9 M DY .03938 M/S Y 125.9 M DY .0394 M/S
 (Z 58.83 M DZ .07356 M/S Z 58.83 M DZ .0736 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 6149.30 KM ECC .276801 APF .236654 DEG
 (LAN 65.1269 DEG INC 85.1112 DEG TFP -8263.55 SEC
 (RCA 4447.16 KM PALT 2709.07 KM PER 721.198 MIN
 (APO 7851.43 KM AALT 6113.34 KM TA 259.252 DEG
 (LAT 281.581 DEG LONG 269.796 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 52.953

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 69.

(5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL
 (DAY 189, 03 HR, 05 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

AGINAT 1. 67. 5. 14. 3. 0. 0.000
 AGINJ+2 -1123.11952209 1975.86466980 -5552.20751953
 .89524326 -.18695956 .02536720

5.1 O.D. IDENTIFICATION NO. 40RB11 TAPE NO. 343Y

134

ITEM NO. 70

5.2 EPOCH DAY 116, 3 0 0.000 GMT
 HR MIN SEC SEQ. NO. 70
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1124.7887 KM DX .89456136 KM/SEC
 Y 1979.9788 KM DY -.19038773 KM/SEC
 Z -5550.4039 KM DZ .02388292 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 310.8 M DX .00644 M/S X 310.8 M DX .0064 M/S
 Y 115.5 M DY .02346 M/S Y 115.5 M DY .0235 M/S
 Z 29.14 M DZ .04056 M/S Z 29.14 M DZ .0406 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 6148.92 KM ECC .277131 APF .183044 DEG
 LAN 58.5113 DEG INC 85.1934 DEG TFP -8310.80 SEC
 RCA 4444.87 KM PALT 2706.78 KM PER 721.132 MIN
 APO 7852.98 KM AALT 6114.89 KM TA 258.809 DEG
 LAT 282.000 DEG LONG 261.815 DEG

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 164.80

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 221Y ITEM NO. 70

5.10 REMARKS: EPOCH REPORT.

TIME OF REPORT: DAY 199, 03 HR, 15 MIN
 PREPARED BY: G.S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100814

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 15. | 3. | 0. | 0.000 |
| AGINJ+2 | -1238.87092590 | | 2022.64634705 | | -5547.12622070 | | |
| | .89138916 | | -.18217029 | | .00899943 | | |

5.1 O.D. IDENTIFICATION NO. 40RB13

TAPE NO. 606Y

ITEM NO. 72

5.2 EPOCH DAY ¹³⁵ ~~117~~, 3 0 0.000 GMT
 HR MIN SEC

SEQ. NO. 72

COMPUTER B.

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1240.3518 | KM | DX | .89069819 | KM/SEC |
| Y | 2027.2048 | KM | DY | -.18558521 | KM/SEC |
| Z | -5545.1312 | KM | DZ | .00752100 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 252.3 M | DX | .00442 M/S | X | 252.3 M | DX | .0044 M/S |
| Y | 160.1 M | DY | .01918 M/S | Y | 160.1 M | DY | .0192 M/S |
| Z | 5.707 M | DZ | .03013 M/S | Z | 5.707 M | DZ | .0301 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6148.01 | KM | ECC | .277985 | APF | .273594 | DEG |
| LAN | 45.2821 | DEG | INC | 85.4111 | DEG | TFP | -8441.20 |
| RCA | 4438.95 | KM | PALT | 2700.86 | KM | PER | 720.971 |
| APO | 7857.06 | KM | AALT | 6118.97 | KM | TA | 257.603 |
| LAT | 282.951 | DEG | LONG | 245.710 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 28.035

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 422Y ITEM NO. 72

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 199, 05 HR, 03 MIN

PREPARED BY: G.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100814

AGINAT 1. 67. 5. 15. 15. 0. 0.000
 AGINJ+2 -1306.30867004 2048.97003174 -5546.30407715
 .88864224 -.17914548 -.00020854

5.1 O.D. IDENTIFICATION NO. 40RB14

TAPE NO. 507Y

135

ITEM NO. 73

5.2 EPOCH DAY 127, 15, 0, 0.000 GMT
 HR MIN SEC

SEQ. NO. 73

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1307.6868 KM DX .88794745 KM/SEC
 Y 2053.7871 KM DY -.18255061 KM/SEC
 Z -5544.1975 KM DZ -.00168267 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 298.5 M DX .00390 M/S X 298.5 M DX .0039 M/S
 Y 229.5 M DY .02198 M/S Y 229.5 M DY .0220 M/S
 Z 16.18 M DZ .03354 M/S Z 16.18 M DZ .0335 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 6147.43 KM ECC .278509 APF .423448 DEG
 LAN 38.6726 DEG INC 85.5244 DEG TFP -8527.82 SEC
 RCA 4435.32 KM PALT 2697.23 KM PER 720.869 MIN
 APO 7859.54 KM AALT 6121.45 KM TA 256.815 DEG
 LAT 283.511 DEG LONG 237.684 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 75.818

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 73.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 189, 06 HR, 39 MIN
 PREPARED BY: J.E. HEDWALL
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100814 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 16. | 3. | 0. | 0.000 |
| AGINJ+2 | -1378.00752258 | | 2077.90118400 | | -5546.97015381 | | |
| | .88526431 | | -.17583066 | | -.00979421 | | |

5.1 O.D. IDENTIFICATION NO. 4ORB15 TAPE NO. 308Y
 136 ITEM NO. 74
 5.2 EPOCH DAY ~~118~~, 3 0 0.000 GMT SEQ. NO. 74
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1379.2754 | KM | DX | .88456619 | KM/SEC |
| Y | 2082.9930 | KM | DY | -.17922357 | KM/SEC |
| Z | -5544.7451 | KM | DZ | -.01126299 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 197.8 M | DX | .00253 M/S | X | 197.8 M | DX | .0025 M/S |
| Y | 181.4 M | DY | .01432 M/S | Y | 181.4 M | DY | .0143 M/S |
| Z | 17.66 M | DZ | .02121 M/S | Z | 17.66 M | DZ | .0212 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6146.90 | KM | ECC | .279081 | APF | .666350 | DEG |
| LAN | 32.0634 | DEG | INC | 85.6485 | DEG | TFP | -8629.96 |
| RCA | 4431.41 | KM | PALT | 2693.32 | KM | PER | 720.775 |
| APO | 7862.38 | KM | AALT | 6124.29 | KM | TA | 255.902 |
| LAT | 284.107 | DEG | LONG | 229.688 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-05 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 41.956

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 450Y ITEM NO. 74

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 199, 05 HR, 28 MIN PREPARED BY: G.S. GOODWIN O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2
 AGINAT 1. 67. 5. 16. 15. 0. 0.000
 AGINJ+2 -1456.05296326 2107.13000488 -5549.30468750
 .88126869 -.17207740 -.01994851

(5.1 O.D. IDENTIFICATION NO. 40RB16 TAPE NO. 502Y
 (136 ITEM NO. 75
 (5.2 EPOCH DAY ~~118~~, 15 0 0.000 GMT SEQ. NO. 75
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -1457.2122 KM DX .88056802 KM/SEC
 (Y 2112.5208 KM DY -.17545570 KM/SEC
 (Z -5546.9506 KM DZ -.02141089 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 187.8 M DX .00185 M/S X 187.8 M DX .0019 M/S
 (Y 224.0 M DY .01321 M/S Y 224.0 M DY .0132 M/S
 (Z 36.61 M DZ .01843 M/S Z 36.61 M DZ .0184 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6146.35 KM ECC .279700 APF .986100 DEG
 (LAN 25.4585 DEG INC 85.7592 DEG TFP -8747.62 SEC
 (RCA 4427.22 KM PALT 2689.13 KM PER 720.680 MIN
 (APO 7865.49 KM AALT 6127.40 KM TA 254.865 DEG
 (LAT 284.759 DEG LONG 221.807 DEG

(5.6 LUNAR HARMONICS USED, LRC 7/28B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

(5.7 DATA ARC LENGTH, 0 HRS 0 MIN SOS= 29.585

(5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS, ~~NOT AVAILABLE~~ ITEM NO. 75.

(5.10 REMARKS, EPOCH REPORT

(TIME OF REPORT, PREPARED BY, J.E.HEDWALL 0000
 (DAY 189, 08 HR, 08 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|----------------|-----|----|----|-------|
| AGINAT | 1. | 67. | 5. | 17. | 3. | 0. | 0.000 |
| AGINJ+2 | -1538.76614380 | 2136.58215332 | -5553.27301025 | | | | |
| | .87667453 | -.16799155 | -.03044683 | | | | |

5.1 O.D. IDENTIFICATION NO. 4ORB17

TAPE NO. 657Y

137

ITEM NO. 76

5.2 EPOCH DAY ~~119~~, 3 ' 0 ' 0.000 GMT

SEQ. NO. 76

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1539.8184 | KM | DX | .87597199 | KM/SEC |
| Y | 2142.2898 | KM | DY | -.17135290 | KM/SEC |
| Z | -5550.7821 | KM | DZ | -.03190181 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 207.1 M | DX | .00195 M/S | X | 207.1 M | DX | .0019 M/S |
| Y | 297.3 M | DY | .01402 M/S | Y | 297.3 M | DY | .0140 M/S |
| Z | 55.21 M | DZ | .01874 M/S | Z | 55.21 M | DZ | .0187 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6145.88 | KM | ECC | .280344 | APF | 1.38365 | DEG |
| LAN | 18.8563 | DEG | INC | 85.8586 | DEG | TFP | -8877.69 |
| RCA | 4422.92 | KM | PALT | 2684.83 | KM | PER | 720.597 |
| APO | 7868.84 | KM | AALT | 6130.75 | KM | TA | 253.720 |
| LAT | 285.449 | DEG | LONG | 214.045 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981736E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 49.348

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 950Y ITEM NO. 76

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 193 , 08 HR , 18 MIN

PREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|----------------|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 5. | 17. | 15. | 0. | 0.000 |
| AGINJ+2 | | -1625.09452820 | | 2166.06335449 | | -5558.61505127 | |
| | | .87153079 | | -.16365948 | | -.04114855 | |

(5.1 O.D. IDENTIFICATION NO. 4ORB18

TAPE NO. 857Y

(137

ITEM NO. 77

(5.2 EPOCH DAY 119 , 15 ' 0 ' 0.000 GMT

SEQ. NO. 77+AA.

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1626.0420 | KM | DX | .87082701 | KM/SEC |
| Y | 2172.1015 | KM | DY | -.16700174 | KM/SEC |
| Z | -5555.9813 | KM | DZ | -.04259520 | KM/SEC |

(5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 130.4 | M | DX | .00088 | M/S | X | 130.4 | M | DX | .0009 | M/S |
| Y | 257.2 | M | DY | .00737 | M/S | Y | 257.2 | M | DY | .0074 | M/S |
| Z | 61.50 | M | DZ | .01017 | M/S | Z | 61.50 | M | DZ | .0102 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6145.50 | KM | ECC | .281010 | APF | 1.85177 | DEG | |
| LAN | 12.2555 | DEG | INC | 85.9475 | DEG | TFP | -9024.80 | SEC |
| RCA | 4418.55 | KM | PALT | 2680.46 | KM | PER | 720.530 | MIN |
| APO | 7872.44 | KM | AALT | 6134.35 | KM | TA | 252.485 | DEG |
| LAT | 286.166 | DEG | LONG | 206.402 | DEG | | | |

(5.6 LUNAR HARMONICS USED' LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN

SOS= 99.974

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~ ITEM NO. 77.

(5.10 REMARKS' EPOCH REPORT

(TIME OF REPORT'

PREPARED BY' J.E.HEDWALL 0000

(DAY 189 , 09 HR , 44 MIN

GMT

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 18. | 3. | 0. | 0.000 |
| AGINJ+2 | -1715.87863159 | | 2190.11260986 | | -5566.24591064 | | |
| | .86594705 | | -.15907235 | | -.05205255 | | |

5.1 O.D. IDENTIFICATION NO. 40RB19

TAPE NO. 541Y

ITEM NO. 78

5.2 EPOCH DAY ~~120~~, 3 : 0 : 0.000 GMT
 HR MIN SEC

SEQ. NO. ~~78~~ N.A.

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1716.7458 | KM | DX | .86524267 | KM/SEC |
| Y | 2196.4985 | KM | DY | -.16239380 | KM/SEC |
| Z | -5563.4617 | KM | DZ | -.05349013 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 181.7 M | DX | .00086 M/S | X | 181.7 M | DX | .0009 M/S |
| Y | 462.2 M | DY | .00820 M/S | Y | 462.2 M | DY | .0082 M/S |
| Z | 123.8 M | DZ | .01143 M/S | Z | 123.8 M | DZ | .0114 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6145.19 | KM | ECC | .281675 | APF | 2.36413 | DEG |
| LAN | 5.65836 | DEG | INC | 85.9734 | DEG | TFP | -9179.95 |
| RCA | 4414.25 | KM | PALT | 2676.16 | KM | PER | 720.476 |
| APO | 7876.14 | KM | AALT | 6138.05 | KM | TA | 251.188 |
| LAT | 286.921 | DEG | LONG | 199.037 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 57.106

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 78.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 222, 02 HR, 41 MIN

PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|----------------|-----|-----|----|-------|
| AGINAT | 1. | 67. | 5. | 18. | 15. | 0. | 0.000 |
| AGINJ+2 | -1804.35446167 | 2224.21347046 | -5571.19378662 | | | | |
| | .86011349 | -.15411514 | -.06257085 | | | | |

5.1 O.D. IDENTIFICATION NO. 4ORB20

TAPE NO. 141Y

138

ITEM NO. 79

5.2 EPOCH DAY ~~22~~, 15, 0, 0.000 GMT

SEQ. NO. 79

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1805.0984 | KM | DX | .85941060 | KM/SEC |
| Y | 2230.9383 | KM | DY | -.15741476 | KM/SEC |
| Z | -5568.2634 | KM | DZ | -.06399895 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 58.09 M | DX | .00392 M/S | X | 58.09 M | DX | .0039 M/S |
| Y | 244.0 M | DY | .01931 M/S | Y | 244.0 M | DY | .0193 M/S |
| Z | 76.29 M | DZ | .00772 M/S | Z | 76.29 M | DZ | .0077 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6145.19 | KM | ECC | .282354 | APF | 2.91914 | DEG |
| LAN | 359.086 | DEG | INC | 86.1088 | DEG | TFP | -9341.63 |
| RCA | 4410.07 | KM | PALT | 2671.98 | KM | PER | 720.476 |
| APO | 7880.31 | KM | AALT | 6142.22 | KM | TA | 249.860 |
| LAT | 287.642 | DEG | LONG | 191.436 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: U HRS U MIN

SOS= 331.79

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 79.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 222, 03 HR, 21 MIN

PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 5. | 19. | 3. | 0. | 0.000 |
| AGINJ+2 | -1896.69726563 | 2239.81622314 | -5581.39501953 | .85402198 | -.14959221 | -.07316237 | |

5.1 O.D. IDENTIFICATION NO. 4ORB21

TAPE NO. 978Y

139

ITEM NO. 80

5.2 EPOCH DAY ~~121~~, 3 ' 0 ' 0.000 GMT
HR MIN SECSEQ. NO. 80
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1897.3976 | KM | DX | .85331880 | KM/SEC |
| Y | 2246.8948 | KM | DY | -.15286898 | KM/SEC |
| Z | -5578.3112 | KM | DZ | -.07458052 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 33.47 M | DX | .00092 M/S | X | 33.47 M | DX | .0009 M/S |
| Y | 262.8 M | DY | .00401 M/S | Y | 262.8 M | DY | .0040 M/S |
| Z | 93.98 M | DZ | .00418 M/S | Z | 93.98 M | DZ | .0042 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6145.14 | KM | ECC | .282975 | APF | 3.48046 | DEG |
| LAN | 352.485 | DEG | INC | 86.0477 | DEG | TFP | -9506.03 |
| RCA | 4406.22 | KM | PALT | 2668.13 | KM | PER | 720.466 |
| APO | 7884.06 | KM | AALT | 6145.97 | KM | TA | 248.535 |
| LAT | 288.399 | DEG | LONG | 184.472 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.5550425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20001697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 25.566

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 495Y

ITEM NO. 80

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 200 , 02 HR , 25 MINPREPARED BY: G.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 5. | 19. | 15. | 0. | 0.000 |
| AGINJ+2 | -1985.88606262 | 2256.38043213 | -5590.26000977 | .84796546 | -.14512875 | -.08326956 | |

5.1 O.D. IDENTIFICATION NO. 4ORB22

TAPE NO. 026Y

139

ITEM NO. 81

5.2 EPOCH DAY ~~121~~, 15 ' 0 ' 0.000 GMT

SEQ. NO. 81

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1986.9369 | KM | DX | .84726257 | KM/SEC |
| Y | 2263.8010 | KM | DY | -.14838277 | KM/SEC |
| Z | -5587.0280 | KM | DZ | -.08467783 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 6.827 | M | DX | .00066 | M/S | X | 6.827 | M | DX | .0007 | M/S |
| Y | 193.0 | M | DY | .00155 | M/S | Y | 193.0 | M | DY | .0015 | M/S |
| Z | 77.28 | M | DZ | .00612 | M/S | Z | 77.28 | M | DZ | .0061 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6145.30 | KM | ECC | .283556 | APF | 4.03128 | DEG | |
| LAN | 345.891 | DEG | INC | 86.0075 | DEG | TFP | -9668.36 | SEC |
| RCA | 4402.76 | KM | PALT | 2664.67 | KM | PER | 720.494 | MIN |
| APO | 7887.83 | KM | AALT | 6149.74 | KM | TA | 247.252 | DEG |
| LAT | 289.123 | DEG | LONG | 177.503 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: U HRS 0 MIN

SOS= 81.752

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER PCINTS. | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|----------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 502Y

ITEM NO. 81

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 200, 03 HR, 52 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 20. | 3. | 0. | 0.000 |
| AGINJ+2 | -2071.12506104 | | 2267.40515137 | | -5599.35156250 | | |
| | .84212229 | | -.14091140 | | -.09274490 | | |

5.1 O.D. IDENTIFICATION NO. 40RB23

TAPE NO. 672Y

140

ITEM NO. 82

5.2 EPOCH DAY ~~122~~, 3 ' 0 ' 0.000 GMT
 HR MIN SEC

SEQ. NO. 82

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2071.7481 | KM | DX | .84141981 | KM/SEC |
| Y | 2275.1527 | KM | DY | -.14414345 | KM/SEC |
| Z | -5595.9776 | KM | DZ | -.09414362 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 34.21 M | DX | .00052 M/S | X | 34.21 M | DX | .0005 M/S |
| Y | 223.9 M | DY | .00399 M/S | Y | 223.9 M | DY | .0040 M/S |
| Z | 102.1 M | DZ | .01048 M/S | Z | 102.1 M | DZ | .0105 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6145.57 | KM | ECC | .284061 | APF | 4.55033 | DEG |
| LAN | 339.300 | DEG | INC | 85.9262 | DEG | TFP | -9823.67 |
| RCA | 4399.85 | KM | PALT | 2661.76 | KM | PER | 720.543 |
| APO | 7891.29 | KM | AALT | 6153.20 | KM | TA | 246.046 |
| LAT | 289.810 | DEG | LONG | 170.704 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 27.378

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: NOT AVAILABLE ITEM NO. 82.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 222, 05 HR, 23 MIN

PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 20. | 15. | 0. | 0.000 |
| AGINJ+2 | -2150.78421021 | | 2274.78060913 | | -5607.39221191 | | |
| | .83665921 | | -.13707389 | | -.10154282 | | |

5.1 O.D. IDENTIFICATION NO. 40RB24
 140
 TAPE NO. 657Y
 ITEM NO. 83

5.2 EPOCH DAY ~~122~~, 15, 0, 0.000 GMT
 HR MIN SEC
 SEQ. NO. 83
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2151.3917 | KM | DX | .83595679 | KM/SEC |
| Y | 2282.8340 | KM | DY | -.14028542 | KM/SEC |
| Z | -5603.8855 | KM | DZ | -.10293263 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 42.62 | M | DX | .00060 | M/S | X | 42.62 | M | DX | .0006 | M/S |
| Y | 154.6 | M | DY | .00427 | M/S | Y | 154.6 | M | DY | .0043 | M/S |
| Z | 77.36 | M | DZ | .00974 | M/S | Z | 77.36 | M | DZ | .0097 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 6146.00 | KM | ECC | .284466 | APF | 5.01022 | DEG |
| LAN | 332.708 | DEG | INC | 85.8256 | TFP | -9967.59 | SEC |
| RCA | 4397.68 | KM | PALT | 2659.59 | PER | 720.619 | MIN |
| APO | 7894.33 | KM | AALT | 6156.24 | TA | 244.953 | DEG |
| LAT | 290.450 | DEG | LONG | 163.995 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 98.637

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 0000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 83.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 222, 06 HR, 24 MIN
 PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 21. | 3. | 0. | 0.000 |
| AGINJ+2 | -2223.43908691 | | 2277.05053711 | | -5614.61059570 | | |
| | .83173092 | | -.13370444 | | -.10952018 | | |

5.1 O.D. IDENTIFICATION NO. 40RB25

141

TAPE NO. 077Y

ITEM NO. 84

5.2 EPOCH DAY ~~123~~, 3, 0, 0.000 GMT

HR MIN SEC

SEQ. NO. 84

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2224.0493 | KM | DX | .83102813 | KM/SEC |
| Y | 2285.3833 | KM | DY | -.13689748 | KM/SEC |
| Z | -5610.9824 | KM | DZ | -.11090197 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 85.66 | M | DX | .00077 | M/S | X | 85.66 | M | DX | .0008 | M/S |
| Y | 176.0 | M | DY | .00769 | M/S | Y | 176.0 | M | DY | .0077 | M/S |
| Z | 103.8 | M | DZ | .01520 | M/S | Z | 103.8 | M | DZ | .0152 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6146.51 | KM | ECC | .284754 | APF | 5.39766 | DEG | |
| LAN | 326.114 | DEG | INC | 85.6949 | DEG | TFP | -10096.2 | SEC |
| RCA | 4396.27 | KM | PALT | 2658.18 | KM | PER | 720.709 | MIN |
| APO | 7896.76 | KM | AALT | 6158.67 | KM | TA | 243.996 | DEG |
| LAT | 291.032 | DEG | LONG | 157.405 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 41.962

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 881Y ITEM NO. 84

5.10 REMARKS: EPOCH REPORT

| | | |
|------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | G.S. GOODWIN |
| DAY 200, 02 HR, 55 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|---------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 5. | 21. | 15. | 0. | 0.000 |
| AGINJ+2 | -2288.49734497 | 2276.00305176 | -5619.91125488 | .82744943 | -.13082675 | -.11671544 | |

5.1 O.D. IDENTIFICATION NO. 4ORB26

TAPE NO. 423Y

141

ITEM NO. 85

5.2 EPOCH DAY ~~123~~, 15, 0, 0.000 GMT

SEQ. NO. 85

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2289.1198 | KM | DX | .82674568 | KM/SEC |
| Y | 2284.5865 | KM | DY | -.13400379 | KM/SEC |
| Z | -5616.1740 | KM | DZ | -.11809028 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 85.78 | M | DX | .00075 | M/S | X | 85.78 | M | DX | .0008 | M/S |
| Y | 139.3 | M | DY | .00769 | M/S | Y | 139.3 | M | DY | .0077 | M/S |
| Z | 90.40 | M | DZ | .01458 | M/S | Z | 90.40 | M | DZ | .0146 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6147.10 | KM | ECC | .284916 | APF | 5.69185 | DEG | |
| LAN | 319.518 | DEG | INC | 85.5531 | DEG | TFP | -10206.5 | SEC |
| RCA | 4395.69 | KM | PALT | 2657.60 | KM | PER | 720.811 | MIN |
| APO | 7898.51 | KM | AALT | 6160.42 | KM | TA | 243.194 | DEG |
| LAT | 291.556 | DEG | LONG | 150.871 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 99.842

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 308Y ITEM NO. 85

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:

DAY 222, 07 HR, 52 MIN

PREPARED BY:

GMT

GEO.S.GOODWIN

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) [2 100314 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 22. | 3. | 0. | 0.000 |
| AGINJ+2 | -2345.19055176 | | 2271.68096924 | | -5623.35742188 | | |
| | .82388004 | | -.12847297 | | -.12307110 | | |

5.1 O.D. IDENTIFICATION NO. 4ORB27
 142
 TAPE NO. 507Y
 ITEM NO. 86

5.2 EPOCH DAY 124, 3 0 0.000 GMT
 HR MIN SEC
 SEQ. NO. 86
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2345.8349 | KM | DX | .82317469 | KM/SEC |
| Y | 2280.4833 | KM | DY | -.13163676 | KM/SEC |
| Z | -5619.5247 | KM | DZ | -.12444019 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 115.1 M | DX | .00122 M/S | X | 115.1 M | DX | .0012 M/S |
| Y | 120.0 M | DY | .00929 M/S | Y | 120.0 M | DY | .0093 M/S |
| Z | 93.73 M | DZ | .01707 M/S | Z | 93.73 M | DZ | .0171 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6147.63 | KM | ECC | .284953 | APF | 5.89190 | DEG |
| LAN | 312.918 | DEG | INC | 85.4015 | DEG | TFP | -10296.9 |
| RCA | 4395.85 | KM | PALT | 2657.76 | KM | PER | 720.905 |
| APO | 7899.42 | KM | AALT | 6161.33 | KM | TA | 242.553 |
| LAT | 292.017 | DEG | LONG | 144.390 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 49.298

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 768Y ITEM NO. 86

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 222, 08 HR, 31 MIN
 PREPARED BY: J.E. HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

| | | | | | | | |
|---------|----------------|---------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 5. | 22. | 15. | 0. | 0.000 |
| AGINJ+2 | -2394.33947754 | 2266.26870728 | -5623.85943604 | .82103848 | -.12656138 | -.12874899 | |

5.1 O.D. IDENTIFICATION NO. 40R828 TAPE NO. 187Y
 142 ITEM NO. 87

5.2 EPOCH DAY 224 , 15 ' 0 ' 0.000 GMT SEQ. NO. 87
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2395.0051 | KM | DX | .82033095 | KM/SEC |
| Y | 2275.2614 | KM | DY | -.12971473 | KM/SEC |
| Z | -5619.9439 | KM | DZ | -.13011356 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 77.98 M | DX | .00080 M/S | X | 77.98 M | DX | .0008 M/S |
| Y | 64.23 M | DY | .00641 M/S | Y | 64.23 M | DY | .0064 M/S |
| Z | 59.07 M | DZ | .01147 M/S | Z | 59.07 M | DZ | .0115 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6148.17 | KM | ECC | .284881 | APF | 5.98336 | DEG |
| LAN | 306.313 | DEG | INC | 85.2606 | DEG | TFP | -10366.6 |
| RCA | 4396.67 | KM | PALT | 2658.58 | KM | PER | 721.000 |
| APO | 7899.67 | KM | AALT | 6161.58 | KM | TA | 242.074 |
| IAT | 292.424 | DEG | LONG | 137.904 | DEG | | |

5.6 LUNAR HARMONICS USED, LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH, 0 HRS 0 MIN SOS= 66.775

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS, TAPE NO. 972Y ITEM NO. 87

5.10 REMARKS, EPOCH REPORT

TIME OF REPORT, DAY 222 , 09 HR , 03 MIN
 PREPARED BY, J.E. HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 23. | 3. | 0. | 0.000 |
| AGINJ+2 | -2435.04647827 | | 2259.47662354 | | -5622.57849121 | | |
| | .81887902 | | -.12515367 | | -.13360531 | | |

5.1 O.D. IDENTIFICATION NO. 4ORB29

TAPE NO. 318Y

143

ITEM NO. 88

5.2 EPOCH DAY ~~125~~, 3, 0, 0.000 GMT

SEQ. NO. 88

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2435.7357 | KM | DX | .81816874 | KM/SEC |
| Y | 2268.6275 | KM | DY | -.12829922 | KM/SEC |
| Z | -5618.5941 | KM | DZ | -.13496649 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 120.6 M | DX | .00150 M/S | X | 120.6 M | DX | .0015 M/S |
| Y | 65.00 M | DY | .00909 M/S | Y | 65.00 M | DY | .0091 M/S |
| Z | 74.56 M | DZ | .01616 M/S | Z | 74.56 M | DZ | .0162 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6148.57 | KM | ECC | .284727 | APF | 5.99568 | DEG |
| LAN | 299.704 | DEG | INC | 85.1252 | DEG | TFP | -10417.3 |
| RCA | 4397.91 | KM | PALT | 2659.82 | KM | PER | 721.070 |
| APO | 7899.23 | KM | AALT | 6161.14 | KM | TA | 241.738 |
| LAT | 292.767 | DEG | LONG | 131.429 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 49.115

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 050Y ITEM NO. 88

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 222, 09 HR, 43 MIN

PREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 23. | 15. | 0. | 0.000 |
| AGINJ+2 | -2472.35165405 | | 2254.75640869 | | -5617.10394287 | | |
| | .81725335 | | -.12388348 | | -.13827163 | | |

5.1 O.D. IDENTIFICATION NO. 4ORB30

TAPE NO. 993Y

143

ITEM NO. 89

| | | | | | | | | |
|-----------|-----|----------------|-----|---|-----|---|-------|-----|
| 5.2 EPOCH | DAY | 125 | 15 | ' | 0 | ' | 0.000 | GMT |
| | HR | | MIN | | SEC | | | |

| | |
|----------|----|
| SEQ. NO. | 89 |
| COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2473.0497 | KM | DX | .81654007 | KM/SEC |
| Y | 2264.0527 | KM | DY | -.12702335 | KM/SEC |
| Z | -5613.0562 | KM | DZ | -.13963034 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 74.98 | M | DX | .00113 | M/S | X | 74.98 | M | DX | .0011 | M/S |
| Y | 29.22 | M | DY | .00578 | M/S | Y | 29.22 | M | DY | .0058 | M/S |
| Z | 45.43 | M | DZ | .01036 | M/S | Z | 45.43 | M | DZ | .0104 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6148.98 | KM | ECC | .284550 | APF | 5.89977 | DEG | |
| LAN | 293.094 | DEG | INC | 85.0255 | DEG | TFP | -10451.6 | SEC |
| RCA | 4399.29 | KM | PALT | 2661.20 | KM | PER | 721.143 | MIN |
| APO | 7898.68 | KM | AALT | 6160.59 | KM | TA | 241.522 | DEG |
| LAT | 293.092 | DEG | LONG | 124.873 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 56.203

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 483Y ITEM NO. 89

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:

DAY 193, 04 HR, 05 MIN

PREPARED BY:

GMT

J.E.HEDWALL 0000

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 24. | 3. | 0. | 0.000 |
| AGINJ+2 | -2503.05877686 | | 2250.97293091 | | -5610.33886719 | | |
| | .81606475 | | -.12300320 | | -.14228548 | | |

5.1 O.D. IDENTIFICATION NO. 40RB31 TAPE NO. 142Y

5.2 EPOCH DAY ¹⁴⁴~~126~~, 3 0 0.000 GMT
 HR MIN SEC ITEM NO. 90
 SEQ. NO. 90
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2503.7598 | KM | DX | .81534806 | KM/SEC |
| Y | 2260.3895 | KM | DY | -.12613907 | KM/SEC |
| Z | -5606.2388 | KM | DZ | -.14364245 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 86.76 | M | DX | .00175 | M/S | X | 86.76 | M | DX | .0017 | M/S |
| Y | 17.80 | M | DY | .00613 | M/S | Y | 17.80 | M | DY | .0061 | M/S |
| Z | 43.87 | M | DZ | .01085 | M/S | Z | 43.87 | M | DZ | .0109 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6149.10 | KM | ECC | .284369 | APF | 5.76788 | DEG |
| LAN | 286.476 | DEG | INC | 84.9458 | TFP | -10473.4 | SEC |
| RCA | 4400.48 | KM | PALT | 2662.39 | KM | PER | 721.163 |
| APO | 7897.71 | KM | AALT | 6159.62 | KM | TA | 241.389 |
| LAT | 293.366 | DEG | LONG | 118.289 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | + .20917160E-03 | J30 | - .17382163E-04 | J40 | - .37928499E-04 |
| C21 | - .15706427E-06 | C22 | + .17664317E-04 | C31 | + .22722029E-04 |
| C32 | + .74045566E-05 | C33 | + .37548319E-05 | C41 | - .32631249E-05 |
| C42 | + .91580155E-07 | C43 | - .41070348E-06 | C44 | - .47307358E-07 |
| S21 | - .55150425E-05 | S22 | - .16672685E-05 | S31 | - .13551220E-04 |
| S32 | + .20901697E-05 | S33 | + .35233005E-06 | S41 | + .67981786E-05 |
| S42 | - .78789806E-06 | S43 | - .93786395E-06 | S44 | + .15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 114.90

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 929Y ITEM NO. 90

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 193 , 04 HR , 39 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

| | | | | | | | |
|---------|----------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 5. | 24. | 15. | 0. | 0.000 |
| AGINJ+2 | -2532.79602051 | | | 2250.40164185 | | -5600.56683350 | |
| | .81510257 | | | -.12212261 | | -.14626385 | |

5.1 O.D. IDENTIFICATION NO. 40RB32 TAPE NO. 681Y
 144 ITEM NO. 91

5.2 EPOCH DAY ~~126~~ , 15 ' 0 ' 0.000 GMT SEQ. NO. 91
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2533.4828 | KM | DX | .81438249 | KM/SEC |
| Y | 2259.9350 | KM | DY | -.12525541 | KM/SEC |
| Z | -5596.4161 | KM | DZ | -.14761947 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 84.91 | M | DX | .00205 | M/S | X | 84.91 | M | DX | .0020 | M/S |
| Y | 7.602 | M | DY | .00614 | M/S | Y | 7.602 | M | DY | .0061 | M/S |
| Z | 58.59 | M | DZ | .01328 | M/S | Z | 58.59 | M | DZ | .0133 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6149.26 | KM | ECC | .284268 | APF | 5.57926 | DEG | |
| LAN | 279.858 | DEG | INC | 84.9042 | DEG | TFP | -10486.7 | SEC |
| RCA | 4401.22 | KM | PALT | 2663.13 | KM | PER | 721.191 | MIN |
| APO | 7897.30 | KM | AALT | 6159.21 | KM | TA | 241.309 | DEG |
| LAT | 293.637 | DEG | LONG | 111.615 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 56.840

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 144Y ITEM NO. 91

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 193 , 05 HR , 30 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 25. | 3. | 0. | 0.000 |
| AGINJ+2 | -2562.90304565 | | 2253.14950562 | | -5588.12542725 | | |
| | .81418235 | | -.12115211 | | -.15039791 | | |

5.1 O.D. IDENTIFICATION NO. 4ORB33 TAPE NO. 648Y
 145 ITEM NO. 92

5.2 EPOCH DAY ~~127~~, 3 0 0.000 GMT SEQ. NO. 92
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2563.5583 | KM | DX | .81345899 | KM/SEC |
| Y | 2262.8009 | KM | DY | -.12428203 | KM/SEC |
| Z | -5583.9237 | KM | DZ | -.15175227 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 157.5 M | DX | .00188 M/S | X | 157.5 M | DX | .0019 M/S |
| Y | 20.74 M | DY | .01059 M/S | Y | 20.74 M | DY | .0108 M/S |
| Z | 88.31 M | DZ | .02237 M/S | Z | 88.31 M | DZ | .0224 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6148.92 | KM | ECC | .284195 | APF | 5.36714 | DEG |
| LAN | 273.239 | DEG | INC | 84.8980 | DEG | TFP | -10497.1 |
| RCA | 4401.42 | KM | PALT | 2663.33 | KM | PER | 721.131 |
| APO | 7896.41 | KM | AALT | 6158.32 | KM | TA | 241.237 |
| LAT | 293.915 | DEG | LONG | 104.854 | DEG | | |

5.6 LUNAR HARMONICS USED L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH 0 HRS 0 MIN SOS= 61.160

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS TAPE NO. 458Y ITEM NO. 92

5.10 REMARKS EPOCH REPORT

TIME OF REPORT DAY 193 , 06 HR , 03 MIN PREPARED BY GEO.S.GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 5. 25. 15. 0. 0.000
 AGINJ+2 -2594.04208374 2259.62719727 -5574.53527832
 .81313641 -.12007930 -.15457256

5.1 O.D. IDENTIFICATION NO. 40RB34 TAPE NO. 305Y
 145 ITEM NO. 93
 5.2 EPOCH DAY ~~127~~, 15, 0, 0.000 GMT SEQ. NO. 93
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2594.6497 KM DX .81241009 KM/SEC
 Y 2269.4007 KM DY -.12320587 KM/SEC
 Z -5570.2809 KM DZ -.15592545 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 268.8 M DX .00418 M/S X 268.8 M DX .0042 M/S
 Y 54.41 M DY .01740 M/S Y 54.41 M DY .0174 M/S
 Z 112.9 M DZ .03511 M/S Z 112.9 M DZ .0351 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 6148.74 KM ECC .284274 APF 5.16375 DEG
 LAN 266.620 DEG INC 84.9256 DEG TFP -10509.0 SEC
 RCA 4400.82 KM PALT 2662.73 KM PER 721.101 MIN
 APO 7896.67 KM AALT 6158.58 KM TA 241.142 DEG
 LAT 294.201 DEG LONG 98.0155 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.74045566E-05 C33 +.37548319E-05 C41 -.32631249E-05
 C42 +.91580155E-07 C43 -.41070348E-06 C44 -.47307358E-07
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.20901697E-05 S33 +.35233005E-06 S41 +.67981786E-05
 S42 -.78789806E-06 S43 -.93786395E-06 S44 +.15804254E-07

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 245.51

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 00000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 021Y ITEM NO. 93

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 193, 07 HR, 01 MIN PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|----------------|-----|---------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 5. | 26. | 3. | 0. | 0.000 |
| AGINJ+2 | -2628.63696289 | | 2269.74285889 | | -5559.86706543 | | |
| | .811175707 | | -.11875573 | | -.15906906 | | |

5.1 O.D. IDENTIFICATION NO. 40RB35

TAPE NO. 454Y

146

ITEM NO. 94

5.2 EPOCH DAY ~~128~~, 3 0 0.000 GMT
HR MIN SECSEQ. NO. 94
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2629.1810 | KM | DX | .81102820 | KM/SEC |
| Y | 2279.6515 | KM | DY | -.12187770 | KM/SEC |
| Z | -5555.5544 | KM | DZ | -.16041994 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 249.3 M | DX | .00393 M/S | X | 249.3 M | DX | .0039 M/S |
| Y | 76.86 M | DY | .01539 M/S | Y | 76.86 M | DY | .0154 M/S |
| Z | 93.35 M | DZ | .03076 M/S | Z | 93.35 M | DZ | .0308 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 6148.39 | KM | ECC | .284475 | APF | 4.99261 | DEG |
| LAN | 260.002 | DEG | INC | 84.9823 | DEG | TFP | -10527.9 |
| RCA | 4399.33 | KM | PALT | 2661.24 | KM | PER | 721.038 |
| APO | 7897.44 | KM | AALT | 6159.35 | KM | TA | 240.982 |
| LAT | 294.513 | DEG | LONG | 91.1033 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.74045566E-05 | C33 | +.37548319E-05 | C41 | -.32631249E-05 |
| C42 | +.91580155E-07 | C43 | -.41070348E-06 | C44 | -.47307358E-07 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.20901697E-05 | S33 | +.35233005E-06 | S41 | +.67981786E-05 |
| S42 | -.78789806E-06 | S43 | -.93786395E-06 | S44 | +.15804254E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 43.711

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 078Y ITEM NO. 94

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 193, 07 HR, 38 MINPREPARED BY: GEO. S. GOODWIN
O.D. ANALYST

USE FOR TYPED WRITTEN MATERIAL ONLY

MISSION IV MAP TIME REPORTS

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 4F5 | TAPE NO. 546Y |
| (131 | ITEM NO. 65 |
| (5.2 EPOCH DAY 113 , 15 ' 45 ' 0.000 GMT | SEQ. NO. N.A. |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X 1533.3368 KM | DX .86779846 KM/SEC |
| (Y 1214.9753 KM | DY -.31791136 KM/SEC |
| (Z -4890.9973 KM | DZ .45832735 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 89.35 M | DX .01022 M/S | X 89.35 M | DX .0102 M/S |
| (Y 37.99 M | DY .00527 M/S | Y 37.99 M | DY .0053 M/S |
| (Z 28.29 M | DZ .01697 M/S | Z 28.29 M | DZ .0170 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 6150.12 KM | ECC .276410 | APF .805632 DEG |
| (LAN 91.1712 DEG | INC 85.0105 DEG | TFP -5433.44 SEC |
| (RCA 4450.16 KM | PALT 2712.07 KM | PER 721.342 MIN |
| (APO 7850.07 KM | AALT 6111.98 KM | IA 286.457 DEG |
| (LAT 287.948 DEG | LONG 75.5351 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 120.18

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 220 , 07 HR , 20 MIN GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F25 TAPE NO. 546Y
 (5.2 EPOCH DAY ¹³¹~~113~~, 23 ' 12 ' 0.000 GMT ITEM NO. 65
 (HR MIN SEC SEQ. NO. N.A.
 (COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -7703.2684 KM DX -.00963823 KM/SEC
 (Y 1401.4876 KM DY .20189294 KM/SEC
 (Z 495.25631 KM DZ -.64157242 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 16.62 M DX .01349 M/S X 16.62 M DX .0135 M/S
 (Y 71.10 M DY .00374 M/S Y 71.10 M DY .0037 M/S
 (Z 145.4 M DZ .00153 M/S Z 145.4 M DZ .0015 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6148.72 KM ECC .276029 APF .737086 DEG
 (LAN 87.0687 DEG INC 85.0096 DEG TFP 21404.1 SEC
 (RCA 4451.49 KM PALT 2713.40 KM PER 721.096 MIN
 (APO 7845.94 KM AALT 6107.85 KM TA 178.876 DEG
 (LAT .385118 DEG LONG 267.035 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 220 , 07 HR , 26 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F26

TAPE NO. 316Y

5.2 EPOCH DAY ¹³²~~114~~, 4 ' 26 ' 0.000 GMT
HR MIN SECITEM NO. 66
SEQ. NO. ~~000000~~
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3384.3563 | KM | DX | .62300763 | KM/SEC |
| Y | 342.46008 | KM | DY | -.39223351 | KM/SEC |
| Z | -3296.8915 | KM | DZ | .85484439 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 52.76 M | DX | .01737 M/S | X | 52.76 M | DX | .0174 M/S |
| Y | 33.03 M | DY | .00297 M/S | Y | 33.03 M | DY | .0030 M/S |
| Z | 47.04 M | DZ | .01126 M/S | Z | 47.04 M | DZ | .0113 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6150.54 | KM | ECC | .276480 | APF | .643300 | DEG |
| LAN | 84.1816 | DEG | INC | 84.9994 | TFP | -3002.74 | SEC |
| RCA | 4450.04 | KM | PALT | 2711.95 | KM | PER | 721.417 |
| APO | 7851.04 | KM | AALT | 6112.95 | KM | TA | 316.069 |
| LAT | 316.918 | DEG | LONG | 79.4878 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 126.06

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 466Y ITEM NO. ~~000000~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 199 , 09 HR , 29 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F32

TAPE NO. 849Y

(132

ITEM NO. 67

(5.2 EPOCH DAY ~~114~~, 15 ' 46 ' 0.000 GMT

SEQ. NO. N.A.

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1504.3412 KM DX .87070929 KM/SEC

(Y 1221.7638 KM DY -.31772038 KM/SEC

(Z -4897.8113 KM DZ .45309107 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 233.5 M DX .02547 M/S X 233.5 M DX .0255 M/S

(Y 44.21 M DY .01675 M/S Y 44.21 M DY .0168 M/S

(Z 60.43 M DZ .03836 M/S Z 60.43 M DZ .0384 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 6150.15 KM ECC .276480 APF .473863 DEG

(LAN 77.9349 DEG INC 85.0113 DEG TFP -5431.99 SEC

(RCA 4449.76 KM PALT 2711.67 KM PER 721.348 MIN

(APO 7850.54 KM AALT 6112.45 KM TA 286.464 DEG

(LAT 287.637 DEG LONG 61.9992 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 25.696

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 220 , 09 HR , 05 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F38 TAPE NO. 891Y

5.2 EPOCH DAY ¹³³~~115~~, 4 ' 27 ' 0.000 GMT ITEM NO. 68

HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3363.5030 | KM | DX | .62838449 | KM/SEC |
| Y | 352.35529 | KM | DY | -.39351854 | KM/SEC |
| Z | -3315.9471 | KM | DZ | .85051443 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6150.49 | KM | ECC | .276705 | APF | .327245 | DEG | |
| LAN | 70.9417 | DEG | INC | 85.0500 | DEG | TFP | -3003.89 | SEC |
| RCA | 4448.62 | KM | PALT | 2710.53 | KM | PER | 721.408 | MIN |
| APO | 7852.36 | KM | AALT | 6114.27 | KM | TA | 316.032 | DEG |
| LAT | 316.562 | DEG | LONG | 66.2375 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. ITEM NO. 68

5.10 REMARKS: MAP TIME REPORT.

| | | |
|------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | G.S. GOODWIN |
| DAY 199, 02 HR, 51 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F44

TAPE NO. 022Y

(5.2 EPOCH DAY ~~115~~ ¹³³, 15 ' 48 ' 0.000 GMT

ITEM NO. 69

(HR MIN SEC

SEQ. NO. N.A.

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1522.0045 KM DX .87052632 KM/SEC

(Y 1220.1110 KM DY -.32065035 KM/SEC

(Z -4878.7094 KM DZ .45643006 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 472.7 M DX .05119 M/S X 472.7 M DX .0512 M/S

(Y 5.219 M DY .04465 M/S Y 5.219 M DY .0447 M/S

(Z 153.2 M DZ .07020 M/S Z 153.2 M DZ .0702 M/S

(5.5. CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6149.88 KM ECC .276887 APF .228601 DEG

(LAN 64.6840 DEG INC 85.1114 DEG TFP -5382.50 SEC

(RCA 4447.05 KM PALT 2708.96 KM PER 721.300 MIN

(APO 7852.70 KM AALT 6114.61 KM TA 286.951 DEG

(LAT 287.841 DEG LONG 49.2730 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28B

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 47.034

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

(5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT:
DAY 189 , 03 HR , 10 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 4F49 | TAPE NO. 022Y |
| (<i>133</i> | ITEM NO. 69 |
| (5.2 EPOCH DAY 115 , 23 ' 15 ' 0.000 GMT | SEQ. NO. N.A. |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -7703.7592 KM | DX -.01244910 KM/SEC |
| (Y 1404.2168 KM | DY .20408722 KM/SEC |
| (Z 545.60902 KM | DZ -.64036749 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 8.675 M | DX .05355 M/S | X 8.675 M | DX .0536 M/S |
| (Y 295.1 M | DY .01128 M/S | Y 295.1 M | DY .0113 M/S |
| (Z 532.2 M | DZ .00375 M/S | Z 532.2 M | DZ .0038 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 6149.44 KM | ECC .276551 | APF .227908 DEG |
| (LAN 60.5600 DEG | INC 85.1641 DEG | TFP 21445.1 SEC |
| (RCA 4448.81 KM | PALT 2710.72 KM | PER 721.224 MIN |
| (APO 7850.08 KM | AALT 6111.99 KM | TA 179.060 DEG |
| (LAT .709792 DEG | LONG 240.500 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 189 , 03 HR , 14 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F52

TAPE NO. 343Y

5.2 EPOCH DAY ¹³⁴~~116~~, 4 ' 29 ' 0.000 GMT
HR MIN SECITEM NO. 70
SEQ. NO. 70
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3371.6082 | KM | DX | .62589062 | KM/SEC |
| Y | 349.44884 | KM | DY | -.39703622 | KM/SEC |
| Z | -3295.1259 | KM | DZ | .85301922 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 161.8 M | DX | .05018 M/S | X | 161.8 M | DX | .0502 M/S |
| Y | 34.67 M | DY | .02917 M/S | Y | 34.67 M | DY | .0292 M/S |
| Z | 162.7 M | DZ | .02402 M/S | Z | 162.7 M | DZ | .0240 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6150.35 | KM | ECC | .277298 | APF | .161320 | DEG |
| LAN | 57.6892 | DEG | INC | 85.1961 | TFP | -2968.68 | SEC |
| RCA | 4444.87 | KM | PALT | 2706.78 | KM | PER | 721.383 |
| APO | 7855.83 | KM | AALT | 6117.74 | KM | TA | 316.450 |
| LAT | 316.801 | DEG | LONG | 53.1629 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 164.75

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 221Y ITEM NO. 70

5.10 REMARKS: MAP TIME REPORT.

TIME OF REPORT:
DAY 199, 03 HR, 17 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F58

TAPE NO. 396Y

(5.2 EPOCH DAY ¹³⁴ ~~116~~, 15 ' 50 ' 0.000 GMT
(HR MIN SEC

ITEM NO. 71
SEQ. NO. 71
COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1523.8734 KM DX .87048042 KM/SEC
(Y 1232.7205 KM DY -.32343427 KM/SEC
(Z -4869.3044 KM DZ .45651840 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 381.4 M DX .04207 M/S X 381.4 M DX .0421 M/S
(Y 92.24 M DY .04571 M/S Y 92.24 M DY .0457 M/S
(Z 145.9 M DZ .05038 M/S Z 145.9 M DZ .0504 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 6149.34 KM ECC .277624 APF .181103 DEG
(LAN 51.4342 DEG INC 85.2979 DEG TFP -5367.76 SEC
(RCA 4442.13 KM PALT 2704.04 KM PER 721.205 MIN
(APO 7856.54 KM AALT 6118.45 KM TA 287.013 DEG
(LAT 287.807 DEG LONG 36.5968 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28B

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 155.76

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

(5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT'
(DAY 189 , 05 HR , 07 MIN

PREPARED BY' J.E.HEDWALL 0000
GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F64

TAPE NO. 606Y

5.2 EPOCH. DAY ~~117~~¹³⁵, 4 : 31 : 0.000 GMT
HR MIN SECITEM NO. 72
SEQ. NO. 72
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3363.3658 | KM | DX | .62670548 | KM/SEC |
| Y | 362.14179 | KM | DY | -.40104828 | KM/SEC |
| Z | -3298.5912 | KM | DZ | .85116392 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 131.6 M | DX | .04059 M/S | X | 131.6 M | DX | .0406 M/S |
| Y | 9.554 M | DY | .03372 M/S | Y | 9.554 M | DY | .0337 M/S |
| Z | 135.5 M | DZ | .01450 M/S | Z | 135.5 M | DZ | .0145 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6150.07 | KM | ECC | .278187 | APF | .233593 | DEG |
| LAN | 44.4417 | DEG | INC | 85.4141 | TFP | -2977.87 | SEC |
| RCA | 4439.20 | KM | PALT | 2701.11 | KM | PER | 721.333 |
| APO | 7860.94 | KM | AALT | 6122.85 | KM | TA | 316.239 |
| LAT | 316.646 | DEG | LONG | 40.0986 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 27.733

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 2422Y ITEM NO. 72

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 199 , 05 HR , 08 MINPREPARED BY: G.S. GOODWIN
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F70

TAPE NO. 507Y

(135

ITEM NO. 73

(5.2 EPOCH DAY ~~117~~, 15 052 0.000 GMT

SEQ. NO. N.A.

HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1500.2034 KM

DX .87090870 KM/SEC

(Y 1260.1759 KM

DY -.32497316 KM/SEC

(Z -4877.4113 KM

DZ .45164725 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 250.8 M DX .02775 M/S X 250.8 M DX .0277 M/S

(Y 136.0 M DY .03775 M/S Y 136.0 M DY .0378 M/S

(Z 114.1 M DZ .02788 M/S Z 114.1 M DZ .0279 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6148.46 KM ECC .278622 APF .402985 DEG

(LAN 38.1938 DEG INC 85.5246 DEG TFP -5405.94 SEC

(RCA 4435.36 KM PALT 2697.27 KM PER 721.051 MIN

(APO 7861.56 KM AALT 6123.47 KM TA 286.459 DEG

(LAT 287.429 DEG LONG 23.7571 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/288

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 75.077

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:

(DAY 189 , 06 HR , 45 MIN

PREPARED BY:

GMT

J.E.HEDWALL 0000

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 4F75 | TAPE NO. 507Y |
| (¹³⁵ | ITEM NO. 73 |
| (5.2 EPOCH DAY 117 , 23 ' 20 ' 0.000 GMT | SEQ. NO. N.A. |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -7714.2775 KM | DX -.00760651 KM/SEC |
| (Y 1432.8193 KM | DY .20777938 KM/SEC |
| (Z 508.55033 KM | DZ -.63788754 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 5.153 M | DX .03028 M/S | X 5.153 M | DX .0303 M/S |
| (Y 162.4 M | DY .02337 M/S | Y 162.4 M | DY .0234 M/S |
| (Z 260.2 M | DZ .00779 M/S | Z 260.2 M | DZ .0078 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 6151.90 KM | ECC .278149 | APF .529775 DEG |
| (LAN 34.0573 DEG | INC 85.5985 DEG | TFP 21465.2 SEC |
| (RCA 4440.76 KM | PALT 2702.67 KM | PER 721.657 MIN |
| (APO 7863.05 KM | AALT 6124.96 KM | TA 179.098 DEG |
| (LAT .370963 DEG | LONG 214.029 DEG | |

(5.6 LUNAR HARMONICS USED' LRC 7/28B

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY'

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

(5.10 REMARKS' MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT' | PREPARED BY' J.E.HEDWALL 0000 |
| (DAY 189 , 06 HR , 50 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F76 TAPE NO. 308Y

ITEM NO. 74

5.2 EPOCH DAY ¹³⁶ ~~118~~, 4 : 34 : 0.000 GMT SEQ. NO. 74

HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3371.0716 KM DX .62272100 KM/SEC

Y 367.73873 KM DY -.40544876 KM/SEC

Z -3284.3654 KM DZ .85299636 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 103.9 M DX .03146 M/S X 103.9 M DX .0315 M/S

Y 38.99 M DY .03452 M/S Y 38.99 M DY .0345 M/S

Z 108.3 M DZ .00649 M/S Z 108.3 M DZ .0065 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 6149.61 KM ECC .279326 APF .608469 DEG

LAN 31.1966 DEG INC 85.6514 DEG TFP -2985.41 SEC

RCA 4431.86 KM PALT 2693.77 KM PER 721.253 MIN

APO 7867.35 KM AALT 6129.26 KM TA 316.024 DEG

LAT 316.788 DEG LONG 27.1000 DEG

5.6 LUNAR HARMONICS USED: L.R.C. 7/28-B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -6.6137

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 450Y ITEM NO. 74

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 199, 05 HR, 31 MIN PREPARED BY: G.S. GOODWIN O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F82 TAPE NO. 502Y
 (5.2 EPOCH DAY ~~110~~¹³⁶, 15 ' 56 ' 0.000 GMT ITEM NO. 75
 (HR MIN SEC SEQ. NO. 75
 (COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1554.3882 KM DX .86540423 KM/SEC
 (Y 1261.5718 KM DY -.32995512 KM/SEC
 (Z -4851.6970 KM DZ .46141990 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 156.3 M DX .01776 M/S X 156.3 M DX .0178 M/S
 (Y 151.0 M DY .03049 M/S Y 151.0 M DY .0305 M/S
 (Z 90.49 M DZ .01251 M/S Z 90.49 M DZ .0125 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 6147.56 KM ECC .279834 APF .961867 DEG
 (LAN 24.9439 DEG INC 85.7595 DEG TFP -5385.32 SEC
 (RCA 4427.26 KM PALT 2689.17 KM PER 720.892 MIN
 (APO 7867.86 KM AALT 6129.77 KM TA 286.522 DEG
 (LAT 287.975 DEG LONG 11.7330 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 22.126

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 189 , 08 HR , 13 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F88

TAPE NO. 657Y

5.2 EPOCH DAY ¹³⁷~~119~~, 4 ' 38 ' 0.000 GMT
HR MIN SECITEM NO. 76
SEQ. NO. 76
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3394.4414 | KM | DX | .61394604 | KM/SEC |
| Y | 363.77884 | KM | DY | -.40944748 | KM/SEC |
| Z | -3254.1613 | KM | DZ | .85854919 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 106.8 M | DX | .03299 M/S | X | 106.8 M | DX | .0330 M/S |
| Y | 98.99 M | DY | .05245 M/S | Y | 98.99 M | DY | .0524 M/S |
| Z | 119.6 M | DZ | .00163 M/S | Z | 119.6 M | DZ | .0016 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 6149.13 | KM | ECC | .280633 | APF | 1.31220 | DEG | |
| LAN | 17.9550 | DEG | INC | 85.8610 | TFP | -2994.23 | SEC | |
| RCA | 4423.48 | KM | PALT | 2685.39 | KM | PER | 721.168 | MIN |
| APO | 7874.78 | KM | AALT | 6136.69 | KM | TA | 315.775 | DEG |
| LAT | 317.226 | DEG | LONG | 14.1161 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 6.9343

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 950Y ITEM NO. 76

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 193 , 08 HR , 22 MINPREPARED BY: ^{G.S. GOODWIN}~~0000000000000000~~
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 4F94

TAPE NO. 857Y

(137

ITEM NO. 77

(5.2 EPOCH DAY ~~119~~, 15 ' 59 ' 0.000 GMT

SEQ. NO. N.A.

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 1531.2813 KM DX .86332968 KM/SEC

(Y 1290.7691 KM DY -.33025076 KM/SEC

(Z -4874.8181 KM DZ .45661604 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 108.6 M DX .01217 M/S X 108.6 M DX .0122 M/S

(Y 195.1 M DY .02871 M/S Y 195.1 M DY .0287 M/S

(Z 86.15 M DZ .00296 M/S Z 86.15 M DZ .0030 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 6146.68 KM ECC .281161 APF 1.82937 DEG

(LAN 11.7146 DEG INC 85.9478 DEG TFP -5482.45 SEC

(RCA 4418.47 KM PALT 2680.38 KM PER 720.738 MIN

(APO 7874.89 KM AALT 6136.80 KM TA 285.284 DEG

(LAT 287.573 DEG LONG 358.788 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 96.892

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

(5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:
(DAY 189 , 09 HR , 49 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 4F99. | TAPE NO. 857Y |
| (137 | ITEM NO. 77 |
| (5.2 EPOCH DAY 117 , 23 ' 23 ' 0.000 GMT | SEQ. NO. N.A. |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -7727.6418 KM | DX -.01580895 KM/SEC |
| (Y 1434.1829 KM | DY .21314348 KM/SEC |
| (Z 530.20349 KM | DZ -.63437554 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 3.892 M | DX .01293 M/S | X 3.892 M | DX .0129 M/S |
| (Y 53.91 M | DY .02778 M/S | Y 53.91 M | DY .0278 M/S |
| (Z 74.58 M | DZ .00938 M/S | Z 74.58 M | DZ .0094 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 6154.40 KM | ECC .280468 | APF 2.04968 DEG |
| (LAN 7.63595 DEG | INC 85.9838 DEG | TFP 21138.2 SEC |
| (RCA 4428.28 KM | PALT 2690.19 KM | PER 722.095 MIN |
| (APO 7880.51 KM | AALT 6142.42 KM | TA 177.447 DEG |
| (LAT .501951 DEG | LONG 187.601 DEG | |

(5.6 LUNAR HARMONICS USED' LRC 7/28B

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY'

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEA |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

(5.10 REMARKS' MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT' | PREPARED BY' J.E.HEDWALL 0000 |
| (DAY 189 , 09 HR , 53 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F100

TAPE NO. 541Y

5.2 EPOCH DAY ¹³⁸ ~~120~~, 4, 42, 0.000 GMT
HR MIN SECITEM NO. 78
SEQ. NO. N.A.
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3400.0919 | KM | DX | .60917762 | KM/SEC |
| Y | 368.22284 | KM | DY | -.41110027 | KM/SEC |
| Z | -3254.6064 | KM | DZ | .85991026 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 95.29 M | DX | .02865 M/S | X | 95.29 M | DX | .0287 M/S |
| Y | 211.1 M | DY | .07598 M/S | Y | 211.1 M | DY | .0760 M/S |
| Z | 121.3 M | DZ | .01591 M/S | Z | 121.3 M | DZ | .0159 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6148.67 | KM | ECC | .282003 | APF | 2.28839 | DEG |
| LAN | 4.72304 | DEG | INC | 85.9746 | TFP | -3053.92 | SEC |
| RCA | 4414.73 | KM | PALT | 2676.64 | KM | PER | 721.088 |
| APO | 7882.62 | KM | AALT | 6144.53 | KM | TA | 314.830 |
| LAT | 317.249 | DEG | LONG | .993154 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 55.825

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222, 02 HR, 45 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F106

TAPE NO. 141Y

5.2 EPOCH DAY ¹³⁸ ~~120~~, 16 ' 3 ' 0.000 GMT
HR. MIN SECITEM NO. 79
SEQ. NO. 79
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1543.9866 | KM | DX | .85833678 | KM/SEC |
| Y | 1306.7434 | KM | DY | -.33133122 | KM/SEC |
| Z | -4885.1138 | KM | DZ | .45856873 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 57.09 | M | DX | .00452 | M/S | X | 57.09 | M | DX | .0045 | M/S |
| Y | 248.1 | M | DY | .01916 | M/S | Y | 248.1 | M | DY | .0192 | M/S |
| Z | 84.03 | M | DZ | .00542 | M/S | Z | 84.03 | M | DZ | .0054 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6146.22 | KM | ECC | .282525 | APF | 2.90292 | DEG | |
| LAN | 358.509 | DEG | INC | 86.1090 | DEG | TFP | -5559.42 | SEC |
| RCA | 4409.76 | KM | PALT | 2671.67 | KM | PER | 720.657 | MIN |
| APO | 7882.68 | KM | AALT | 6144.59 | KM | TA | 284.274 | DEG |
| LAT | 287.599 | DEG | LONG | 346.127 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 331.78

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222, 03 HR, 24 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F112 TAPE NO. 978Y

5.2 EPOCH DAY ¹³⁹~~121~~, 4 ' 46 ' 0.000 GMT
HR MIN SEC
ITEM NO. 80
SEQ. NO. 80
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3398.5425 KM DX .60623005 KM/SEC
Y 378.23362 KM DY -.41141012 KM/SEC
Z -3270.2379 KM DZ .85915763 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 14.90 M DX .00539 M/S X 14.90 M DX .0054 M/S
Y 123.6 M DY .04265 M/S Y 123.6 M DY .0426 M/S
Z 28.66 M DZ .01651 M/S Z 28.66 M DZ .0165 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 6148.46 KM ECC .283329 APF 3.41231 DEG
LAN 351.515 DEG INC 86.0475 DEG TFP -3140.21 SEC
RCA 4406.42 KM PALT 2668.33 KM PER 721.051 MIN
APO 7890.50 KM AALT 6152.41 KM TA 313.532 DEG
LAT 317.071 DEG LONG 347.830 DEG

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 25.551

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 495Y ITEM NO. 80

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 200, 02 HR, 28 MIN
PREPARED BY: G.S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F118 TAPE NO. 026Y

139
5.2 EPOCH DAY ~~121~~, 16 ' 7 ' 0.000 GMT ITEM NO. 81HR MIN SEC COMPUTER B
5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1550.1438 | KM | DX | .85359661 | KM/SEC |
| Y | 1301.9916 | KM | DY | -.33021008 | KM/SEC |
| Z | -4906.5259 | KM | DZ | .46041745 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 7.180 | M | DX | .00059 | M/S | X | 7.180 | M | DX | .0006 | M/S |
| Y | 161.2 | M | DY | .01761 | M/S | Y | 161.2 | M | DY | .0176 | M/S |
| Z | 40.09 | M | DZ | .01245 | M/S | Z | 40.09 | M | DZ | .0125 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6146.03 | KM | ECC | .283745 | APF | 4.02525 | DEG | |
| LAN | 345.277 | DEG | INC | 86.0075 | DEG | TFP | -5646.45 | SEC |
| RCA | 4402.13 | KM | PALT | 2664.04 | KM | PER | 720.624 | MIN |
| APO | 7889.94 | KM | AALT | 6151.85 | KM | TA | 283.183 | DEG |
| LAT | 287.651 | DEG | LONG | 332.607 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 81.378

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 502Y ITEM NO. 81

5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------|------------------|
| TIME OF REPORT: | PREPARED BY: |
| DAY 200 , 03 HR , 54 MIN | G.S. GOODWIN |
| | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F123

139

TAPE NO. 026Y

ITEM NO. 81

5.2 EPOCH DAY ~~121~~, 23 ' 27 ' 0.000 GMT

HR MIN SEC

SEQ. NO. 81

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -7737.0325 | KM | DX | -.02193642 | KM/SEC |
| Y | 1443.4877 | KM | DY | .21366402 | KM/SEC |
| Z | 499.35324 | KM | DZ | -.63292696 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 4.543 | M | DX | .00189 | M/S | X | 4.543 | M | DX | .0019 | M/S |
| Y | 13.53 | M | DY | .02150 | M/S | Y | 13.53 | M | DY | .0215 | M/S |
| Z | 72.41 | M | DZ | .00744 | M/S | Z | 72.41 | M | DZ | .0074 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 6154.57 | KM | ECC | .282927 | APF | 4.21915 | DEG | |
| LAN | 341.267 | DEG | INC | 85.9699 | DEG | TFP | 20739.7 | SEC |
| RCA | 4413.27 | KM | PALT | 2675.18 | KM | PER | 722.125 | MIN |
| APO | 7895.86 | KM | AALT | 6157.77 | KM | TA | 175.522 | DEG |
| LAT | .257753 | DEG | LONG | 161.249 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 502Y ITEM NO. 81

5.10 REMARKS: MAP TIME REPORT.

TIME OF REPORT:

DAY 200 , 03 HR , 57 MIN

PREPARED BY: G.S.GOODWIN

GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F124

TAPE NO. 672Y

5.2 EPOCH DAY ¹⁴⁰ ~~122~~, 4 : 50 : 0.000 GMT
HR MIN SEC

ITEM NO. 82

SEQ. NO. 82

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3399.9898 | KM | DX | .60285094 | KM/SEC |
| Y | 374.41283 | KM | DY | -.40883817 | KM/SEC |
| Z | -3284.3980 | KM | DZ | .86007850 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 19.10 M | DX | .00540 M/S | X | 19.10 M | DX | .0054 M/S |
| Y | 132.4 M | DY | .03430 M/S | Y | 132.4 M | DY | .0343 M/S |
| Z | 6.409 M | DZ | .01993 M/S | Z | 6.409 M | DZ | .0199 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 6148.39 | KM | ECC | .284429 | APF | 4.50040 | DEG | |
| LAN | 338.296 | DEG | INC | 85.9247 | TFP | -3218.69 | SEC | |
| RCA | 4399.61 | KM | PALT | 2661.52 | KM | PER | 721.038 | MIN |
| APO | 7897.17 | KM | AALT | 6159.08 | KM | TA | 312.366 | DEG |
| LAT | 317.002 | DEG | LONG | 334.486 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 27.207

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222, 05 HR, 26 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F130 TAPE NO. 657Y

ITEM NO. 83

5.2 EPOCH DAY ¹⁴⁰~~122~~, 16 ' 10 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 83

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1520.6438 | KM | DX | .85149216 | KM/SEC |
| Y | 1303.5642 | KM | DY | -.32647999 | KM/SEC |
| Z | -4947.6041 | KM | DZ | .45576096 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 36.54 | M | DX | .00373 | M/S | X | 36.54 | M | DX | .0037 | M/S |
| Y | 142.2 | M | DY | .01136 | M/S | Y | 142.2 | M | DY | .0114 | M/S |
| Z | 23.97 | M | DZ | .01543 | M/S | Z | 23.97 | M | DZ | .0154 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6146.38 | KM | ECC | .284667 | APF | 5.01593 | DEG | |
| LAN | 332.066 | DEG | INC | 85.8253 | DEG | TFP | -5766.18 | SEC |
| RCA | 4396.70 | KM | PALT | 2658.61 | KM | PER | 720.684 | MIN |
| APO | 7896.05 | KM | AALT | 6157.96 | KM | TA | 281.798 | DEG |
| LAT | 287.310 | DEG | LONG | 318.521 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 93.414

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222, 06 HR, 28 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F136 TAPE NO. 077Y

ITEM NO. 84

5.2 EPOCH DAY ¹⁴¹~~133~~, 4 ' 53 ' 0.000 GMT SEQ. NO. 84
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3383.1864 | KM | DX | .60501843 | KM/SEC |
| Y | 375.76947 | KM | DY | -.40413074 | KM/SEC |
| Z | -3324.3258 | KM | DZ | .85677613 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 45.28 M | DX | .01348 M/S | X | 45.28 M | DX | .0135 M/S |
| Y | 127.2 M | DY | .02551 M/S | Y | 127.2 M | DY | .0255 M/S |
| Z | 32.59 M | DZ | .02139 M/S | Z | 32.59 M | DZ | .0214 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6148.58 | KM | ECC | .285117 | APF | 5.37233 | DEG |
| LAN | 325.082 | DEG | INC | 85.6925 | TFP | -3312.51 | SEC |
| RCA | 4395.52 | KM | PALT | 2657.43 | KM | PER | 721.072 |
| APO | 7901.64 | KM | AALT | 6163.55 | KM | TA | 311.044 |
| LAT | 316.570 | DEG | LONG | 320.993 | DEG | | |

5.6 LUNAR HARMONICS USED' L.R.C. 7/28 B

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 40.232

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 881Y ITEM NO. 84

5.10 REMARKS' MAP TIME REPORT

TIME OF REPORT' DAY 200, 02 HR, 58 MIN PREPARED BY' G.S. GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F142

TAPE NO. 423Y

141

ITEM NO. 85

5.2 EPOCH DAY ~~123~~, 16 ' 55 ' 0.000 GMT

SEQ. NO. 85

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3402.7702 | KM | DX | .59933180 | KM/SEC |
| Y | 355.36145 | KM | DY | -.40226559 | KM/SEC |
| Z | -3303.2043 | KM | DZ | .86223640 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 43.55 | M | DX | .01403 | M/S | X | 43.55 | M | DX | .0140 | M/S |
| Y | 108.4 | M | DY | .01979 | M/S | Y | 108.4 | M | DY | .0198 | M/S |
| Z | 39.11 | M | DZ | .01969 | M/S | Z | 39.11 | M | DZ | .0197 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 6148.82 | KM | ECC | .285275 | | APF | 5.67785 | DEG |
| LAN | 318.466 | DEG | INC | 85.5506 | DEG | TFP | -3303.41 | SEC |
| RCA | 4394.72 | KM | PALT | 2656.63 | KM | PER | 721.114 | MIN |
| APO | 7902.92 | KM | AALT | 6164.83 | KM | TA | 311.152 | DEG |
| LAT | 316.991 | DEG | LONG | 314.304 | DEG | | | |

5.6 LUNAR HARMONICS USED' L.R.C. 7/28 B

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 96.301

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 308Y ITEM NO. 85

5.10 REMARKS' MAP TIME REPORT

| | | | |
|-----------------|--------------------------|--------------|---------------|
| TIME OF REPORT' | DAY 222 , 07 HR , 57 MIN | PREPARED BY' | GEO.S.GOODWIN |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 4F146 141 | TAPE NO. 423Y |
| | ITEM NO. 85 |
| 5.2 EPOCH DAY 22 , 23 ' 29 ' 0.000 GMT | SEQ. NO. 85 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -7731.6407 KM | DX -.03519944 KM/SEC |
| Y 1431.0713 KM | DY .21037078 KM/SEC |
| Z 541.54664 KM | DZ -.63371902 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 5.068 M | DX .01256 M/S | X 5.068 M | DX .0126 M/S |
| Y 66.14 M | DY .01749 M/S | Y 66.14 M | DY .0175 M/S |
| Z 169.8 M | DZ .00632 M/S | Z 169.8 M | DZ .0063 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 6151.57 KM | ECC .284334 | APF 5.75961 DEG |
| LAN 314.884 DEG | INC 85.4770 DEG | TFP 20340.6 SEC |
| RCA 4402.47 KM | PALT 2664.38 KM | PER 721.598 MIN |
| APO 7900.67 KM | AALT 6162.58 KM | TA 173.672 DEG |
| LAT .567072 DEG | LONG 134.839 DEG | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E-

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 308Y ITEM NO. 85

5.10 REMARKS: MAP TIME REPORT

| | |
|------------------------|----------------------------|
| TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| DAY 222, 08 HR, 01 MIN | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F148

TAPE NO. 507Y

5.2 EPOCH DAY ¹⁴²~~124~~, 4 : 56 : 0.000 GMT

ITEM NO. 86

SEQ. NO. 86

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3393.9040 | KM | DX | .60123022 | KM/SEC |
| Y | 352.74300 | KM | DY | -.39956710 | KM/SEC |
| Z | -3321.5465 | KM | DZ | .86061550 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 60.24 | M | DX | .01824 | M/S | X | 60.24 | M | DX | .0182 | M/S |
| Y | 108.1 | M | DY | .01636 | M/S | Y | 108.1 | M | DY | .0164 | M/S |
| Z | 52.26 | M | DZ | .02038 | M/S | Z | 52.26 | M | DZ | .0204 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6149.01 | KM | ECC | .285299 | APF | 5.88827 | DEG | |
| LAN | 311.855 | DEG | INC | 85.3990 | DEG | TFP | -3334.39 | SEC |
| RCA | 4394.71 | KM | PALT | 2656.62 | KM | PER | 721.148 | MIN |
| APO | 7903.32 | KM | AALT | 6165.23 | KM | TA | 310.739 | DEG |
| LAT | 316.801 | DEG | LONG | 307.521 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 26.782

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 768Y ITEM NO. 86

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222, 08 HR, 34 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F154

TAPE NO. 187Y

5.2 EPOCH DAY ¹⁴²~~124~~, 16 ' 15 ' 0.000 GMT
HR MIN SECITEM NO. 87
SEQ. NO. 87
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1509.0871 | KM | DX | .84840618 | KM/SEC |
| Y | 1262.7990 | KM | DY | -.32086557 | KM/SEC |
| Z | -4989.9801 | KM | DZ | .45588595 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 6148.24 | KM | ECC | .285084 | APF | 5.99812 | DEG | |
| LAN | 305.622 | DEG | INC | 85.2598 | TFP | -5865.55 | SEC | |
| RCA | 4395.48 | KM | PALT | 2657.39 | KM | PER | 721.012 | MIN |
| APO | 7901.00 | KM | AALT | 6162.91 | KM | TA | 280.726 | DEG |
| LAT | 287.365 | DEG | LONG | 290.245 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 972Y ITEM NO. 87

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 222 , 09 HR , 17 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F160 TAPE NO. 318Y

5.2 EPOCH DAY ¹⁴³~~125~~, 4 ' 58 ' 0.000 GMT
HR MIN SEC ITEM NO. 88
SEQ. NO. 88
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3398.4947 KM DX .60003193 KM/SEC
Y 331.78576 KM DY -.39555031 KM/SEC
Z -3321.2759 KM DZ .86294553 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 62.70 M DX .01930 M/S X 62.70 M DX .0193 M/S
Y 81.41 M DY .00774 M/S Y 81.41 M DY .0077 M/S
Z 60.07 M DZ .01727 M/S Z 60.07 M DZ .0173 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 6149.51 KM ECC .285042 APF 6.00414 DEG
LAN 298.620 DEG INC 85.1235 DEG TFP -3335.59 SEC
RCA 4396.64 KM PALT 2658.55 KM PER 721.236 MIN
APO 7902.39 KM AALT 6164.30 KM TA 310.755 DEG
LAT 316.953 DEG LONG 294.049 DEG

5.6 LUNAR HARMONICS USED' L.R.C. 7/28 B

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 46.189

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 050Y ITEM NO. 88

5.10 REMARKS' MAP TIME REPORT

TIME OF REPORT' DAY 222 , 09 HR , 47 MIN
PREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F165

TAPE NO. 318Y

ITEM NO. 88

5.2 EPOCH DAY ~~125~~ ¹⁴³, 9, 43, 0.000 GMT
HR MIN SEC

SEQ. NO. 88

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -5831.9043 | KM | DX | -.54399292 | KM/SEC |
| Y | -111.99967 | KM | DY | .25389505 | KM/SEC |
| Z | 4244.5897 | KM | DZ | -.44880245 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 84.72 | M | DX | .01181 | M/S | X | 84.72 | M | DX | .0118 | M/S |
| Y | 122.0 | M | DY | .00186 | M/S | Y | 122.0 | M | DY | .0019 | M/S |
| Z | 118.6 | M | DZ | .01527 | M/S | Z | 118.6 | M | DZ | .0153 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 6148.27 | KM | ECC | .284564 | APF | 5.99834 | DEG | |
| LAN | 296.013 | DEG | INC | 85.1043 | DEG | TFP | 13770.4 | SEC |
| RCA | 4398.70 | KM | PALT | 2660.61 | KM | PER | 721.018 | MIN |
| APO | 7897.85 | KM | AALT | 6159.76 | KM | TA | 139.608 | DEG |
| LAT | 34.2507 | DEG | LONG | 112.669 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 050Y ITEM NO. 88

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 222, 09 HR, 50 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F166 TAPE NO. 993Y

5.2 EPOCH DAY ¹⁴³~~125~~, 16 ' 18 ' 0.000 GMT ITEM NO. 89
HR MIN SEC SEQ. NO. 89
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1582.3461 | KM | DX | .84447958 | KM/SEC |
| Y | 1211.7988 | KM | DY | -.32294853 | KM/SEC |
| Z | -4954.1606 | KM | DZ | .47058677 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 60.98 | M | DX | .00727 | M/S | X | 60.98 | M | DX | .0073 | M/S |
| Y | 47.56 | M | DY | .00148 | M/S | Y | 47.56 | M | DY | .0015 | M/S |
| Z | 13.26 | M | DZ | .01234 | M/S | Z | 13.26 | M | DZ | .0123 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6149.23 | KM | ECC | .284744 | APF | 5.90830 | DEG |
| LAN | 292.373 | DEG | INC | 85.0247 | TFP | -5770.24 | SEC |
| RCA | 4398.28 | KM | PALT | 2660.19 | KM | PER | 721.187 |
| APO | 7900.19 | KM | AALT | 6162.10 | KM | TA | 281.788 |
| LAT | 288.361 | DEG | LONG | 277.167 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 56.085

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 483Y ITEM NO. 89

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 193, 04 HR, 08 MIN PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 4F171 144 | TAPE NO. 993Y |
| | ITEM NO. 89 |
| 5.2 EPOCH DAY 126 , 1 ' 28 ' 0.000 GMT | SEQ. NO. 89 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -6150.3520 KM | DX .48188133 KM/SEC |
| Y 2413.7657 KM | DY .05945865 KM/SEC |
| Z -3639.6247 KM | DZ -.51653159 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 74.70 M | DX .00873 M/S | X 74.70 M | DX .0087 M/S |
| Y 11.02 M | DY .00787 M/S | Y 11.02 M | DY .0079 M/S |
| Z 107.6 M | DZ .00683 M/S | Z 107.6 M | DZ .0068 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|------------------|
| SMA 6148.85 KM | ECC .284165 | APF 5.77729 DEG |
| LAN 287.335 DEG | INC 84.9625 DEG | TFP -16000.3 SEC |
| RCA 4401.56 KM | PALT 2663.47 KM | PER 721.119 MIN |
| APO 7896.14 KM | AALT 6158.05 KM | TA 208.099 DEG |
| LAT 326.272 DEG | LONG 110.709 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 483Y ITEM NO. 89

5.10 REMARKS: MAP TIME REPORT

| | |
|------------------------------|-------------------------------|
| TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| DAY 193 , 04 HR , 11 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F172 TAPE NO. 142Y
 144 ITEM NO. 90
 5.2 EPOCH DAY ~~126~~, 4 : 59 : 0.000 GMT SEQ. NO. 90
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 3388.9391 | KM | DX | .60307796 | KM/SEC |
| Y | 322.71002 | KM | DY | -.39316778 | KM/SEC |
| Z | -3333.4365 | KM | DZ | .86167957 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 45.74 | M | DX | .01406 | M/S | X | 45.74 | M | DX | .0141 | M/S |
| Y | 44.17 | M | DY | .00112 | M/S | Y | 44.17 | M | DY | .0011 | M/S |
| Z | 49.95 | M | DZ | .01106 | M/S | Z | 49.95 | M | DZ | .0111 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6149.99 | KM | ECC | .284651 | APF | 5.77489 | DEG | |
| LAN | 285.380 | DEG | INC | 84.9456 | DEG | TFP | -3331.61 | SEC |
| RCA | 4399.39 | KM | PALT | 2661.30 | KM | PER | 721.320 | MIN |
| APO | 7900.59 | KM | AALT | 6162.30 | KM | TA | 310.853 | DEG |
| LAT | 316.838 | DEG | LONG | 280.622 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 114.87

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 929Y ITEM NO. 90

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 DAY 193, 04 HR, 43 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F177

TAPE NO. 142Y

5.2 EPOCH DAY ~~126~~¹⁴⁴, 9 : 44 : 0.000 GMT
HR MIN SEC

ITEM NO. 90

SEQ. NO. 90

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -5810.9959 | KM | DX | -.54611784 | KM/SEC |
| Y | -104.62203 | KM | DY | .25283970 | KM/SEC |
| Z | 4271.6244 | KM | DZ | -.44702687 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 67.92 M | DX | .00952 M/S | X | 67.92 M | DX | .0095 M/S |
| Y | 72.20 M | DY | .00139 M/S | Y | 72.20 M | DY | .0014 M/S |
| Z | 93.49 M | DZ | .01044 M/S | Z | 93.49 M | DZ | .0104 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 6148.26 | KM | ECC | .284235 | APF | 5.77545 | DEG | |
| LAN | 282.764 | DEG | INC | 84.9403 | DEG | TFP | 13773.4 | SEC |
| RCA | 4400.71 | KM | PALT | 2662.62 | KM | PER | 721.015 | MIN |
| APO | 7895.80 | KM | AALT | 6157.71 | KM | TA | 139.602 | DEG |
| LAT | 34.4681 | DEG | LONG | 99.2790 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 929Y ITEM NO. 90

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|--------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL |
| DAY 193, 04 HR, 46 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| 5.1 O.D. IDENTIFICATION NO. 4F178 144 | TAPE NO. 142Y |
| | ITEM NO. 90 |
| 5.2 EPOCH DAY 126 , 13 ' 28 ' 0.000 GMT | SEQ. NO. 90 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -6167.9975 KM | DX .47931392 KM/SEC |
| Y 2409.6374 KM | DY .05983578 KM/SEC |
| Z -3614.0907 KM | DZ -.51868864 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 97.18 M | DX .01129 M/S | X 97.18 M | DX .0113 M/S |
|-----------|---------------|-----------|--------------|

| | | | |
|-----------|---------------|-----------|--------------|
| Y 22.38 M | DY .00765 M/S | Y 22.38 M | DY .0077 M/S |
| Z 117.1 M | DZ .00774 M/S | Z 117.1 M | DZ .0077 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|------------------|
| SMA 6148.46 KM | ECC .284050 | APF 5.61755 DEG |
| LAN 280.711 DEG | INC 84.9135 DEG | TFP -16014.1 SEC |
| RCA 4402.00 KM | PALT 2663.91 KM | PER 721.051 MIN |
| APO 7894.93 KM | AALT 6156.84 KM | TA 208.023 DEG |
| LAT 326.509 DEG | LONG 104.087 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 929Y ITEM NO. 90

5.10 REMARKS: MAP TIME REPORT

| | |
|------------------------|-------------------------------|
| TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| DAY 193, 04 HR, 49 MIN | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F179

TAPE NO. 681Y

5.2 EPOCH DAY ¹⁴⁴~~126~~, 16 ' 18 ' 0.000 GMT

ITEM NO. 91

SEQ. NO. 91

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|-----|----|------------|--------|
| X | 1525.4171 | KM. | DX | .84905685 | KM/SEC |
| Y | 1217.9955 | KM | DY | -.32046128 | KM/SEC |
| Z | -4980.7979 | KM | DZ | .46051699 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 65.47 M | DX | .00896 M/S | X | 65.47 M | DX | .0090 M/S |
| Y | 25.45 M | DY | .00388 M/S | Y | 25.45 M | DY | .0039 M/S |
| Z | 22.23 M | DZ | .01234 M/S | Z | 22.23 M | DZ | .0123 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 6149.82 | KM | ECC | .284448 | APF | 5.57664 | DEG |
| LAN | 279.137 | DEG | INC | 84.9037 | TFP | -5804.72 | SEC |
| RCA | 4400.52 | KM | PALT | 2662.43 | KM | PER | 721.289 |
| APO | 7899.12 | KM | AALT | 6161.03 | KM | TA | 281.469 |
| LAT | 287.770 | DEG | LONG | 262.980 | DEG | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 56.839

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 144Y ITEM NO. 91

5.10 REMARKS: MAP TIME REPORT.

TIME OF REPORT:
DAY 193 , 05 HR , 33 MINPREPARED BY: GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 4F184 | TAPE NO. 681Y |
| 145 | ITEM NO. 91 |
| 5.2 EPOCH DAY 127 , 1, 29, 0.000 GMT | SEQ. NO. 91 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -6158.7701 KM | DX .48081692 KM/SEC |
| Y 2411.3668 KM | DY .05898039 KM/SEC |
| Z -3615.8605 KM | DZ -.51839922 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 58.74 M | DX .00711 M/S | X 58.74 M | DX .0071 M/S |
| Y 32.76 M | DY .00501 M/S | Y 32.76 M | DY .0050 M/S |
| Z 89.89 M | DZ .00713 M/S | Z 89.89 M | DZ .0071 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|------------------|
| SMA 6148.33 KM | ECC .284037 | APF 5.41906 DEG |
| LAN 274.079 DEG | INC 84.9037 DEG | TFP -15966.3 SEC |
| RCA 4401.98 KM | PALT 2663.89 KM | PER 721.028 MIN |
| APO 7894.68 KM | AALT 6156.59 KM | TA 208.275 DEG |
| LAT 326.457 DEG | LONG 97.4681 DEG | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 144Y ITEM NO. 91

5.10 REMARKS: MAP TIME REPORT

| | |
|----------------------------|------------------------------|
| TIME OF REPORT: | PREPARED BY: GEO. S. GOODWIN |
| DAY 193, 05 HR, 36 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F186

TAPE NO. 648Y

5.2 EPOCH DAY ¹⁴⁵~~127~~, 5 : 0 : 0.000 GMT
HR MIN SEC

ITEM NO. 92

SEQ. NO. 92

COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 3388.2917 KM
Y 313.15615 KM
Z -3325.7103 KMDX .60387740 KM/SEC
DY -.39341969 KM/SEC
DZ .86264440 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 74.35 M DX .02399 M/S X 74.35 M DX .0240 M/S
Y 43.86 M DY .00464 M/S Y 43.86 M DY .0046 M/S
Z 66.79 M DZ .01479 M/S Z 66.79 M DZ .0148 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 6150.10 KM ECC .284453 APF 5.36120 DEG
LAN 272.132 DEG INC 84.8993 DEG TFP -3294.71 SEC
RCA 4400.68 KM PALT 2662.59 KM PER 721.340 MIN
APO 7899.52 KM AALT 6161.43 KM TA 311.365 DEG
LAT 316.940 DEG LONG 267.347 DEG

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 61.139

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 458Y ITEM NO. 92

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 193, 06 HR, 07 MINPREPARED BY: GEO. S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 4F191 | TAPE NO. 648Y |
| 145 | ITEM NO. 92 |
| 5.2 EPOCH DAY 127 , 9 ' 46 ' 0.000 GMT | SEQ. NO. 92 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -5830.9150 KM | DX -.54244385 KM/SEC |
| Y -89.528835 KM | DY .25282448 KM/SEC |
| Z 4271.1274 KM | DZ -.44826888 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 115.6 M | DX .01280 M/S | X 115.6 M | DX .0128 M/S |
| Y 83.01 M | DY .00472 M/S | Y 83.01 M | DY .0047 M/S |
| Z 134.4 M | DZ .01185 M/S | Z 134.4 M | DZ .0119 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 6148.50 KM | ECC .284058 | APF 5.37903 DEG |
| LAN 269.499 DEG | INC 84.9089 DEG | IFP 13868.7 SEC |
| RCA 4401.97 KM | PALT 2663.88 KM | PER 721.057 MIN |
| APO 7895.03 KM | AALT 6156.94 KM | TA 140.136 DEG |
| LAT 34.3298 DEG | LONG 86.0104 DEG | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 458Y ITEM NO. 92

5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------|----------------------------|
| TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| DAY 193 , 06 HR , 15 MIN | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F193

TAPE NO. 305Y

5.2 EPOCH DAY ¹⁴⁵~~127~~, 16 ' 23 ' 0.000 GMT
HR MIN SEC

ITEM NO. 93

SEQ. NO. 93

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 1722.7838 | KM | DX | .83816642 | KM/SEC |
| Y | 1137.7509 | KM | DY | -.33105957 | KM/SEC |
| Z | -4857.1341 | KM | DZ | .49851022 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 218.0 M | DX | .02666 M/S | X | 218.0 M | DX | .0267 M/S |
| Y | 37.35 M | DY | .01765 M/S | Y | 37.35 M | DY | .0176 M/S |
| Z | 72.70 M | DZ | .03580 M/S | Z | 72.70 M | DZ | .0358 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 6149.68 | KM | ECC | .284454 | APF | 5.14915 | DEG | |
| LAN | 265.854 | DEG | INC | 84.9256 | TFP | -5526.37 | SEC | |
| RCA | 4400.38 | KM | PALT | 2662.29 | KM | PER | 721.266 | MIN |
| APO | 7898.99 | KM | AALT | 6160.90 | KM | TA | 284.441 | DEG |
| LAI | 290.211 | DEG | LONG | 251.896 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 243.02

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 021Y ITEM NO. 93

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 193 , 00 HR , 00 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F198
 146
 TAPE NO. 305Y
 ITEM NO. 93

5.2 EPOCH DAY ~~128~~, 1 31 0.000 GMT
 HR MIN SEC
 SEQ. NO. 93
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -6141.7997 | KM | DX | .48364569 | KM/SEC |
| Y | 2421.5777 | KM | DY | .05819289 | KM/SEC |
| Z | -3615.5261 | KM | DZ | -.51758447 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 125.5 M | DX | .01474 M/S | X | 125.5 M | DX | .0147 M/S |
| Y | 125.0 M | DY | .00777 M/S | Y | 125.0 M | DY | .0078 M/S |
| Z | 202.2 M | DZ | .01723 M/S | Z | 202.2 M | DZ | .0172 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6147.83 | KM | ECC | .284250 | APF | 5.03724 | DEG | |
| LAN | 260.815 | DEG | INC | 84.9836 | DEG | TFP | -15875.2 | SEC |
| RCA | 4400.31 | KM | PALT | 2662.22 | KM | PER | 720.940 | MIN |
| APO | 7895.35 | KM | AALT | 6157.26 | KM | TA | 208.739 | DEG |
| LAT | 326.371 | DEG | LONG | 84.1617 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 021Y ITEM NO. 93

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 193, 07 HR, 09 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F200

TAPE NO. 454Y

5.2 EPOCH DAY ¹⁴⁶~~120~~, 5 33 0.000 GMT
HR MIN SEC

ITEM NO. 94

SEQ. NO. 94

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 4206.8491 | KM | DX | .22831698 | KM/SEC |
| Y | -450.37665 | KM | DY | -.38787598 | KM/SEC |
| Z | -1420.9103 | KM | DZ | 1.0941820 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 45.32 | M | DX | .04781 | M/S | X | 45.32 | M | DX | .0478 | M/S |
| Y | 75.61 | M | DY | .00939 | M/S | Y | 75.61 | M | DY | .0094 | M/S |
| Z | 155.5 | M | DZ | .00734 | M/S | Z | 155.5 | M | DZ | .0073 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 6150.36 | KM | ECC | .284773 | APF | 4.97366 | DEG | |
| LAN | 258.590 | DEG | INC | 84.9879 | DEG | TFP | -1344.84 | SEC |
| RCA | 4398.90 | KM | PALT | 2660.81 | KM | PER | 721.385 | MIN |
| APO | 7901.82 | KM | AALT | 6163.73 | KM | TA | 339.242 | DEG |
| LAT | 344.278 | DEG | LONG | 257.175 | DEG | | | |

5.6 LUNAR HARMONICS USED' L.R.C. 7/28 B

5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 43.684

5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS' TAPE NO. 078Y ITEM NO. 94

5.10 REMARKS' MAP TIME REPORT

TIME OF REPORT'
DAY 193 , 07 HR , 42 MINPREPARED BY' GEO.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 4F202

TAPE NO. 454Y

ITEM NO. 94

5.2 EPOCH DAY ~~120~~, 9 ' 47 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 94

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -5821.6050 | KM | DX | -.54318232 | KM/SEC |
| Y | -98.291269 | KM | DY | .25370812 | KM/SEC |
| Z | 4294.3294 | KM | DZ | -.44562657 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 156.7 | M | DX | .01951 | M/S | X | 156.7 | M | DX | .0195 | M/S |
| Y | 84.39 | M | DY | .01185 | M/S | Y | 84.39 | M | DY | .0118 | M/S |
| Z | 189.2 | M | DZ | .01588 | M/S | Z | 189.2 | M | DZ | .0159 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 6149.10 | KM | ECC | .284316 | APF | 5.00876 | DEG | |
| LAN | 256.247 | DEG | INC | 85.0061 | DEG | TFP | 13896.8 | SEC |
| RCA | 4400.81 | KM | PALT | 2662.72 | KM | PER | 721.164 | MIN |
| APO | 7897.40 | KM | AALT | 6159.31 | KM | TA | 140.305 | DEG |
| LAT | 34.5360 | DEG | LONG | 72.7992 | DEG | | | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 078Y ITEM NO. 94

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:

DAY 193, 00 HR, 00 MIN

PREPARED BY: GEO.S.GOODWIN

O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION V EPOCH REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 8. 6. 6. 49. 0.000
 AGINJ+2 -2413.36813354 -5907.88665771 -4100.27429199
 .12870172 .36901052 -.35958624

5.1 O.D. IDENTIFICATION NO. 5A1 TAPE NO. 820Y
 218 ITEM NO. 95
 5.2 EPOCH DAY ~~146~~, 6 ' 49 ' 0.000 GMT SEQ. NO. 95
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2443.3315 KM DX .12952974 KM/SEC
 Y -5898.5728 KM DY .36849361 KM/SEC
 Z -4095.9363 KM DZ -.35981897 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 37.96 M DX .02374 M/S X 37.96 M DX .0237 M/S
 Y 264.2 M DY .01637 M/S Y 264.2 M DY .0164 M/S
 Z 386.5 M DZ .02085 M/S Z 386.5 M DZ .0208 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 4851.23 KM ECC .600913 APF 1.50880 DEG
 LAN 110.154 DEG INC 84.7956 DEG TFP -12445.9 SEC
 RCA 1936.07 KM PALT 197.976 KM PER 505.352 MIN
 APO 7766.40 KM AALT 6028.31 KM TA 190.211 DEG
 LAT 348.329 DEG LONG 291.232 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 +.19924546E-04 C33 +.12048649E-04 C41 -.32631249E-05
 C42 -.42223308E-05 C43 -.51547842E-05 C44 +.11345245E-05
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 -.36070349E-04 S33 +.66721538E-05 S41 +.67981786E-05
 S42 -.23547469E-05 S43 -.38992554E-05 S44 -.28684530E-05

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 219.55

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 316Y ITEM NO. 95

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 195 , 03 HR , 06 MIN PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 1003:4 2

AGINAT 1. 67. 8. 7. 8. 43. 59.650
 AGINJ+2 -2030.79629517 -4859.47467041 -4784.20422363
 .19565124 .52593996 -.21531841

5.1 O.D. IDENTIFICATION NO. 5A6 TAPE NO. 803Y
 219 ITEM NO. 96

5.2 EPOCH DAY 147, 8 43 59.650 GMT SEQ. NO. 96
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2057.8395 KM DX .19733535 KM/SEC
 Y -4851.6843 KM DY .52516555 KM/SEC
 Z -4780.5541 KM DZ -.21567150 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 74.46 M DX .01796 M/S X 74.46 M DX .0180 M/S
 Y 392.5 M DY .01406 M/S Y 392.5 M DY .0141 M/S
 Z 421.0 M DZ .03966 M/S Z 421.0 M DZ .0397 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 4821.63 KM ECC .618648 APF 1.36027 DEG
 LAN 95.8958 DEG INC 84.6128 DEG TFP -9814.16 SEC
 RCA 1838.74 KM PALT 100.648 KM PER 500.735 MIN
 APO 7804.53 KM AALT 6066.44 KM TA 199.900 DEG
 LAT 338.838 DEG LONG 277.988 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.21148161E-05 C33 +.41299248E-04 C41 -.32630998E-05
 C42 +.22167470E-04 C43 -.38330681E-05 C44 -.24069482E-05
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 -.23632209E-04 S33 -.33201156E-04 S41 +.67981997E-05
 S42 +.23576171E-05 S43 +.10382321E-06 S44 -.53401825E-05

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1691.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 3070000 | 3070000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 885Y ITEM NO. 96

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 195, 05 HR, 18 MIN GMT PREPARED BY: GEO.S.GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|----------------|----------------|----------------|----|-----|----|-------|
| AGINAT | 1. | 67. | 8. | 7. | 23. | 0. | 0.000 |
| AGINJ+2 | -2701.19827271 | -6885.68170166 | -1212.77537537 | | | | |
| | .04842689 | -.08051616 | -.53143541 | | | | |

5.1 O.D. IDENTIFICATION NO. 5A8

TAPE NO. 497Y

219

ITEM NO. 97

5.2 EPOCH DAY ~~147~~, 23 ' 0 ' 0.000 GMT

SEQ. NO. 97

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2730.0833 | KM | DX | -.04964156 | KM/SEC |
| Y | -6875.1375 | KM | DY | -.08034521 | KM/SEC |
| Z | -1207.9085 | KM | DZ | -.53134921 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 53.42 | M | DX | .00654 | M/S | X | 53.42 | M | DX | .0065 | M/S |
| Y | 83.99 | M | DY | .02232 | M/S | Y | 83.99 | M | DY | .0223 | M/S |
| Z | 347.2 | M | DZ | .00915 | M/S | Z | 347.2 | M | DZ | .0092 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 4821.02 | KM | ECC | .618485 | APF | 1.22235 | DEG |
| LAN | 88.0206 | DEG | INC | 84.5709 | DEG | TFP | 11521.5 |
| RCA | 1839.29 | KM | PALT | 101.199 | KM | PER | 500.638 |
| APO | 7802.74 | KM | AALT | 6064.65 | KM | TA | 167.084 |
| LAT | 11.6402 | DEG | LONG | 266.899 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.29448855E-04 | C33 | -.80120587E-05 | C41 | -.32630998E-05 |
| C42 | +.22489442E-04 | C43 | -.45153509E-05 | C44 | -.57181981E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.25774859E-04 | S33 | -.64836660E-04 | S41 | +.67981996E-05 |
| S42 | -.11668241E-04 | S43 | -.46361537E-05 | S44 | +.74868895E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 164.55

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 051Y ITEM NO. 97

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 195 , 06 HR , 37 MIN

PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 8. 8. 16. 0. 0.000
 AGINJ+2 -2742.74728394 -6932.64508057 -1788.14120483
 .01445850 .00729553 -.51168805

5.1 O.D. IDENTIFICATION NO. 5A11.2 TAPE NO. 558Y
 ZZO ITEM NO. 98

5.2 EPOCH DAY ~~148~~, 16 ' 0 ' 0.000 GMT SEQ. NO. 98
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -2772.7922 KM DX -.01529757 KM/SEC
 Y -6921.9583 KM DY .00733394 KM/SEC
 Z -1783.1995 KM DZ -.51166312 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S
 Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S
 Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 4821.56 KM ECC .618736 APF 1.02882 DEG
 LAN 78.6477 DEG INC 84.6205 DEG TFP 12673.0 SEC
 RCA 1838.29 KM PALT 100.196 KM PER 500.722 MIN
 APO 7804.83 KM AALT 6066.74 KM TA 171.462 DEG
 LAT 7.47637 DEG LONG 257.940 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.43404338E-04 C33 +.52656226E-04 C41 -.32630998E-05
 C42 -.15820018E-04 C43 -.27984955E-05 C44 +.10057261E-04
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 -.14747205E-04 S33 +.10181070E-03 S41 +.67981995E-05
 S42 -.11188710E-05 S43 +.26878726E-05 S44 -.74017791E-05

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 281Y ITEM NO. 98

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 195, 08 HR, 05 MIN PREPARED BY: GEO.S.GOODWIN O.D. ANALYST
 GMT

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 1003:4 2

| | | | | | | | |
|---------|---------------|----------------|----------------|-----------|------------|------------|-------|
| AGINAT | 1. | 67. | 8. | 9. | 7. | 20. | 0.000 |
| AGINJ+2 | -563.00321960 | -1207.58721924 | -2650.53390503 | .40116760 | 1.06484790 | -.28012245 | |

5.1 O.D. IDENTIFICATION NO. 5A13

TAPE NO. 560Y

ZZI

ITEM NO. 99

5.2 EPOCH DAY ~~149~~, 7, 20, 0.000 GMT

SEG. NO. 99

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -572.20255 | KM | DX | .40484204 | KM/SEC |
| Y | -1205.4754 | KM | DY | 1.0632654 | KM/SEC |
| Z | -2649.5251 | KM | DZ | -.28084674 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 13.16 | M | DX | .00331 | M/S | X | 13.16 | M | DX | .0033 | M/S |
| Y | 136.9 | M | DY | .01360 | M/S | Y | 136.9 | M | DY | .0136 | M/S |
| Z | 80.63 | M | DZ | .04984 | M/S | Z | 80.63 | M | DZ | .0498 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2537.69 | KM | ECC | .275917 | APF | 1.84119 | DEG | |
| LAN | 70.2072 | DEG | INC | 84.7589 | DEG | TFP | -3673.35 | SEC |
| RCA | 1837.50 | KM | PALT | 99.4073 | KM | PER | 191.194 | MIN |
| APO | 3237.88 | KM | AALT | 1499.79 | KM | TA | 220.536 | DEG |
| LAT | 317.841 | DEG | LONG | 254.971 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.37440826E-04 | C33 | +.14990753E-04 | C41 | -.32630998E-05 |
| C42 | -.44134765E-05 | C43 | +.19838796E-05 | C44 | +.81710780E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.23995428E-04 | S33 | +.45552937E-05 | S41 | +.67981996E-05 |
| S42 | +.25043163E-05 | S43 | -.30126375E-05 | S44 | -.84172460E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2434.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 236Y ITEM NO. 99

5.10 REMARKS: EPOCH REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195, 09 HR, 12 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

(5.1 O.D. IDENTIFICATION NO. 5V1 TAPE NO. 997Y

AGINAT 1. 67. 8. 9. 13. 45. 0.000
AGINJ+2 -499.64260101 -1041.66329956 -2684.16815186
.41757355 1.09931265 -.20106761

(221 ITEM NO. 100

(5.2 EPOCH DAY 149, 13 ' 45 ' 0.000 GMT SEQ. NO. 100
HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -508.25250 KM DX .42151637 KM/SEC
(Y -1039.8011 KM DY 1.0976686 KM/SEC
(Z -2683.2736 KM DZ -.20182132 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 11.84 M DX .00128 M/S X 11.84 M DX .0013 M/S
(Y 144.3 M DY .01221 M/S Y 144.3 M DY .0122 M/S
(Z 63.72 M DZ .05664 M/S Z 63.72 M DZ .0566 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.46 KM ECC .276158 APF 1.56261 DEG
(LAN 66.6821 DEG INC 84.7426 DEG TFP -3507.33 SEC
(RCA 1836.72 KM PALT 98.6340 KM PER 191.168 MIN
(APO 3238.21 KM AALT 1500.12 KM TA 224.226 DEG
(LAT 314.458 DEG LONG 252.063 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 +.16435056E-04 C33 +.14196026E-04 C41 -.32630998E-05
C42 -.30783657E-05 C43 +.23525317E-05 C44 -.63051979E-06
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 +.10154887E-04 S33 -.51522364E-05 S41 +.67981995E-05
S42 +.85031852E-05 S43 -.25081357E-05 S44 -.52361152E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5062.6

(5.8 DATA SUMMARY:

(STA DATA START STOP NUMBER STANDARD
(NO. TYPE TIME TIME POINTS DEVIATION MEAN
(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 127Y ITEM NO. 100

(5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: PREPARED BY: GEO.S.GOODWIN
(DAY 195, 03 HR, 04 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 8. 9. 20. 7. 24.000
AGINJ+2 -500.17136002 -1042.02746582 -2681.37277222
.41806653 1.10030012 -.20091346

(5.1 O.D. IDENTIFICATION NO. 5V2.1 TAPE NO. 895Y

(221 ITEM NO. 101

(5.2 EPOCH DAY 149, 20, 7, 24.000 GMT SEQ. NO. 101

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -508.77804 KM DX .42201351 KM/SEC

(Y -1040.1631 KM DY 1.0986541 KM/SEC

(Z -2680.4773 KM DZ -.20166809 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 12.97 M DX .00240 M/S X 12.97 M DX .0024 M/S

(Y 116.5 M DY .00960 M/S Y 116.5 M DY .0096 M/S

(Z 53.04 M DZ .04447 M/S Z 53.04 M DZ .0445 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2537.23 KM ECC .276399 APF 1.34669 DEG

(LAN 63.1750 DEG INC 84.7456 DEG TFP -3497.83 SEC

(RCA 1835.95 KM PALT 97.8563 KM PER 191.143 MIN

(APO 3238.52 KM AALT 1500.43 KM TA 224.413 DEG

(LAT 314.487 DEG LONG 248.547 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002

J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04

C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04

C32 -.90919865E-05 C33 +.62996742E-05 C41 -.32631249E-05

C42 -.59090965E-06 C43 +.76975480E-06 C44 -.93443402E-06

S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04

S32 -.29931661E-05 S33 -.28310704E-05 S41 +.67981786E-05

S42 +.12040366E-04 S43 -.17515091E-05 S44 +.23184711E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1357

(5.8 DATA SUMMARY:

(STA DATA START STOP NUMBER STANDARD
(NO. TYPE TIME TIME POINTS DEVIATION MEAN

(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 648Y ITEM NO. 101

(5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
(DAY 196, 05 HR, 36 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100314 2

AGINAT 1. 67. 8. 10. 5. 40. 0.000
AGINJ+2 -526.36304474 -1093.55221558 -2670.91525269
.41255246 1.09023343 -.22662525

(5.1 O.D. IDENTIFICATION NO. 5V3.1 TAPE NO. 276Y
(222 ITEM NO. 102

(5.2 EPOCH DAY ~~156~~, 5 ' 40 ' 0.000 GMT SEQ. NO. 102
(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -535.15289 KM DX .41641669 KM/SEC
(Y -1091.5850 KM DY 1.0886081 KM/SEC
(Z -2669.9732 KM DZ -.22737010 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 22.37 M DX .00450 M/S X 22.37 M DX .0045 M/S
(Y 116.3 M DY .01148 M/S Y 116.3 M DY .0115 M/S
(Z 49.90 M DZ .04388 M/S Z 49.90 M DZ .0439 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.49 KM ECC .276326 APF 1.35526 DEG
(LAN 57.8919 DEG INC 84.8716 DEG TFP -3547.73 SEC
(RCA 1836.31 KM PALT 98.2232 KM PER 191.171 MIN
(APO 3238.66 KM AALT 1500.57 KM TA 223.299 DEG
(LAT 315.572 DEG LONG 242.939 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 +.48273687E-04 C33 +.87647656E-05 C41 -.32631249E-05
C42 -.14807795E-05 C43 -.15976557E-05 C44 -.23816430E-05
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 +.10814996E-04 S33 -.22826030E-04 S41 +.67981786E-05
S42 +.85138669E-05 S43 -.45676883E-05 S44 +.22180655E-06

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 5709.9

(5.8 DATA SUMMARY'

(STA DATA START STOP NUMBER STANDARD
(NO. TYPE TIME TIME POINTS DEVIATION MEAN
(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS' TAPE NO. 936Y ITEM NO. 102

(5.10 REMARKS' EPOCH REPORT

(TIME OF REPORT' PREPARED BY' GEO.S.GOODWIN
(DAY 196 , 06 HR , 50 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) 00314 2

AGINAT 1. 67. 8. 10. 18. 25. 0.000
AGINJ+2 -520.50981903 -1064.51901245 -2675.49172974
.41500860 1.09581278 -.21319814

(5.1 O.D. IDENTIFICATION NO. 5V6 TAPE NO. 251Y
(222 ITEM NO. 103
(5.2 EPOCH DAY ~~150~~, 18 ' 25 ' 0.000 GMT SEQ. NO. 103
(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -529.19451 KM DX .41891747 KM/SEC
(Y -1062.5750 KM DY 1.0941782 KM/SEC
(Z -2674.5608 KM DZ -.21394742 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 34.95 M DX .01061 M/S X 34.95 M DX .0106 M/S
(Y 123.5 M DY .01171 M/S Y 123.5 M DY .0117 M/S
(Z 52.73 M DZ .04680 M/S Z 52.73 M DZ .0468 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2537.07 KM ECC .276666 APF 1.31460 DEG
(LAN 50.8487 DEG INC 84.9593 DEG TFP -3518.90 SEC
(RCA 1835.15 KM PALT 97.0606 KM PER 191.124 MIN
(APO 3238.99 KM AALT 1500.90 KM TA 223.906 DEG
(LAT 315.003 DEG LONG 235.908 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 +.21492134E-04 C33 -.26004694E-05 C41 -.32631249E-05
C42 +.21020901E-05 C43 -.20799836E-05 C44 -.12256140E-06
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 +.11253264E-05 S33 -.10533626E-04 S41 +.67981786E-05
S42 +.58531738E-05 S43 -.51832205E-06 S44 +.65805099E-06

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 6578.4

(5.8 DATA SUMMARY:

(STA DATA START STOP NUMBER STANDARD
(NO. TYPE TIME TIME POINTS DEVIATION MEAN
(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 229Y ITEM NO. 103

(5.10 REMARKS: EPOCH REPORT
(
(

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
(DAY 196 , 09 HR , 21 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) 100314 2

AGINAT 1. 67. 8. 11. 0. 50. 0.000
AGINJ+2 -452.75326157 -884.99455261 -2701.53567505
.43121319 1.12772995 -.12609182

(5.1 O.D. IDENTIFICATION NO. 5V8A TAPE NO. 113Y

(ITEM NO. 104

(5.2 EPOCH DAY ~~151~~ 223, 0 : 50 : 0.000 GMT SEQ. NO. 104

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -460.78266 KM DX .43539420 KM/SEC
(Y -883.31696 KM DY 1.1260350 KM/SEC
(Z -2700.7271 KM DZ -.12687004 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 34.63 M DX .00967 M/S X 34.63 M DX .0097 M/S
(Y 94.89 M DY .00835 M/S Y 94.89 M DY .0084 M/S
(Z 30.55 M DZ .03604 M/S Z 30.55 M DZ .0360 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.81 KM ECC .276781 APF 1.22286 DEG
(LAN 47.3098 DEG INC 84.9587 DEG TFP -3353.05 SEC
(RCA 1834.67 KM PALT 96.5805 KM PER 191.095 MIN
(APO 3238.96 KM AALT 1500.87 KM TA 227.707 DEG
(LAT 311.324 DEG LONG 233.068 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002
J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 -.23033268E-05 C33 -.11838999E-04 C41 -.32631249E-05
C42 +.65816548E-05 C43 -.10914724E-05 C44 +.39913473E-06
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 -.38662228E-06 S33 -.11578097E-04 S41 +.67981786E-05
S42 +.45665095E-05 S43 +.12030038E-05 S44 +.18650218E-05

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 4525.9

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 130Y ITEM NO. 104

(5.10 REMARKS' EPOCH REPORT

(TIME OF REPORT' PREPARED BY' GEO.S.GOODWIN
(DAY 197 , 03 HR , 44 MIN GMT U.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

100314 2

| | | | | | | | |
|---------|---------------|-----|----------------|-----|----------------|-----|-------|
| AGINAT | 1. | 67. | 8. | 11. | 7. | 10. | 0.000 |
| AGINJ+2 | -514.03221893 | | -1034.81829834 | | -2678.85302734 | | |
| | .41764194 | | 1.10187854 | | -.19948336 | | |

5.1 O.D. IDENTIFICATION NO. 5V9.1

TAPE NO. 578Y

223

ITEM NO. 105

5.2 EPOCH DAY ~~151~~, 7 ' 10 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 105

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -522.60719 | KM | DX | .42159787 | KM/SEC |
| Y | -1032.8997 | KM | DY | 1.1002341 | KM/SEC |
| Z | -2677.9343 | KM | DZ | -.20023737 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 45.56 | M | DX | .01296 | M/S | X | 45.56 | M | DX | .0130 | M/S |
| Y | 110.6 | M | DY | .01186 | M/S | Y | 110.6 | M | DY | .0119 | M/S |
| Z | 34.95 | M | DZ | .03870 | M/S | Z | 34.95 | M | DZ | .0387 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2536.85 | KM | ECC | .276840 | | APF | 1.18644 | DEG |
| LAN | 43.8110 | DEG | INC | 85.0445 | DEG | TFP | -3486.96 | SEC |
| RCA | 1834.55 | KM | PALT | 96.4569 | KM | PER | 191.099 | MIN |
| APO | 3239.15 | KM | AALT | 1501.06 | KM | TA | 224.608 | DEG |
| LAT | 314.425 | DEG | LONG | 228.886 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.17893026E-04 | C33 | -.12014311E-04 | C41 | -.32631249E-05 |
| C42 | +.63641616E-05 | C43 | +.90563812E-06 | C44 | -.17893275E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.33456932E-05 | S33 | -.18272569E-04 | S41 | +.67981786E-05 |
| S42 | +.45906959E-05 | S43 | +.62762927E-06 | S44 | +.23907744E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 4736.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 556Y ITEM NO. 105

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 199, 04 HR, 29 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

100314

AGINAT 1. 67. 8. 11. 13. 30. 0.000
 AGINJ+2 -570.84187317 -1184.36738586 -2645.28793335
 .40374260 1.07257979 -.27046745

5.1 O.D. IDENTIFICATION NO. 5V10

TAPE NO. 327Y

223

ITEM NO. 0106

5.2 EPOCH DAY 151, 13, 30, 0.000 GMT
 HR MIN SEC

SEQ. NO. 106 H.A.
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -579.94299 KM DX .40746409 KM/SEC
 Y -1182.2247 KM DY 1.07098739 KM/SEC
 Z -2644.2667 KM DZ -.27119656 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 67292 M DX 1136.9 M/S X 67292 M DX 1137 M/S
 Y 318444 M DY 2967.9 M/S Y 318444 M DY 2968 M/S
 Z .0000 M DZ 289.58 M/S Z .0000 M DZ 289.6 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

SMA 2537.71 KM ECC .277189 APF 1.09280 DEG
 LAN 36.3129 DEG INC 85.1080 DEG TFP -454.385 SEC
 RCA 1834.29 KM PALT 96.1951 KM PER 191.196 MIN
 APO 3241.13 KM AALT 1503.04 KM TA 334.161 DEG
 LAT 335.350 DEG LONG 34.0619 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.56904043E-05 C33 -.19593720E-04 C41 -.32631249E-05
 C42 +.91514380E-05 C43 +.85644555E-06 C44 +.13268941E-05
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.33565193E-05 S33 -.76553585E-05 S41 +.67981786E-05
 S42 +.39606559E-05 S43 -.47714807E-06 S44 +.16814244E-05

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= -.0000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 106.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 181, 09 HR, 00 MIN

PREPARED BY: G. S. GOODWIN
 O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

AGINAT 1. 67. 8. 11. 23. 5. 0.000
AGINJ+2 -534.41419983 -1075.41056824 -2669.65609741
.41378146 1.09434345 -.21942360

(5.1 O.D. IDENTIFICATION NO. 5V11B TAPE NO. 311Y
(223 ITEM NO. 107
(5.2 EPOCH DAY ~~151~~, 23 ' 5 ' 0.000 GMT SEQ. NO. 107
(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -543.13333 KM DX .41767417 KM/SEC
(Y -1073.4100 KM DY 1.0927135 KM/SEC
(Z -2668.7016 KM DZ -.22017020 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 73.04 M DX .02546 M/S X 73.04 M DX .0255 M/S
(Y 124.6 M DY .01719 M/S Y 124.6 M DY .0172 M/S
(Z 36.34 M DZ .04097 M/S Z 36.34 M DZ .0410 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.79 KM ECC .277024 APF 1.10959 DEG
(LAN 35.0259 DEG INC 85.1263 DEG TFP -3521.31 SEC
(RCA 1834.04 KM PALT 95.9488 KM PER 191.092 MIN
(APO 3239.54 KM AALT 1501.45 KM TA 223.810 DEG
(LAT 315.287 DEG LONG 219.868 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
C32 +.58631840E-05 C33 -.23736079E-04 C41 -.32631249E-05
C42 +.32910355E-05 C43 -.71098638E-07 C44 +.12713286E-05
S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
S32 -.67962359E-05 S33 -.14416814E-04 S41 +.67981786E-05
S42 +.64912172E-05 S43 +.10567543E-05 S44 +.27843324E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1512.9

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 107.

5.10 REMARKS: EPOCH REPORT

(
(
(

(TIME OF REPORT: PREPARED BY: G.S.GOODWIN 0000
(DAY 212 , 06 HR , 38 MIN GMT U.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|---------------|----|---------------|----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 12. | 5. | 30. | 0.000 |
| AGINJ+2 | | -465.46949768 | | -888.94119263 | | -2698.67730713 | |
| | | .43030197 | | 1.12730214 | | -.12936561 | |

(5.1 O.D. IDENTIFICATION NO. 5A18.1 TAPE NO. 973Y

(224 ITEM NO. 108

(5.2 EPOCH DAY ~~180~~, 5 ' 30 ' 0.000 GMT SEQ. NO. 108

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -473.51041 KM DX .43447633 KM/SEC

(Y -887.21326 KM DY 1.1256104 KM/SEC

(Z -2697.8470 KM DZ -.13014221 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 138.6 M DX .03819 M/S X 138.6 M DX .0382 M/S

(Y 193.3 M DY .02083 M/S Y 193.3 M DY .0208 M/S

(Z 42.36 M DZ .06021 M/S Z 42.36 M DZ .0602 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.49 KM ECC .277136 APF 1.12101 DEG

(LAN 31.4939 DEG INC 85.1650 DEG TFP -3353.51 SEC

(RCA 1833.54 KM PALT 95.4461 KM PER 191.058 MIN

(APO 3239.44 KM AALT 1501.35 KM TA 227.651 DEG

(LAT 311.460 DEG LONG 216.988 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

RE 6378.14948 KE 398601.277 KM 4902.58002

J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04

C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04

C32 -.17165930E-04 C33 -.21549271E-04 C41 -.32631249E-05

C42 +.74949381E-05 C43 +.23289169E-05 C44 +.20509863E-05

S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04

S32 +.61100335E-05 S33 -.47603579E-05 S41 +.67981786E-05

S42 +.23728524E-05 S43 +.25225824E-05 S44 +.17788767E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1694.5

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 255Y ITEM NO. 108

(5.10 REMARKS: EPOCH REPORT

| | | |
|------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 197, 07 HR, 13 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) 100314
 AGINAT 1. 67. 8. 12. 15. 0. 0.000
 AGINJ+2 -550.59893036 -1103.81007385 -2663.77780151
 .40970920 1.08852200 -.23366182

(5.1 O.D. IDENTIFICATION NO. 5V16A TAPE NO. 468Y
 (224 ITEM NO. 109
 (5.2 EPOCH DAY ~~180~~, 15 ' 0 ' 0.000 GMT SEQ. NO. ~~109~~ ~~111A~~.
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -559.41866 KM DX .41355580 KM/SEC
 (Y -1101.7469 KM DY 1.0869072 KM/SEC
 (Z -2662.7942 KM DZ -.23440171 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 139.1 M DX .05019 M/S X 139.1 M DX .0502 M/S
 (Y 166.6 M DY .02827 M/S Y 166.6 M DY .0283 M/S
 (Z 41.61 M DZ .04816 M/S Z 41.61 M DZ .0482 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.46 KM ECC .277170 APF 1.18643 DEG
 (LAN 26.2714 DEG INC 85.2499 DEG TFP -3550.77 SEC
 (RCA 1833.43 KM PALT 95.3432 KM PER 191.055 MIN
 (APO 3239.49 KM AALT 1501.40 KM TA 223.118 DEG
 (LAT 315.887 DEG LONG 210.892 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28B MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.20590815E-04 C33 -.18752824E-04 C41 -.32631249E-05
 C42 +.30311103E-05 C43 +.32786235E-05 C44 +.24422430E-05
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.21859753E-04 S33 -.59957347E-05 S41 +.67981786E-05
 S42 +.36043772E-05 S43 -.23970386E-06 S44 +.20934623E-05

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 3473.2

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~ ITEM No. 109.

5.10 REMARKS' EPOCH REPORT

(TIME OF REPORT' PREPARED BY' J.E.HEDWALL 0000
 (DAY 183 , 04 HR , 38 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

D2 100314 2

| | | | | | | | |
|---------|----|---------------|----|----------------|----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 13. | 3. | 45. | 0.000 |
| AGINJ+2 | | -531.31607056 | | -1052.52951050 | | -2676.33584595 | |
| | | .41443894 | | 1.09724373 | | -.20969658 | |

5.1 O.D. IDENTIFICATION NO. 5V18

TAPE NO. 626Y

225

ITEM NO. 110

5.2 EPOCH DAY ~~120~~, 3 ' 45 ' 0.000 GMT

SEQ. NO. 110

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -539.95808 | KM | DX | .41836058 | KM/SEC |
| Y | -1050.5420 | KM | DY | 1.0956111 | KM/SEC |
| Z | -2675.3871 | KM | DZ | -.21044487 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 92.10 | M | DX | .03426 | M/S | X | 92.10 | M | DX | .0343 | M/S |
| Y | 83.00 | M | DY | .01704 | M/S | Y | 83.00 | M | DY | .0170 | M/S |
| Z | 18.06 | M | DZ | .02247 | M/S | Z | 18.06 | M | DZ | .0225 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|----------|-----|
| SMA | 2536.19 | KM | ECC | .276980 | | APF | 1.40943 | DEG |
| LAN | 19.2640 | DEG | INC | 85.2401 | DEG | TFP | -3512.84 | SEC |
| RCA | 1833.71 | KM | PALT | 95.6246 | KM | PER | 191.024 | MIN |
| APO | 3238.66 | KM | AALT | 1500.57 | KM | TA | 223.977 | DEG |
| LAT | 314.813 | DEG | LONG | 204.072 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.27617897E-04 | C33 | -.19470701E-04 | C41 | -.32631249E-05 |
| C42 | +.90326671E-05 | C43 | +.37101959E-05 | C44 | +.18967034E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.36924023E-04 | S33 | +.13122556E-04 | S41 | +.67981786E-05 |
| S42 | -.47379708E-05 | S43 | -.27364497E-06 | S44 | -.12422180E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= 3690.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 708Y ITEM NO. 110

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 199 , 03 HR , 52 MIN

PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----------------|-----|----------------|----|-------|
| AGINAT | 1. | 67. | 8. | 13. | 10. | 5. | 0.000 |
| AGINJ+2 | -587.41059875 | | -1183.19079590 | | -2648.70132446 | | |
| | .39888988 | | 1.07064302 | | -.27276556 | | |

5.1 O.D. IDENTIFICATION NO. 5A20

TAPE NO. 392Y

225
 5.2 EPOCH DAY ~~129~~, 10 ' 5 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 111
 SEQ. NO. 111
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -596.51555 | KM | DX | .40260109 | KM/SEC |
| Y | -1180.9822 | KM | DY | 1.0690689 | KM/SEC |
| Z | -2647.6520 | KM | DZ | -.27348629 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 85.56 M | DX | .03122 M/S | X | 85.56 M | DX | .0312 M/S |
| Y | 68.08 M | DY | .01507 M/S | Y | 68.08 M | DY | .0151 M/S |
| Z | 11.89 M | DZ | .01548 M/S | Z | 11.89 M | DZ | .0155 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2536.32 | KM | ECC | .276833 | APF | 1.60118 | DEG |
| LAN | 15.7889 | DEG | INC | 85.4247 | TFP | -3643.96 | SEC |
| RCA | 1834.18 | KM | PALT | 96.0920 | KM | PER | 191.039 |
| APO | 3238.46 | KM | AALT | 1500.37 | KM | TA | 221.054 |
| LAT | 317.513 | DEG | LONG | 199.992 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.10459081E-04 | C33 | +.44752730E-07 | C41 | -.32631249E-05 |
| C42 | +.54185075E-05 | C43 | +.16010004E-05 | C44 | -.50574618E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.18090590E-04 | S33 | -.34518121E-05 | S41 | +.67981786E-05 |
| S42 | -.49367407E-06 | S43 | +.81255050E-06 | S44 | +.86803575E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3350.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 286Y ITEM NO. 111

5.10 REMARKS: EPOCH REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 199, 06 HR, 42 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 13. | 16. | 30. | 0.000 |
| AGINJ+2 | -514.47418213 | | | -992.39727783 | | -2690.13140869 | |
| | .41805283 | | | 1.10668181 | | -.18225328 | |

5.1 O.D. IDENTIFICATION NO. 5V22 TAPE NO. 687Y

| | | | | | | | |
|-----------|-----|----|-----|-------|-----|----------|-----|
| 5.2 EPOCH | DAY | HR | MIN | SEC | GMT | ITEM NO. | 112 |
| | 225 | 16 | 30 | 0.000 | | SEQ. NO. | 112 |
| | | | | | | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -522.90613 | KM | DX | .42205830 | KM/SEC |
| Y | -990.47595 | KM | DY | 1.1050358 | KM/SEC |
| Z | -2689.2137 | KM | DZ | -.18300814 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 121.1 | M | DX | .04066 | M/S | X | 121.1 | M | DX | .0407 | M/S |
| Y | 76.48 | M | DY | .01712 | M/S | Y | 76.48 | M | DY | .0171 | M/S |
| Z | 6.846 | M | DZ | .01397 | M/S | Z | 6.846 | M | DZ | .0140 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2536.10 | KM | ECC | .276742 | APF | 1.74302 | DEG |
| LAN | 12.2540 | DEG | INC | 85.3753 | DEG | TFP | -3473.90 |
| RCA | 1834.25 | KM | PALT | 96.1641 | KM | PER | 191.014 |
| APO | 3237.94 | KM | AALT | 1499.85 | KM | TA | 224.879 |
| LAT | 313.575 | DEG | LONG | 197.131 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.28892920E-04 | C33 | -.15614325E-04 | C41 | -.32631249E-05 |
| C42 | +.27240036E-05 | C43 | +.36828266E-05 | C44 | +.14298078E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.50783917E-04 | S33 | +.23068096E-04 | S41 | +.67981786E-05 |
| S42 | -.54421638E-05 | S43 | -.17778148E-05 | S44 | -.11041057E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2970.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 069Y ITEM NO. 112

5.10 REMARKS: EPOCH REPORT

| | | | |
|-----------------|--------------------------|--------------|------------------|
| TIME OF REPORT: | DAY 199 , 07 HR , 44 MIN | PREPARED BY: | J.E.HEDWALL 0000 |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 13. | 22. | 55. | 0.000 |
| AGINJ+2 | -437.63100815 | | | -796.74417114 | | -2715.03585815 | |
| | .43565814 | | | 1.13760145 | | -.08622922 | |

5.1 O.D. IDENTIFICATION NO. 5V24

TAPE NO. 219Y

225

ITEM NO. 113

5.2 EPOCH DAY ~~120~~, 22 ' 55 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 113

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -445.34293 | KM | DX | .43994729 | KM/SEC |
| Y | -795.12487 | KM | DY | 1.1358897 | KM/SEC |
| Z | -2714.2565 | KM | DZ | -.08701538 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 148.3 | M | DX | .04470 | M/S | X | 148.3 | M | DX | .0447 | M/S |
| Y | 75.51 | M | DY | .01760 | M/S | Y | 75.51 | M | DY | .0176 | M/S |
| Z | 3.989 | M | DZ | .01020 | M/S | Z | 3.989 | M | DZ | .0102 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.98 | KM | ECC | .276656 | APF | 1.86160 | DEG |
| LAN | 8.71789 | DEG | INC | 85.3022 | TFP | -3303.56 | SEC |
| RCA | 1834.38 | KM | PALT | 96.2939 | KM | PER | 191.000 |
| APO | 3237.57 | KM | AALT | 1499.48 | KM | TA | 228.845 |
| LAT | 309.528 | DEG | LONG | 194.433 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.22235097E-04 | C33 | -.11754324E-04 | C41 | -.32631249E-05 |
| C42 | +.46874248E-06 | C43 | +.26431905E-05 | C44 | +.14636462E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.56563901E-04 | S33 | +.17650029E-04 | S41 | +.67981786E-05 |
| S42 | -.93418202E-05 | S43 | -.31064234E-05 | S44 | -.11569418E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4276.4

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 314Y ITEM NO. 113

5.10 REMARKS: EPOCH REPORT

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 199 , 08 HR , 48 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT

5.1 O.D. IDENTIFICATION NO. 5V26.1

TAPE NO. 441Y

| | | | | | | | |
|---------|----|---------------|----|---------------|----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 14. | 5. | 15. | 0.000 |
| AGINJ+2 | | -494.18825912 | | -936.08525085 | | -2700.62692261 | |
| | | .42318661 | | 1.11531281 | | -.15557288 | |

226

ITEM NO. 114

5.2 EPOCH DAY ~~20~~, 5 ' 15 ' 0.000 GMT
HR MIN SEC

SEQ. NO. ~~114~~
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -502.41954 | KM | DX | .42727150 | KM/SEC |
| Y | -934.24348 | KM | DY | 1.1136474 | KM/SEC |
| Z | -2699.7458 | KM | DZ | -.15633688 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 176.5 | M | DX | .06629 | M/S | X | 176.5 | M | DX | .0663 | M/S |
| Y | 71.21 | M | DY | .02578 | M/S | Y | 71.21 | M | DY | .0258 | M/S |
| Z | 8.281 | M | DZ | .00467 | M/S | Z | 8.281 | M | DZ | .0047 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2536.12 | KM | ECC | .276535 | APF | 1.92655 | DEG | |
| LAN | 5.22877 | DEG | INC | 85.3753 | DEG | TFP | -3431.38 | SEC |
| RCA | 1834.80 | KM | PALT | 96.7059 | KM | PER | 191.017 | MIN |
| APO | 3237.45 | KM | AALT | 1499.36 | KM | TA | 225.873 | DEG |
| LAT | 312.406 | DEG | LONG | 190.310 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/288 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.94661707E-05 | C33 | -.48997446E-05 | C41 | -.32631249E-05 |
| C42 | +.12270341E-05 | C43 | +.12815082E-05 | C44 | +.75447755E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.51300757E-05 | S33 | +.12508034E-04 | S41 | +.67981786E-05 |
| S42 | -.17341644E-04 | S43 | -.57230347E-06 | S44 | -.42733673E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5673.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 114.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 186 , 04 HR , 25 MIN

PREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT

D2 100314 2

(5.1 O.D. IDENTIFICATION NO. 5V278 TAPE NO. 941Y
 AGINAT 1. 67. 8. 14. 14. 50. 0.000
 AGINJ+2 -444.80830002 -809.27613831 -2715.37747192
 .43386165 1.13515028 -.09314965

(226 ITEM NO. 115
 (5.2 EPOCH DAY 129, 14, 50, 0.000 GMT SEQ. NO. 115
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -452.57100 KM DX .43813026 KM/SEC
 (Y -807.62829 KM DY 1.1334450 KM/SEC
 (Z -2714.5853 KM DZ -.09393273 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 154.8 M DX .03998 M/S X 154.8 M DX .0400 M/S
 (Y 46.27 M DY .01526 M/S Y 46.27 M DY .0153 M/S
 (Z 11.30 M DZ .00461 M/S Z 11.30 M DZ .0046 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2535.99 KM ECC .276513 APF 1.99298 DEG
 (LAN 359.978 DEG INC 85.3576 DEG TFP -3320.78 SEC
 (RCA 1834.75 KM PALT 96.6646 KM PER 191.001 MIN
 (APO 3237.22 KM AALT 1499.13 KM TA 228.450 DEG
 (LAT 309.784 DEG LONG 185.575 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

RE 6378.15033 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.10707540E-04 C33 -.47185879E-05 C41 -.32631249E-05
 C42 -.69651628E-05 C43 +.15146506E-05 C44 +.95297364E-06
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 +.14971151E-04 S33 +.23869500E-04 S41 +.67981786E-05
 S42 -.17477583E-04 S43 -.20174874E-05 S44 -.20369155E-05

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4835.4

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM NO. 115.

5.10 REMARKS: EPOCH REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 183, 09 HR, 24 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|---------------|----------------|-----------|------------|-----------|-------|
| AGINAT | 1. | 67. | 8. | 14. | 21. | 20. | 0.000 |
| AGINJ+2 | -227.66428757 | -254.23030663 | -2692.29040527 | .47008859 | 1.19144477 | .19789183 | |

5.1 O.D. IDENTIFICATION NO. 5V30

TAPE NO. 155Y

5.2 EPOCH DAY ²²⁶~~120~~, 21 ' 20 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 116

SEQ. NO. 116

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -233.22378 | KM | DX | .47507086 | KM/SEC |
| Y | -253.43332 | KM | DY | 1.1896077 | KM/SEC |
| Z | -2691.8897 | KM | DZ | .19704449 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 190.6 M | DX | .03505 M/S | X | 190.6 M | DX | .0350 M/S |
| Y | 41.81 M | DY | .01493 M/S | Y | 41.81 M | DY | .0149 M/S |
| Z | 11.50 M | DZ | .01228 M/S | Z | 11.50 M | DZ | .0123 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.80 | KM | ECC | .276430 | APF | 2.00862 | DEG |
| LAN | 356.405 | DEG | INC | 85.3186 | TFP | -2845.43 | SEC |
| RCA | 1834.83 | KM | PALT | 96.7404 | KM | PER | 190.981 |
| APO | 3236.77 | KM | AALT | 1498.68 | KM | TA | 240.290 |
| LAT | 298.063 | DEG | LONG | 185.241 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.12675098E-04 | C33 | -.48886863E-05 | C41 | -.32631249E-05 |
| C42 | -.67568613E-05 | C43 | +.18988523E-05 | C44 | +.75660377E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.21093712E-04 | S33 | +.11161717E-04 | S41 | +.67981786E-05 |
| S42 | -.15276687E-04 | S43 | -.39335030E-06 | S44 | -.18697599E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5533.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 641Y ITEM NO. 116

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 200 , 05 HR , 12 MIN

PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----------|----|---------------|-----|----|----------------|
| AGINAT | 1. | 67. | 8. | 15. | 10. | 0. | 0.000 |
| AGINJ+2 | -333.08976364 | | | -543.47147369 | | | -2722.21527100 |
| | | .45515691 | | 1.16820374 | | | .04327698 |

5.1 O.D. IDENTIFICATION NO. 5V33

TAPE NO. 813Y

5.2 EPOCH DAY ²²⁷~~111~~, 10 ' 0 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 118

SEQ. NO. 118

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -339.82913 | KM | DX | .45978639 | KM/SEC |
| Y | -542.26163 | KM | DY | 1.1664194 | KM/SEC |
| Z | -2721.6236 | KM | DZ | .04245603 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 141.4 M | DX | .03479 M/S | X | 141.4 M | DX | .0348 M/S |
| Y | 6.846 M | DY | .01365 M/S | Y | 6.846 M | DY | .0136 M/S |
| Z | 18.23 M | DZ | .02066 M/S | Z | 18.23 M | DZ | .0207 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.86 | KM | ECC | .276205 | APF | 2.05592 | DEG |
| LAN | 349.447 | DEG | INC | 85.1367 | TFP | -3090.63 | SEC |
| RCA | 1835.44 | KM | PALT | 97.3512 | KM | PER | 190.987 |
| APO | 3236.27 | KM | AALT | 1498.18 | KM | TA | 234.042 |
| LAT | 304.200 | DEG | LONG | 176.637 | DEG | | |

5.6 LUNAR HARMONICS USED* LRC 7/288 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | + .20917160E-03 | J30 | - .17382163E-04 | J40 | - .37928499E-04 |
| C21 | - .15706427E-06 | C22 | + .17664317E-04 | C31 | + .22722029E-04 |
| C32 | - .19205998E-04 | C33 | + .29713840E-05 | C41 | - .32631249E-05 |
| C42 | - .74692614E-05 | C43 | + .30082765E-05 | C44 | - .18135597E-06 |
| S21 | - .55150425E-05 | S22 | - .16672685E-05 | S31 | - .13551220E-04 |
| S32 | - .31363802E-04 | S33 | + .17760648E-04 | S41 | + .67981786E-05 |
| S42 | - .14527950E-04 | S43 | - .67691204E-07 | S44 | - .23215414E-05 |

5.7 DATA ARC LENGTH* 0 HRS 0 MIN

SOS= 4143.1

5.8 DATA SUMMARY*

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS* TAPE NO. 483Y ITEM NO. 118

5.10 REMARKS* EPOCH REPORT

TIME OF REPORT*
 DAY 200 , 03 HR , 07 MIN

PREPARED BY* J.L.HEDWALL 0000
 U.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE) D2 100814 2
 AGINAT 1. 67. 8. 15. 16. 20. 0.000
 AGINJ+2 -392.69126129 -682.17499542 -2722.59567261
 .44389659 1.15257134 -.02945296

5.1 O.D. IDENTIFICATION NO. 5V35 TAPE NO. 272Y

5.2 EPOCH DAY ²²⁷~~121~~, 16 ' 20 ' 0.000 GMT ITEM NO. 119
 HR MIN SEC SEQ. NO. 119
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -399.97279 | KM | DX | .44834253 | KM/SEC |
| Y | -680.73135 | KM | DY | 1.1508285 | KM/SEC |
| Z | -2721.8970 | KM | DZ | -.03025412 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 149.4 | M | DX | .03859 | M/S | X | 149.4 | M | DX | .0386 | M/S |
| Y | 7.768 | M | DY | .01469 | M/S | Y | 7.768 | M | DY | .0147 | M/S |
| Z | 22.92 | M | DZ | .02547 | M/S | Z | 22.92 | M | DZ | .0255 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2535.75 | KM | ECC | .276023 | APF | 2.05414 | DEG | |
| LAN | 345.996 | DEG | INC | 85.2928 | TFP | -3212.34 | SEC | |
| RCA | 1835.83 | KM | PALT | 97.7374 | KM | PER | 190.975 | MIN |
| APO | 3235.68 | KM | AALT | 1497.59 | KM | TA | 231.072 | DEG |
| LAT | 307.131 | DEG | LONG | 172.240 | DEG | | | |

5.6 LUNAR HARMONICS USED* LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.16862374E-04 | C33 | +.21436069E-04 | C41 | -.32631247E-05 |
| C42 | -.48482284E-05 | C43 | +.19525024E-05 | C44 | -.23495283E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.21010665E-04 | S33 | +.23678759E-04 | S41 | +.67981786E-05 |
| S42 | -.10103867E-04 | S43 | -.10922142E-05 | S44 | -.19803981E-05 |

5.7 DATA ARC LENGTH* 0 HRS 0 MIN SOS= 1452.6

5.8 DATA SUMMARY*

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS* TAPE NO. 732Y ITEM NO. 119

5.10 REMARKS* EPOCH REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT* | PREPARED BY* | J.E.HEDWALL 0000 |
| DAY 201, 03 HR, 04 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 15. | 22. | 40. | U.000 |
| AGINJ+2 | -444.37181091 | | | -817.13352203 | | -2715.57186890 | |
| | .43311451 | | | 1.13368696 | | -.09765510 | |

5.1 O.D. IDENTIFICATION NO. 5V37

TAPE NO. 046Y

227

ITEM NO. 120

5.2 EPOCH DAY ~~22~~, 22 ' 40 ' 0.000 GMT

SEQ. NO. 120

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -452.16845 | KM | DX | .43737137 | KM/SEC |
| Y | -815.48676 | KM | DY | 1.1319838 | KM/SEC |
| Z | -2714.7798 | KM | DZ | -.09843716 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 102.8 M | DX | .03123 M/S | X | 102.8 M | DX | .0312 M/S |
| Y | 15.73 M | DY | .01073 M/S | Y | 15.73 M | DY | .0107 M/S |
| Z | 22.01 M | DZ | .02129 M/S | Z | 22.01 M | DZ | .0213 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.57 | KM | ECC | .275799 | APF | 2.12098 | DEG |
| LAN | 342.529 | DEG | INC | 85.2985 | TFP | -3333.43 | SEC |
| RCA | 1836.26 | KM | PALT | 98.1727 | KM | PER | 190.954 |
| APC | 3234.88 | KM | AALT | 1426.79 | KM | TA | 228.192 |
| LAT | 309.918 | DEG | LONG | 168.170 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17564317E-04 | C31 | +.22722029E-04 |
| C32 | +.81778966E-05 | C33 | +.31453962E-04 | C41 | -.52631249E-05 |
| C42 | -.39621532E-05 | C43 | -.44457929E-06 | C44 | -.29349166E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.11354161E-04 | S33 | +.21369367E-04 | S41 | +.67981785E-05 |
| S42 | -.66580920E-05 | S43 | -.19004879E-05 | S44 | -.10623197E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SCS= 5114.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 011Y ITEM NO. 120

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 200, 09 HR, 38 MINPREPARED BY: J.A. BEACON 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|----|---------------|----|---------------|----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 16. | 5. | 5. | 0.000 |
| AGINJ+2 | | -369.78702545 | | -607.33614349 | | -2723.33618164 | |
| | | .44696398 | | 1.16188735 | | .00708428 | |

5.1 O.D. IDENTIFICATION NO. 5V38

TAPE NO. 456Y

228

ITEM NO. 121

5.2 EPOCH DAY ~~100~~, 5 ' 5 ' 0.000 GMT

SEQ. NO. 121

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -376.77889 | KM | DX | .45150898 | KM/SEC |
| Y | -605.98244 | KM | DY | 1.1601334 | KM/SEC |
| Z | -2722.6794 | KM | DZ | .00627729 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 135.6 M | DX | .03680 M/S | X | 135.6 M | DX | .0368 M/S |
| Y | 28.30 M | DY | .01299 M/S | Y | 28.30 M | DY | .0130 M/S |
| Z | 23.19 M | DZ | .03151 M/S | Z | 23.19 M | DZ | .0315 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.17 | KM | ECC | .275528 | APF | 2.14319 | DEG |
| LAN | 339.037 | DEG | INC | 85.4619 | TFP | -3153.68 | SEC |
| RCA | 1536.66 | KM | PALT | 98.5698 | KM | PER | 190.909 |
| APC | 3233.68 | KM | AALT | 1495.59 | KM | TA | 232.516 |
| LAT | 305.593 | DEG | LONG | 165.404 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14943 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | +.19283084E-04 | C33 | +.34116138E-04 | C41 | -.32831247E-05 |
| C42 | -.15146431E-05 | C43 | -.16797712E-05 | C44 | -.21792690E-05 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | +.13134901E-04 | S33 | +.20679888E-05 | S41 | +.67981786E-05 |
| S42 | -.12612479E-05 | S43 | -.72581983E-06 | S44 | +.14584043E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5201.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 921Y ITEM NO. 121

5.10 REMARKS: EPOCH REPORT

| | | | |
|------------------------|--------------|--------------|------|
| TIME OF REPORT: | PREPARED BY: | J.A. BEACON | 0000 |
| DAY 201, 04 HR, 50 MIN | GMT | O.D. ANALYST | |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 16. | 17. | 55. | 0.000 |
| AGINJ+2 | -187.39612770 | | | -167.45036888 | | -2681.02935791 | |
| | .47352050 | | | 1.19303253 | | .24457669 | |

5.1 O.D. IDENTIFICATION NO. 5A24

TAPE NO. 446Y

5.2 EPOCH DAY ~~122~~ ²²⁸, 17 ' 55 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 122

SEQ. NO. 122

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -192.60090 | KM | DX | .47859085 | KM/SEC |
| Y | -166.81087 | KM | DY | 1.1911827 | KM/SEC |
| Z | -2680.7004 | KM | DZ | .24372277 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 149.8 M | DX | .02787 M/S | X | 149.8 M | DX | .0279 M/S |
| Y | 47.89 M | DY | .01810 M/S | Y | 47.89 M | DY | .0181 M/S |
| Z | 14.13 M | DZ | .04677 M/S | Z | 14.13 M | DZ | .0468 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|
| SMA | 2535.06 | KM | ECC | .274967 | APF | 2.45360 | DEG |
| LAN | 331.929 | DEG | INC | 85.1871 | TFP | -2791.31 | SEC |
| RCA | 1838.00 | KM | PALT | 99.9125 | KM | PER | 190.897 |
| APD | 3232.12 | KM | AALT | 1494.03 | KM | TA | 241.844 |
| LAT | 296.119 | DEG | LONG | 161.817 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | + .20917160E-03 | J30 | - .17382163E-04 | J40 | - .37928499E-04 |
| C21 | - .15706427E-06 | C22 | + .17664317E-04 | C31 | + .22722029E-04 |
| C32 | + .11432112E-04 | C33 | + .24281128E-04 | C41 | - .52631249E-05 |
| C42 | + .16989605E-05 | C43 | - .78511849E-06 | C44 | - .11175044E-05 |
| S21 | - .55150425E-05 | S22 | - .16672685E-05 | S31 | - .13551220E-04 |
| S32 | + .24565342E-05 | S33 | - .73680974E-05 | S41 | + .67981786E-05 |
| S42 | + .35255850E-08 | S43 | + .15959436E-06 | S44 | + .20908878E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2201.0

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 973Y ITEM NO. 122

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
 DAY 201, 06 HR, 13 MIN

PREPARED BY: GEO. S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 17. | 3. | 25. | 0.000 |
| AGINJ+2 | -268.98734283 | | | -372.68114090 | | -2714.43194580 | |
| | .46426387 | | | 1.18112721 | | .13079771 | |

5.1 O.D. IDENTIFICATION NO. 5V42A

TAPE NO. 985Y

229

ITEM NO. 0123

5.2 EPOCH DAY ~~120~~, 3 ' 25 ' 0.000 GMT

SEG. NO. 123

HR MIN SEC

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -275.05026 | KM | DX | .46909513 | KM/SEC |
| Y | -371.72271 | KM | DY | 1.1793094 | KM/SEC |
| Z | -2713.9558 | KM | DZ | .12995998 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 92.19 M | DX | .02094 M/S | X | 92.19 M | DX | .0209 M/S |
| Y | 41.59 M | DY | .01122 M/S | Y | 41.59 M | DY | .0112 M/S |
| Z | 16.22 M | DZ | .03280 M/S | Z | 16.22 M | DZ | .0328 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2535.17 | KM | ECC | .274778 | APF | 2.53093 | DEG |
| LAN | 326.689 | DEG | INC | 85.1866 | DEG | TFP | -2967.83 |
| RCA | 1838.56 | KM | PALT | 100.470 | KM | PER | 190.909 |
| APO | 3231.78 | KM | AALT | 1493.69 | KM | TA | 237.243 |
| LAT | 300.571 | DEG | LONG | 154.885 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

| | | | | | |
|-----|-----------------|-----|-----------------|-----|-----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | + .20917160E-03 | J30 | - .17382163E-04 | J40 | - .37928499E-04 |
| C21 | - .15706427E-06 | C22 | + .17664317E-04 | C31 | + .22722029E-04 |
| C32 | + .15207640E-04 | C33 | + .38041203E-04 | C41 | - .50999998E-05 |
| C42 | - .59568993E-05 | C43 | - .10770184E-05 | C44 | - .18323039E-05 |
| S21 | - .55150425E-05 | S22 | - .16672685E-05 | S31 | - .13551220E-04 |
| S32 | + .10403248E-04 | S33 | - .81097851E-05 | S41 | - .10200000E-04 |
| S42 | - .18738267E-05 | S43 | - .51962446E-06 | S44 | + .24066012E-05 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2091.2

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~ ITEM No. 123.

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 186 , 05 HR , 51 MINPREPARED BY: G.S.GOODWIN 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 8. 17. 13. 0. 0.000
 AGINJ+2 -205.32545471 -219.91220474 -2692.76834106
 .47285419 1.18966138 .21470319

5.1 O.D. IDENTIFICATION NO. 5A25 TAPE NO. 452Y

5.2 EPOCH DAY ~~120~~²²⁹, 13 ' 0 ' 0.000 GMT
 HR MIN SEC ITEM NO. 124
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -210.75601 | KM | DX | .47786169 | KM/SEC |
| Y | -219.20301 | KM | DY | 1.1878128 | KM/SEC |
| Z | -2692.4066 | KM | DZ | .21385011 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 100.0 M | DX | .01913 M/S | X | 100.0 M | DX | .0191 M/S |
| Y | 55.74 M | DY | .01357 M/S | Y | 55.74 M | DY | .0136 M/S |
| Z | 14.61 M | DZ | .04202 M/S | Z | 14.61 M | DZ | .0420 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE UPDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2535.21 | KM | ECC | .274488 | APF | 2.57889 | DEG | |
| LAN | 321.387 | DEG | INC | 85.0924 | TFP | -2840.83 | SEC | |
| RCA | 1839.33 | KM | PALT | 101.238 | KM | PER | 190.914 | MIN |
| APD | 3231.10 | KM | AALT | 1493.01 | KM | TA | 240.580 | DEG |
| LAT | 297.253 | DEG | LONG | 150.983 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 298601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37926499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.26001732E-04 | C33 | +.29844497E-05 | C41 | -.32631249E-05 |
| C42 | -.53019165E-05 | C43 | +.16427062E-05 | C44 | -.55616397E-06 |
| S21 | -.55150425E-05 | S22 | -.16672885E-05 | S31 | -.13551220E-04 |
| S32 | -.89016079E-05 | S33 | +.72775540E-05 | S41 | +.67961786E-05 |
| S42 | -.35527760E-05 | S43 | -.17446153E-06 | S44 | -.44401404E-07 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3475.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 287Y ITEM NO. 124

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 201, 07 HR, 21 MIN PREPARED BY: J.E.HEDWALL 0000
 U.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|----|---------------|-----|----------------|-------|
| AGINAT | 1. | 67. | 8. | 17. | 22. | 30. | 0.000 |
| AGINJ+2 | -282.64680481 | | | -423.02038193 | | -2719.91024780 | |
| | .46408810 | | | 1.17623363 | | .10425433 | |

5.1 O.D. IDENTIFICATION NO. 5V46 TAPE NO. 849Y
 5.2 EPOCH DAY ~~120~~ ²²⁹, 22 ' 30 ' 0.000 GMT
 HR MIN SEC ITEM NO. 125
 SEQ. NO. 125
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -288.91674 | KM | DX | .46885609 | KM/SEC |
| Y | -422.00874 | KM | DY | 1.1744153 | KM/SEC |
| Z | -2719.4086 | KM | DZ | .10341674 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 83.72 M | DX | .02130 M/S | X | 83.72 M | DX | .0213 M/S |
| Y | 62.48 M | DY | .00996 M/S | Y | 62.48 M | DY | .0100 M/S |
| Z | 18.60 M | DZ | .03977 M/S | Z | 18.60 M | DZ | .0398 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2535.30 | KM | ECC | .274445 | APF | 2.56695 | DEG |
| LAN | 316.137 | DEG | INC | 85.0056 | TFP | -3011.24 | SEC |
| RCA | 1839.50 | KM | PALT | 101.409 | PER | 190.924 | MIN |
| APO | 3231.10 | KM | AALT | 1493.01 | TA | 236.174 | DEG |
| LAT | 301.615 | DEG | LONG | 144.298 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398601.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.13742789E-04 | C33 | +.7597J499E-05 | C41 | -.32631249E-05 |
| C42 | -.56465485E-05 | C43 | -.31000931E-06 | C44 | -.15704849E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.21777990E-05 | S33 | +.25400230E-05 | S41 | +.67981786E-05 |
| S42 | -.81451000E-05 | S43 | -.68762722E-06 | S44 | +.79510827E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN COS = 2615.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 057Y ITEM NO. 125

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT: DAY 201, 08 HR, 52 MIN
 PREPARED BY: GEO. S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | | | | | |
|---------|---------------|-----|---------------|-----|----------------|-----|-------|
| AGINAT | 1. | 67. | 8. | 18. | 1. | 45. | 0.000 |
| AGINJ+2 | -167.92698479 | | -135.61639786 | | -2675.20480347 | | |
| | .47751984 | | 1.19261263 | | .26282299 | | |

5.1 O.D. IDENTIFICATION NO. 5V49 TAPE NO. 564Y

| | | | | | | | | | |
|-----------|-----|----------------|-----|----|-----|-------|-----|----------|-----|
| 5.2 EPOCH | DAY | 229 | 230 | 1 | 45 | 0.000 | GMT | ITEM NO. | 126 |
| | | | | HR | MIN | SEC | | SEQ. NO. | 126 |
| | | | | | | | | COMPUTER | G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -172.99939 | KM | DX | .48262118 | KM/SEC |
| Y | -135.05363 | KM | DY | 1.1907473 | KM/SEC |
| Z | -2674.9101 | KM | DZ | .26196160 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 84.13 | M | DX | .01566 | M/S | X | 84.13 | M | DX | .0157 | M/S |
| Y | 63.31 | M | DY | .01463 | M/S | Y | 63.31 | M | DY | .0146 | M/S |
| Z | 12.26 | M | DZ | .04278 | M/S | Z | 12.26 | M | DZ | .0428 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2535.07 | KM | ECC | .274417 | APF | 2.55106 | DEG |
| LAN | 314.347 | DEG | INC | 84.9927 | DEG | TFP | -2767.83 |
| RCA | 1839.40 | KM | PALT | 101.314 | KM | PER | 190.898 |
| APO | 3230.74 | KM | AALT | 1492.65 | KM | TA | 242.531 |
| LAT | 295.385 | DEG | LONG | 144.987 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | |
|-----|----------------|-----|----------------|-----|----------------|
| RE | 6378.14948 | KE | 398001.277 | KM | 4902.58002 |
| J20 | +.20917160E-03 | J30 | -.17382163E-04 | J40 | -.37928499E-04 |
| C21 | -.15706427E-06 | C22 | +.17664317E-04 | C31 | +.22722029E-04 |
| C32 | -.58024998E-05 | C33 | +.20889723E-05 | C41 | -.32631249E-05 |
| C42 | -.50895855E-05 | C43 | -.39713227E-06 | C44 | +.66369842E-06 |
| S21 | -.55150425E-05 | S22 | -.16672685E-05 | S31 | -.13551220E-04 |
| S32 | -.45608253E-05 | S33 | -.40420370E-06 | S41 | +.67981786E-05 |
| S42 | -.78933609E-05 | S43 | +.10777372E-06 | S44 | +.52995362E-06 |

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2799.9

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 404Y ITEM NO. 126

5.10 REMARKS: EPOCH REPORT

TIME OF REPORT:
DAY 232, 03 HR, 44 MIN

PREPARED BY: J.E. HEDWALL 0000
C.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)
 AGINAT 1. 67. 8. 18. 11. 40. 0.000
 AGINJ+2 450.45679092 1328.07722473 -1658.33561707
 .39321032 .86406747 1.29595631

(5.1 O.D. IDENTIFICATION NO. 5V50 TAPE NO. 802Y
 (²³⁰
 (5.2 EPOCH DAY ~~110~~, 11 ' 40 ' 0.000 GMT ITEM NO. 127
 (HR MIN SEC SEQ. NO. 127
 (COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)
 (X 452.82452 KM DX .39878423 KM/SEC
 (Y 1326.2485 KM DY .86257043 KM/SEC
 (Z -1659.1542 KM DZ 1.2952503 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI
 (X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S
 (Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S
 (Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)
 (SMA 2534.94 KM ECC .274253 APF 2.42894 DEG
 (LAN 308.876 DEG INC 84.9385 DEG TFP -1435.19 SEC
 (RCA 1839.73 KM PALT 101.635 KM PER 190.883 MIN
 (APO 3230.15 KM AALT 1492.06 KM TA 286.831 DEG
 (LAT 289.889 DEG LONG 294.705 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28B MODIFIED
 RE 6378.14948 KE 398601.277 KM 4902.58002
 J20 +.20917160E-03 J30 -.17382163E-04 J40 -.37928499E-04
 C21 -.15706427E-06 C22 +.17664317E-04 C31 +.22722029E-04
 C32 -.51649730E-05 C33 +.53716243E-05 C41 -.32631249E-05
 C42 -.64009151E-05 C43 -.27941918E-06 C44 +.47656913E-06
 S21 -.55150425E-05 S22 -.16672685E-05 S31 -.13551220E-04
 S32 -.94966023E-06 S33 -.67020591E-05 S41 +.67981786E-05
 S42 -.84964309E-05 S43 -.66588127E-06 S44 +.62091709E-06

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= .00000

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 985Y ITEM NO. 127

(5.10 REMARKS' EPOCH REPORT

(TIME OF REPORT' PREPARED BY' J.A.BEACON 0000
 (DAY 203 , 04 HR , 25 MIN GMT O.D. ANALYST

USE FOR TYPEWRITTEN MATERIAL ONLY

MISSION V MAP TIME REPORTS

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A1 TAPE NO. 820Y

5.2 EPOCH DAY ²¹⁸~~116~~ , 11 ' 21 ' 0.000 GMT
 HR MIN SEC ITEM NO. 95
 SEQ. NO. 95
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1132.9194 | KM | DX | -.40124957 | KM/SEC |
| Y | -3172.6306 | KM | DY | -1.0052193 | KM/SEC |
| Z | 2737.8949 | KM | DZ | -.27685180 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 155.2 M | DX | .01716 M/S | X | 155.2 M | DX | .0172 M/S |
| Y | 71.04 M | DY | .01636 M/S | Y | 71.04 M | DY | .0164 M/S |
| Z | 151.5 M | DZ | .05270 M/S | Z | 151.5 M | DZ | .0527 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 4851.32 | KM | ECC | .601000 | APF | 1.46136 | DEG |
| LAN | 107.638 | DEG | INC | 84.7508 | TFP | 3876.01 | SEC |
| RCA | 1935.67 | KM | PALT | 197.584 | PER | 505.366 | MIN |
| APO | 7766.96 | KM | AALT | 6028.87 | TA | 118.429 | DEG |
| LAT | 59.6937 | DEG | LONG | 278.594 | | | |

5.6 LUNAR HARMONICS USED LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH 0 HRS 0 MIN SOS= 213.31

5.8 DATA SUMMARY

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS TAPE NO. 316Y ITEM NO. 95

5.10 REMARKS MAP TIME REPORT

TIME OF REPORT DAY 195 , 03 HR , 10 MIN
 PREPARED BY J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|---------------------|----------|------------|
| 5.1 O.D. IDENTIFICATION NO. | 5A2 | TAPE NO. | 820Y |
| | 218 | ITEM NO. | 95 |
| 5.2 EPOCH DAY | 146 , 13 | 0.000 | GMT |
| | HR | MIN | SEC |
| | | | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2715.4251 | KM | DX | -.04500563 | KM/SEC |
| Y | -6862.9435 | KM | DY | -.06486609 | KM/SEC |
| Z | -1258.6503 | KM | DZ | -.54099474 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 106.7 | M | DX | .01809 | M/S | X | 106.7 | M | DX | .0181 | M/S |
| Y | 130.2 | M | DY | .02229 | M/S | Y | 130.2 | M | DY | .0223 | M/S |
| Z | 381.0 | M | DZ | .00898 | M/S | Z | 381.0 | M | DZ | .0090 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 4850.74 | KM | ECC | .600773 | APF | 1.45105 | DEG | |
| LAN | 106.439 | DEG | INC | 84.7305 | DEG | TFP | 11799.4 | SEC |
| RCA | 1936.55 | KM | PALT | 198.456 | KM | PER | 505.276 | MIN |
| APO | 7764.94 | KM | AALT | 6026.85 | KM | TA | 167.251 | DEG |
| LAT | 11.2494 | DEG | LONG | 285.388 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | | | | | | |
|----------------------|---|-----|---|-----|------|-------|
| 5.7 DATA ARC LENGTH: | 0 | HRS | 0 | MIN | SOS= | -.0E+ |
|----------------------|---|-----|---|-----|------|-------|

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

| | | |
|---------------------|---------------|-------------|
| 5.9 RESIDUAL PLOTS: | TAPE NO. 316Y | ITEM NO. 95 |
|---------------------|---------------|-------------|

| | |
|---------------|-----------------|
| 5.10 REMARKS: | MAP TIME REPORT |
|---------------|-----------------|

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195 , 03 HR , 12 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A3 TAPE NO. 820Y
 5.2 EPOCH DAY ²¹⁸~~146~~, 17 ' 16 ' 0.000 GMT ITEM NO. 95
 HR MIN SEC SEQ. NO. 95
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | -740.66206 | KM | DX | .33750320 | KM/SEC |
| Y | -1459.4276 | KM | DY | .83882722 | KM/SEC |
| Z | -4846.6497 | KM | DZ | .29784702 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 150.9 | M | DX | .00648 | M/S | X | 150.9 | M | DX | .0065 | M/S |
| Y | 236.3 | M | DY | .02903 | M/S | Y | 236.3 | M | DY | .0290 | M/S |
| Z | 154.0 | M | DZ | .04642 | M/S | Z | 154.0 | M | DZ | .0464 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 4851.66 | KM | ECC | .600727 | APF | 1.42100 | DEG | |
| LAN | 104.382 | DEG | INC | 84.6602 | DEG | TFP | -5131.39 | SEC |
| RCA | 1937.14 | KM | PALT | 199.047 | KM | PER | 505.419 | MIN |
| APO | 7766.17 | KM | AALT | 6028.08 | KM | TA | 229.034 | DEG |
| LAT | 309.845 | DEG | LONG | 290.813 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7728B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 316Y ITEM NO. 95

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 195, 03 HR, 15 MIN PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|------------------------|----------|-------------|
| 5.1 O.D. IDENTIFICATION NO. | 5A4 | TAPE NO. | 820Y |
| | 219 | ITEM NO. | 95 |
| 5.2 EPOCH | DAY 177 , 0 | HR | 34 |
| | | MIN | 0.000 |
| | | SEC | GMT |
| | | | SEQ. NO. 95 |
| | | | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1866.8121 | KM | DX | .22223704 | KM/SEC |
| Y | -4343.9024 | KM | DY | .58409853 | KM/SEC |
| Z | -4971.5142 | KM | DZ | -.16736874 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 99.39 M | DX | .01748 M/S | X | 99.39 M | DX | .0175 M/S |
| Y | 253.0 M | DY | .02065 M/S | Y | 253.0 M | DY | .0207 M/S |
| Z | 264.4 M | DZ | .02933 M/S | Z | 264.4 M | DZ | .0293 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 4851.22 | KM | ECC | .600481 | APF | 1.32866 | DEG |
| LAN | 100.367 | DEG | INC | 84.5969 | DEG | TFP | -9156.13 |
| RCA | 1938.16 | KM | PALT | 200.066 | KM | PER | 505.351 |
| | | | | | | | MIN |

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----|---------|-----|
| APO | 7764.29 | KM | AALT | 6026.20 | KM | TA | 204.163 | DEG |
| LAT | 334.629 | DEG | LONG | 282.938 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 316Y ITEM NO. 95

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195, 03 HR, 18 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A6

TAPE NO. 803Y

5.2 EPOCH DAY ²¹⁹~~147~~, 13 : 50 : 0.000 GMT
HR MIN SEC

ITEM NO. 96

SEQ. NO. 96

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2430.8485 | KM | DX | -.15346204 | KM/SEC |
| Y | -6259.9271 | KM | DY | -.34481383 | KM/SEC |
| Z | 398.28912 | KM | DZ | -.54618638 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 113.4 M | DX | .00766 M/S | X | 113.4 M | DX | .0077 M/S |
| Y | 76.40 M | DY | .02949 M/S | Y | 76.40 M | DY | .0295 M/S |
| Z | 413.7 M | DZ | .03168 M/S | Z | 413.7 M | DZ | .0317 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 4821.64 | KM | ECC | .618630 | APF | 1.30228 | DEG |
| LAN | 93.0763 | DEG | INC | 84.5908 | TFP | 8548.86 | SEC |
| RCA | 1838.83 | KM | PALT | 100.738 | PER | 500.735 | MIN |
| APO | 7804.45 | KM | AALT | 6066.36 | TA | 154.326 | DEG |
| LAT | 24.2560 | DEG | LONG | 270.631 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 1582.5

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 885Y ITEM NO. 96

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 195, 05 HR, 21 MINPREPARED BY: GEO. S. GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5A7.1 | TAPE NO. 803Y |
| 219 | ITEM NO. 96 |
| 5.2 EPOCH DAY 147 , 20 ' 50 ' 0.000 GMT | SEG. NO. 96 |
| HR MIN SEC | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -1140.8793 KM | DX -.40758909 KM/SEC |
| Y -3149.1800 KM | DY -1.0189629 KM/SEC |
| Z 2655.4772 KM | DZ -.27001106 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 107.4 M | DX .03440 M/S | X 107.4 M | DX .0344 M/S |
| Y 277.7 M | DY .05527 M/S | Y 277.7 M | DY .0553 M/S |
| Z 164.4 M | DZ .05923 M/S | Z 164.4 M | DZ .0592 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 4822.50 KM | ECC .618648 | APF 1.20950 DEG |
| LAN 89.2189 DEG | INC 84.5607 DEG | TFP 3720.73 SEC |
| RCA 1839.07 KM | PALT 100.978 KM | PER 500.869 MIN |
| APO 7805.92 KM | AALT 6067.83 KM | TA 119.387 DEG |
| LAT 58.9700 DEG | LONG 260.112 DEG | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 885Y ITEM NO. 96

5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 195 , 05 HR , 24 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A8 TAPE NO. 497Y

ITEM NO. 97

5.2 EPOCH DAY ²²⁰ ~~148~~, 1 ' 41 ' 0.000 GMT SEQ. NO. 97

HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1861.2549 KM DX .22507738 KM/SEC

Y -4325.8451 KM DY .58862931 KM/SEC

Z -4941.8861 KM DZ -.14959566 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 37.57 M DX .00556 M/S X 37.57 M DX .0056 M/S

Y 217.1 M DY .00855 M/S Y 217.1 M DY .0086 M/S

Z 233.4 M DZ .02570 M/S Z 233.4 M DZ .0257 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 4821.39 KM ECC .618512 APF 1.18329 DEG

LAN 86.5466 DEG INC 84.5698 DEG TFP -8846.95 SEC

RCA 1839.30 KM PALT 101.211 KM PER 500.696 MIN

APO 7803.47 KM AALT 6065.38 KM TA 204.256 DEG

LAT 334.683 DEG LONG 269.124 DEG

5.6 LUNAR HARMONICS USED¹ LRC 7728B MODIFIED5.7 DATA ARC LENGTH¹ 0 HRS 0 MIN SOS= 161.195.8 DATA SUMMARY¹

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS¹ TAPE NO. 051Y ITEM NO. 975.10 REMARKS¹ MAP TIME REPORT

| | | |
|-----------------------------|--------------------------|------------------|
| TIME OF REPORT ¹ | PREPARED BY ¹ | J.E.HEDWALL 0000 |
| DAY 195 , 06 HR , 40 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|--------------------------------------|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 5A9 | TAPE NO. | 497Y |
| | 220 | ITEM NO. | 97 |
| 5.2 EPOCH | DAY 148 , 9, 4, 0.000 GMT | SEQ. NO. | 97 |
| | HR MIN SEC | COMPUTER | G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2475.2966 | KM | DX | .12863973 | KM/SEC |
| Y | -5966.3255 | KM | DY | .36011427 | KM/SEC |
| Z | -4037.0147 | KM | DZ | -.35224723 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 50.04 | M | DX | .00646 | M/S | X | 50.04 | M | DX | .0065 | M/S |
| Y | 180.6 | M | DY | .01643 | M/S | Y | 180.6 | M | DY | .0164 | M/S |
| Z | 273.0 | M | DZ | .01380 | M/S | Z | 273.0 | M | DZ | .0138 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 4820.95 | KM | ECC | .618564 | APF | 1.10374 | DEG | |
| LAN | 82.4728 | DEG | INC | 84.5916 | DEG | TFP | -12294.7 | SEC |
| RCA | 1838.89 | KM | PALT | 100.796 | KM | PER | 500.628 | MIN |
| APO | 7803.02 | KM | AALT | 6064.93 | KM | TA | 189.951 | DEG |
| LAT | 348.995 | DEG | LONG | 263.528 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 051Y ITEM NO. 97

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195, 06 HR, 43 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A10

TAPE NO. 497Y

220
 5.2 EPOCH DAY ~~140~~, 14 ' 51 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 97

SEQ. NO. 97

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -2431.4315 | KM | DX | -.15572639 | KM/SEC |
| Y | -6250.0326 | KM | DY | -.34871640 | KM/SEC |
| Z | 438.07781 | KM | DZ | -.54434682 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 43.19 M | DX | .01204 M/S | X | 43.19 M | DX | .0120 M/S |
| Y | 109.0 M | DY | .02943 M/S | Y | 109.0 M | DY | .0294 M/S |
| Z | 249.0 M | DZ | .01821 M/S | Z | 249.0 M | DZ | .0182 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 4821.58 | KM | ECC | .618677 | APF | 1.05844 | DEG | |
| LAN | 79.2803 | DEG | INC | 84.6081 | TFP | 8529.45 | SEC | |
| RCA | 1838.58 | KM | PALT | 100.489 | KM | PER | 500.726 | MIN |
| APO | 7804.57 | KM | AALT | 6066.48 | KM | TA | 154.236 | DEG |
| LAT | 24.5893 | DEG | LONG | 256.805 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 051Y ITEM NO. 97

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195, 06 HR, 46 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A11.2 TAPE NO. 558Y

220
5.2 EPOCH DAY ~~148~~, 21 ' 51 ' 0.000 GMT ITEM NO. 98

HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1124.5543 | KM | DX | -.40980988 | KM/SEC |
| Y | -3121.6281 | KM | DY | -1.0234761 | KM/SEC |
| Z | 2675.7774 | KM | DZ | -.26138658 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | .0000 | M | DX | .00000 | M/S | X | .0000 | M | DX | .0000 | M/S |
| Y | .0000 | M | DY | .00000 | M/S | Y | .0000 | M | DY | .0000 | M/S |
| Z | .0000 | M | DZ | .00000 | M/S | Z | .0000 | M | DZ | .0000 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 4822.73 | KM | ECC | .618989 | APF | .913689 | DEG | |
| LAN | 75.4360 | DEG | INC | 84.6529 | DEG | TFP | 3702.36 | SEC |
| RCA | 1837.51 | KM | PALT | 99.4240 | KM | PER | 500.906 | MIN |
| APO | 7807.95 | KM | AALT | 6069.86 | KM | TA | 119.210 | DEG |
| LAT | 59.4494 | DEG | LONG | 246.312 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 281Y ITEM NO. 98

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|-----------------|
| TIME OF REPORT: | PREPARED BY: | GEO. S. GOODWIN |
| DAY 195, 08 HR, 09 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5A12 | TAPE NO. 558Y |
| 221 | ITEM NO. 98 |
| 5.2 EPOCH DAY 195 , 2 ' 43 ' 0.000 GMT | SEQ. NO. 98 |
| HR MIN SEC | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -1875.1326 KM | DX .22514153 KM/SEC |
| Y -4327.9122 KM | DY .59038719 KM/SEC |
| Z -4920.5955 KM | DZ -.15008026 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X .0000 M | DX .00000 M/S | X .0000 M | DX .0000 M/S |
| Y .0000 M | DY .00000 M/S | Y .0000 M | DY .0000 M/S |
| Z .0000 M | DZ .00000 M/S | Z .0000 M | DZ .0000 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|------------------|
| SMA 4821.77 KM | ECC .618959 | APF .867394 DEG |
| LAN 72.7574 DEG | INC 84.7190 DEG | TFP -8808.94 SEC |
| RCA 1837.29 KM | PALT 99.2024 KM | PER 500.755 MIN |
| APO 7806.24 KM | AALT 6068.15 KM | TA 204.415 DEG |
| LAT 334.832 DEG | LONG 255.247 DEG | |

5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= .00000

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 281Y ITEM NO. 98

5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------|-------------------------------|
| TIME OF REPORT: | PREPARED BY: |
| DAY 195 , 08 HR , 11 MIN | GEO.S.GOODWIN O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A13 TAPE NO. 560Y

5.2 EPOCH DAY ~~149~~ ²²¹, 9 : 31 : 0.000 GMT ITEM NO. 99

HR MIN SEC SEQ. NO. 99

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X -1102.5898 KM DX -.15450779 KM/SEC

Y -2856.7723 KM DY -.29130369 KM/SEC

Z 369.37809 KM DZ -1.0669446 KM/SEC

5.4 STANDARD DEVIATIONS A PRIORI

X 21.60 M DX .01661 M/S X 21.60 M DX .0166 M/S

Y 41.69 M DY .03807 M/S Y 41.69 M DY .0381 M/S

Z 105.0 M DZ .02183 M/S Z 105.0 M DZ .0218 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2537.71 KM ECC .275966 APF 1.77924 DEG

LAN 69.0072 DEG INC 84.7548 DEG TFP 4188.16 SEC

RCA 1837.39 KM PALT 99.2986 KM PER 191.196 MIN

APO 3238.04 KM AALT 1499.95 KM TA 150.375 DEG

LAT 27.7187 DEG LONG 246.242 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 2401.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 236Y ITEM NO. 99

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 195, 09 HR, 16 MIN
 PREPARED BY: J.E. HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|-------------------------|----------|-------------|
| 5.1 O.D. IDENTIFICATION NO. | 5A14 | TAPE NO. | 560Y |
| | ZZI | ITEM NO. | 99 |
| 5.2 EPOCH | DAY 149 , 15 | HR | 57 |
| | | MIN | 0.000 |
| | | SEC | GMT |
| | | | SEQ. NO. 99 |
| | | | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -1132.6113 | KM | DX | -.11490916 | KM/SEC |
| Y | -2910.2000 | KM | DY | -.18875818 | KM/SEC |
| Z | 139.62210 | KM | DZ | -1.0751806 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 29.68 M | DX | .05701 M/S | X | 29.68 M | DX | .0570 M/S |
| Y | 61.29 M | DY | .12956 M/S | Y | 61.29 M | DY | .1296 M/S |
| Z | 289.1 M | DZ | .02057 M/S | Z | 289.1 M | DZ | .0206 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2537.76 | KM | ECC | .276118 | APF | 1.57074 | DEG |
| LAN | 65.4663 | DEG | INC | 84.7573 | TFP | 4412.89 | SEC |
| RCA | 1837.04 | KM | PALT | 98.9508 | KM | PER | 191.202 |
| APO | 3238.49 | KM | AALT | 1500.40 | KM | TA | 154.907 |
| LAT | 23.4182 | DEG | LONG | 243.189 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 236Y ITEM NO. 99

5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 195 , 09 HR , 20 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V1 TAPE NO. 997Y
 (^{ZZI}
 (5.2 EPOCH DAY ~~149~~, 20 ' 57 ' 0.000 GMT SEQ. NO. 100
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 674.98666 KM DX .07089377 KM/SEC
 (Y 1749.0988 KM DY .00230806 KM/SEC
 (Z -235.27229 KM DZ 1.8034316 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 12.00 M DX .12576 M/S X 12.00 M DX .1258 M/S
 (Y 28.40 M DY .34699 M/S Y 28.40 M DY .3470 M/S
 (Z 486.0 M DZ .05762 M/S Z 486.0 M DZ .0576 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.80 KM ECC .276406 APF 1.42443 DEG
 (LAN 62.7053 DEG INC 84.7832 DEG TFP -522.840 SEC
 (RCA 1836.34 KM PALT 98.2465 KM PER 191.206 MIN
 (APO 3239.27 KM AALT 1501.18 KM TA 330.460 DEG
 (LAT 332.011 DEG LONG 59.9240 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 5038.1

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 127Y ITEM NO. 100

(5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT' PREPARED BY' GEO.S.GOODWIN
 (DAY 195 , 03 HR , 12 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V2.1 TAPE NO. 895Y

(~~222~~ ITEM NO. 101(5.2 EPOCH DAY ~~150~~, 3 ' 21 ' 0.000 GMT SEQ. NO. 101

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 679.34490 KM DX .02151908 KM/SEC

(Y 1741.7047 KM DY -.13011581 KM/SEC

(Z -49.451993 KM DZ 1.8148638 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 7.046 M DX .10518 M/S X 7.046 M DX .1052 M/S

(Y 43.37 M DY .25171 M/S Y 43.37 M DY .2517 M/S

(Z 354.4 M DZ .02278 M/S Z 354.4 M DZ .0228 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.78 KM ECC .276634 APF 1.31140 DEG

(LAN 59.1683 DEG INC 84.8351 DEG TFP -417.855 SEC

(RCA 1835.74 KM PALT 97.6549 KM PER 191.204 MIN

(APO 3239.82 KM AALT 1501.73 KM TA 336.217 DEG

(LAT 337.625 DEG LONG 57.0359 DEG

(5.6 LUNAR HARMONICS USED' LRC 7728B MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 164.55

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 648Y ITEM NO. 101

(5.10 REMARKS' MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT' | PREPARED BY' | J.E.HEDWALL 0000 |
| DAY 196 , 05 HR , 44 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V3.1 TAPE NO. 276Y

(~~ZZZ~~ ITEM NO. 102(5.2 EPOCH DAY ~~150~~, 9 : 49 : 0.000 GMT SEQ. NO. 102

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 656.56842 KM DX -.15552224 KM/SEC

(Y 1619.6501 KM DY -.58082707 KM/SEC

(Z 565.63308 KM DZ 1.7447098 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 26.01 M DX .06869 M/S X 26.01 M DX .0687 M/S

(Y 85.10 M DY .17338 M/S Y 85.10 M DY .1734 M/S

(Z 220.3 M DZ .05465 M/S Z 220.3 M DZ .0547 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.23 KM ECC .276468 APF 1.36589 DEG

(LAN 55.6026 DEG INC 84.8929 DEG TFP -75.8798 SEC

(RCA 1835.77 KM PALT 97.6767 KM PER 191.142 MIN

(APO 3238.69 KM AALT 1500.60 KM TA 355.629 DEG

(LAT 357.007 DEG LONG 55.3349 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5444.6

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 936Y ITEM NO. 102

(5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 196 , 06 HR , 56 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5A15 | TAPE NO. 276Y |
| (222 | ITEM NO. 102 |
| (5.2 EPOCH DAY 150 , 10 ' 52 ' 0.000 GMT | SEQ. NO. 102 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -1001.6329 KM | DX -.24971391 KM/SEC |
| (Y -2655.4796 KM | DY -.53211094 KM/SEC |
| (Z 893.45741 KM | DZ -1.0088931 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 37.24 M | DX .03109 M/S | X 37.24 M | DX .0311 M/S |
| (Y 78.44 M | DY .08479 M/S | Y 78.44 M | DY .0848 M/S |
| (Z 189.1 M | DZ .03501 M/S | Z 189.1 M | DZ .0350 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 2537.53 KM | ECC .276439 | APF 1.37471 DEG |
| (LAN 55.0207 DEG | INC 84.9025 DEG | TFP 3704.11 SEC |
| (RCA 1836.06 KM | PALT 97.9700 KM | PER 191.176 MIN |
| (APO 3239.01 KM | AALT 1500.92 KM | TA 140.186 DEG |
| (LAT 38.2599 DEG | LONG 230.987 DEG | |

(5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 936Y ITEM NO. 102

(5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|----------------------------|
| (TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| (DAY 196 , 07 HR , 02 MIN GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5V4 | TAPE NO. 276Y |
| (222 | ITEM NO. 102 |
| (5.2 EPOCH DAY 156 , 12 ' 51 ' 0.000 GMT | SEQ. NO. 102 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|---------------------|
| (X 663.58994 KM | DX .12481868 KM/SEC |
| (Y 1741.6577 KM | DY .12950032 KM/SEC |
| (Z -419.37356 KM | DZ 1.7799592 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 23.98 M | DX .10527 M/S | X 23.98 M | DX .1053 M/S |
| (Y 28.97 M | DY .27737 M/S | Y 28.97 M | DY .2774 M/S |
| (Z 400.2 M | DZ .07191 M/S | Z 400.2 M | DZ .0719 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2537.65 KM | ECC .276633 | APF 1.32763 DEG |
| (LAN 53.9252 DEG | INC 84.9236 DEG | TFP -623.355 SEC |
| (RCA 1835.66 KM | PALT 97.5652 KM | PER 191.190 MIN |
| (APO 3239.65 KM | AALT 1501.56 KM | TA 325.031 DEG |
| (LAT 326.508 DEG | LONG 50.5554 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

| | |
|-------------------------------------|--------------|
| (5.9 RESIDUAL PLOTS: TAPE NO. 936Y | ITEM NO. 102 |
|-------------------------------------|--------------|

| |
|---------------------------------|
| (5.10 REMARKS: MAP TIME REPORT |
|---------------------------------|

| | | |
|--|----------------------------|--------------|
| (TIME OF REPORT: DAY 196 , 07 HR , 08 MIN | PREPARED BY: GEO.S.GOODWIN | O.D. ANALYST |
|--|----------------------------|--------------|

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5V5.1 | TAPE NO. 276Y |
| (222 | ITEM NO. 102 |
| (5.2 EPOCH DAY 150 , 16 ' 10 ' 0.000 GMT | SEQ. NO. 102 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 667.24341 KM | DX -.11408985 KM/SEC |
| (Y 1659.6698 KM | DY -.48268925 KM/SEC |
| (Z 431.26128 KM | DZ 1.7749794 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 43.50 M | DX .17338 M/S | X 43.50 M | DX .1734 M/S |
| (Y 168.9 M | DY .43258 M/S | Y 168.9 M | DY .4326 M/S |
| (Z 580.4 M | DZ .10729 M/S | Z 580.4 M | DZ .1073 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|-----------------|------------------|
| (SMA 2537.23 KM | ECC .276611 | APF 1.34697 DEG |
| (LAN 52.0940 DEG | INC 84.9421 DEG | TFP -151.708 SEC |
| (RCA 1835.41 KM | PALT 97.3184 KM | PER 191.143 MIN |

| | | |
|-------------------|------------------|----------------|
| (APO 3239.06 KM | AALT 1500.97 KM | TA 351.269 DEG |
| (LAT 352.645 DEG | LONG 51.4395 DEG | |

(5.6 LUNAR HARMONICS USED' LRC 7/288 MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH' 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY'

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 936Y ITEM NO. 102

| |
|----------------------------------|
| (5.10 REMARKS' MAP TIME REPORT. |
| (|
| (|
| (|

| | |
|--|----------------------------|
| (TIME OF REPORT' DAY 196 , 07 HR , 13 MIN | PREPARED BY' GEO.S.GOODWIN |
| (GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V6 TAPE NO. 251Y

(222 ITEM NO. 103

(5.2 EPOCH DAY ~~150~~, 22 ' 33 ' 0.000 GMT SEQ. NO. 103

(HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 662.15086 KM DX -.13605349 KM/SEC

(Y 1636.3954 KM DY -.54028582 KM/SEC

(Z 509.44574 KM DZ 1.7588896 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 18.38 M DX .07793 M/S X 18.38 M DX .0779 M/S

(Y 58.94 M DY .11581 M/S Y 58.94 M DY .1158 M/S

(Z 157.3 M DZ .03146 M/S Z 157.3 M DZ .0315 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2536.87 KM ECC .276638 APF 1.26691 DEG

(LAN 48.5656 DEG INC 84.9752 DEG TFP -105.899 SEC

(RCA 1835.07 KM PALT 96.9811 KM PER 191.101 MIN

(APO 3238.66 KM AALT 1500.57 KM TA 353.899 DEG

(LAT 355.184 DEG LONG 48.1412 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5262.2

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 229Y ITEM NO. 103

(5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 196 , 09 HR , 28 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5A16.1 | TAPE NO. 251Y |
| (<u>223</u> | ITEM NO. 103 |
| (5.2 EPOCH DAY 151 , 3 ' 57 ' 0.000 GMT | SEQ. NO. 103 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -567.73402 KM | DX .40985397 KM/SEC |
| (Y -1154.6519 KM | DY 1.0762472 KM/SEC |
| (Z -2653.2021 KM | DZ -.25797515 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|---------------|
| (X 128.8 M | DX .03505 M/S | X 128.8 M | DX* .0350 M/S |
| (Y 238.2 M | DY .05221 M/S | Y 238.2 M | DY .0522 M/S |
| (Z 50.03 M | DZ .11191 M/S | Z 50.03 M | DZ .1119 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2537.08 KM | ECC .276802 | APF 1.22931 DEG |
| (LAN 45.5853 DEG | INC 85.0166 DEG | TFP -3600.70 SEC |
| (RCA 1834.81 KM | PALT 96.7193 KM | PER 191.125 MIN |
| (APO 3239.35 KM | AALT 1501.26 KM | TA 222.055 DEG |
| (LAT 316.920 DEG | LONG 230.262 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 229Y ITEM NO. 103

(5.10 REMARKS: MAP TIME REPORT

| | |
|--|-------------------------------|
| (TIME OF REPORT: DAY 196, 09 HR, 34 MIN | PREPARED BY: J.E.HEDWALL 0000 |
| (GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5V8A | TAPE NO. 113Y |
| (<u>223</u> | ITEM NO. 104 |
| (5.2 EPOCH DAY 151 , 8 ' 7 ' 0.000 GMT | SEQ. NO. 104 |
| (HR MIN SEC | COMPUTER B |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 657.46187 KM | DX -.15307598 KM/SEC |
| (Y 1614.8959 KM | DY -.58799869 KM/SEC |
| (Z 573.91723 KM | DZ 1.7435134 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 27.82 M | DX .09435 M/S | X 27.82 M | DX .0943 M/S |
| (Y 97.94 M | DY .20066 M/S | Y 97.94 M | DY .2007 M/S |
| (Z 268.3 M | DZ .06731 M/S | Z 268.3 M | DZ .0673 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2536.81 KM | ECC .276762 | APF 1.16223 DEG |
| (LAN 43.2824 DEG | INC 85.0391 DEG | TFP -67.0626 SEC |
| (RCA 1834.72 KM | PALT 96.6309 KM | PER 191.095 MIN |
| (APO 3238.91 KM | AALT 1500.82 KM | TA 356.133 DEG |
| (LAT 357.305 DEG | LONG 43.0483 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4496.7

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 130Y ITEM NO. 104

(5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|----------------------------|
| (TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| (DAY 197 , 03 HR , 50 MIN GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V8B TAPE NO. 113Y

(²²³ 5.2 EPOCH DAY ~~151~~, 11 18 0.000 GMT ITEM NO. 104

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 658.77840 KM DX -.14811873 KM/SEC

(Y 1618.8863 KM DY -.57919153 KM/SEC

(Z 561.27147 KM DZ 1.7468189 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 37.87 M DX .13130 M/S X 37.87 M DX .1313 M/S

(Y 138.9 M DY .29264 M/S Y 138.9 M DY .2926 M/S

(Z 396.3 M DZ .09783 M/S Z 396.3 M DZ .0978 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.80 KM ECC .276806 APF 1.15499 DEG

(LAN 41.5234 DEG INC 85.0775 DEG TFP -74.1142 SEC

(RCA 1834.60 KM PALT 96.5069 KM PER 191.093 MIN

(APO 3239.00 KM AALT 1500.91 KM TA 355.726 DEG

(LAT 356.893 DEG LONG 41.2555 DEG

(5.6 LUNAR HARMONICS USED: L.R.C. 7/28 B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 130Y ITEM NO. 104

(5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT: DAY 197, 03 HR, 55 MIN PREPARED BY: GEO.S.GOODWIN O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V9.1 TAPE NO. 578Y

5.2 EPOCH DAY ²²³~~151~~, 14 : 28 : 45.000 GMT ITEM NO. 105

HR MIN SEC SEQ. NO. 105

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 661.91381 | KM | DX | -.13519723 | KM/SEC |
| Y | 1630.9910 | KM | DY | -.55200473 | KM/SEC |
| Z | 523.27536 | KM | DZ | 1.7561356 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 28.62 | M | DX | .09474 | M/S | X | 28.62 | M | DX | .0947 | M/S |
| Y | 113.5 | M | DY | .26227 | M/S | Y | 113.5 | M | DY | .2623 | M/S |
| Z | 328.8 | M | DZ | .07719 | M/S | Z | 328.8 | M | DZ | .0772 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2536.82 | KM | ECC | .276864 | APF | 1.16293 | DEG | |
| LAN | 39.7708 | DEG | INC | 85.1305 | DEG | TFP | -95.8861 | SEC |
| RCA | 1834.47 | KM | PALT | 96.3799 | KM | PER | 191.096 | MIN |
| APO | 3239.18 | KM | AALT | 1501.09 | KM | TA | 354.472 | DEG |
| LAT | 355.650 | DEG | LONG | 39.3995 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4652.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 556Y ITEM NO. 105

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 199, 04 HR, 34 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5A17.1 | TAPE NO. 578Y |
| 223 | ITEM NO. 105 |
| 5.2 EPOCH DAY 151 , 18 ' 39 ' 0.000 GMT | SEQ. NO. 105 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -926.10114 KM | DX -.30212210 KM/SEC |
| Y -2505.3736 KM | DY -.65833742 KM/SEC |
| Z 1149.7367 KM | DZ -.95638215 KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 86.57 M | DX .05253 M/S | X 86.57 M | DX .0525 M/S |
| Y 203.3 M | DY .16023 M/S | Y 203.3 M | DY .1602 M/S |
| Z 328.0 M | DZ .07989 M/S | Z 328.0 M | DZ .0799 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 2536.99 KM | ECC .276981 | APF 1.14397 DEG |
| LAN 37.4675 DEG | INC 85.1676 DEG | TFP 3452.53 SEC |
| RCA 1834.29 KM | PALT 96.2043 KM | PER 191.115 MIN |
| APO 3239.69 KM | AALT 1501.60 KM | TA 134.608 DEG |
| LAT 44.0496 DEG | LONG 212.776 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 556Y ITEM NO. 105

5.10 REMARKS: MAP TIME REPORT

| | |
|------------------------|-------------------------------|
| TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| DAY 199, 04 HR, 37 MIN | GMT O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V10

TAPE NO.

(223

ITEM NO. 106 ~~106~~(5.2 EPOCH DAY ~~151~~, 20 ' 45 ' 0.000 GMTSEQ. NO. 106 ~~106~~

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 677.13969 KM DX .05207172 KM/SEC

(Y 1743.9827 KM DY -.07857671 KM/SEC

(Z -124.57206 KM DZ 1.8134846 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S

(Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S

(Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2537.71 KM ECC .277189 APF 1.09280 DEG

(LAN 36.3129 DEG INC 85.1080 DEG TFP -454.385 SEC

(RCA 1834.29 KM PALT 96.1951 KM PER 191.196 MIN

(APO 3241.13 KM AALT 1503.04 KM TA 334.161 DEG

(LAT 335.350 DEG LONG 34.0619 DEG

(5.6 LUNAR HARMONICS USED' LRC 7/28 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= .00000

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' ~~NOT AVAILABLE~~

5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT'
(DAY 183 , 08 HR , 04 MINPREPARED BY' G. S. G.
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V12

TAPE NO. 311Y

(5.2 EPOCH DAY ²²⁴ ~~100~~ , 6 ' 24 ' 0.000 GMT

ITEM NO. 107

SEQ. NO. 107

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 664.68584 KM

DX -.12303737 KM/SEC

(Y 1640.2231 KM

DY -.52885281 KM/SEC

(Z 490.31346 KM

DZ 1.7640366 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 26.24 M DX .09209 M/S

X 26.24 M DX .0921 M/S

(Y 93.66 M DY .23855 M/S

Y 93.66 M DY .2385 M/S

(Z 283.8 M DZ .06303 M/S

Z 283.8 M DZ .0630 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2536.85 KM ECC .277123 APF 1.14277 DEG

(LAN 31.0031 DEG INC 85.2057 DEG TFP -113.964 SEC

(RCA 1833.83 KM PALT 95.7400 KM PER 191.099 MIN

(APO 3239.87 KM AALT 1501.78 KM TA 353.427 DEG

(LAT 354.589 DEG LONG 30.5479 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN

SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:
(DAY 212 , 06 HR , 53 MINPREPARED BY:
GMTG.S.G.
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V13

TAPE NO.

(ZZ4

ITEM NO. 107 ~~107~~(5.2 EPOCH DAY ~~100~~, 9 35 0.000 GMTSEQ. NO. 107 ~~107~~

(HR MIN SEC

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 665.34094 KM DX -.11900030 KM/SEC

(Y 1643.1613 KM DY -.52206934 KM/SEC

(Z 480.30129 KM DZ 1.7661592 KM/SEC

(5.4 STANDARD DEVIATIONS

A PRIORI

(X 33.89 M DX .12046 M/S X 33.89 M DX .1205 M/S

(Y 129.5 M DY .32717 M/S Y 129.5 M DY .3272 M/S

(Z 408.3 M DZ .08781 M/S Z 408.3 M DZ .0878 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2536.88 KM ECC .277157 APF 1.16438 DEG

(LAN 29.2522 DEG INC 85.2423 DEG TFP -119.977 SEC

(RCA 1833.76 KM PALT 95.6741 KM PER 191.102 MIN

(APO 3239.99 KM AALT 1501.90 KM TA 353.080 DEG

(LAT 354.265 DEG LONG 28.7733 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:

PREPARED BY:

G.S.G.

(DAY 212, 06 HR, 58 MIN

GMT

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5A18.1 TAPE NO. 973Y

(²²⁴ ITEM NO. 108

(5.2 EPOCH DAY ~~100~~, 11 ' 48 ' 0.000 GMT SEQ. NO. 108

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -582.16858 KM DX .40744708 KM/SEC

(Y -1160.9767 KM DY 1.0751097 KM/SEC

(Z -2649.0052 KM DZ -.26245069 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 142.7 M DX .04763 M/S X 142.7 M DX .0476 M/S

(Y 258.8 M DY .04649 M/S Y 258.8 M DY .0465 M/S

(Z 66.61 M DZ .09953 M/S Z 66.61 M DZ .0995 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2536.60 KM ECC .277125 APF 1.16422 DEG

(LAN 28.0299 DEG INC 85.2590 DEG TFP -3605.18 SEC

(RCA 1833.64 KM PALT 95.5526 KM PER 191.070 MIN

(APO 3239.55 KM AALT 1501.46 KM TA 221.908 DEG

(LAT 317.111 DEG LONG 212.448 DEG

(5.6 LUNAR HARMONICS USED' LRC 7728 MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SOS= 1424.6

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 255Y ITEM NO. 108

(5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT' PREPARED BY' GEO. S. GOODWIN
 DAY 197 , 07 HR , 19 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V15.1 TAPE NO. 973Y

(²²⁴ ITEM NO. 108

(5.2 EPOCH DAY ~~180~~, 16 ' 3 ' 0.000 GMT SEQ. NO. 108

(HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 593.15429 KM DX -.29250870 KM/SEC

(Y 1384.1890 KM DY -.94561771 KM/SEC

(Z 1064.5379 KM DZ 1.5507271 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 82.33 M DX .16637 M/S X 82.33 M DX .1664 M/S

(Y 264.4 M DY .31640 M/S Y 264.4 M DY .3164 M/S

(Z 402.4 M DZ .21993 M/S Z 402.4 M DZ .2199 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2537.22 KM ECC .277285 APF 1.21475 DEG

(LAN 25.6938 DEG INC 85.3144 DEG TFP 228.714 SEC

(RCA 1833.69 KM PALT 95.5962 KM PER 191.141 MIN

(APO 3240.76 KM AALT 1502.67 KM TA 13.1561 DEG

(LAT 14.3218 DEG LONG 26.8928 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(0 000000 30/0000 30/0000 0 .0000 .0000

(5.9 RESIDUAL PLOTS: TAPE NO. 255Y ITEM NO. 108

(5.10 REMARKS: MAP TIME REPORT.

(TIME OF REPORT: DAY 197, 07 HR, 33 MIN PREPARED BY: GEO.S.GOODWIN O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5V16A | TAPE NO. 468Y |
| (| ITEM NO. 109 |
| (5.2 EPOCH DAY ²²⁴ 180 , 19 ' 9 ' 0.000 GMT | SEQ. NO. N.A. |
| (| COMPUTER G |
| | HR MIN SEC |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 659.66061 KM | DX -.14043653 KM/SEC |
| (Y 1618.6000 KM | DY -.58098330 KM/SEC |
| (Z 558.49828 KM | DZ 1.7475713 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 32.31 M | DX .13680 M/S | X 32.31 M | DX .1368 M/S |
| (Y 104.2 M | DY .24990 M/S | Y 104.2 M | DY .2499 M/S |
| (Z 265.8 M | DZ .06898 M/S | Z 265.8 M | DZ .0690 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2537.08 KM | ECC .277230 | APF 1.25427 DEG |
| (LAN 23.9916 DEG | INC 85.3128 DEG | TFP -76.9693 SEC |
| (RCA 1833.73 KM | PALT 95.6355 KM | PER 191.125 MIN |
| (APO 3240.44 KM | AALT 1502.35 KM | TA 355.558 DEG |
| (LAT 356.823 DEG | LONG 23.7308 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | |
|------------------------------------|--------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -6514.2 |
|------------------------------------|--------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 183 , 04 HR , 45 MIN GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| (5.1 O.D. IDENTIFICATION NO. 5V16B | TAPE NO. 468Y |
| (224 | ITEM NO. 109 |
| (5.2 EPOCH DAY 183 , 22, 20, 0.000 GMT | SEQ. NO. N.A. |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|------------------|----------------------|
| (X 660.15179 KM | DX -.13692619 KM/SEC |
| (Y 1621.2931 KM | DY -.57624722 KM/SEC |
| (Z 550.85172 KM | DZ 1.7492327 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-------------|---------------|-----------|--------------|
| (X 47.13 M | DX .16690 M/S | X 47.13 M | DX .1669 M/S |
| (Y 172.4 M | DY .39439 M/S | Y 172.4 M | DY .3944 M/S |
| (Z 473.7 M | DZ .11823 M/S | Z 473.7 M | DZ .1182 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-------------------|------------------|------------------|
| (SMA 2537.16 KM | ECC .277228 | APF 1.32013 DEG |
| (LAN 22.2465 DEG | INC 85.3583 DEG | TFP -82.4989 SEC |
| (RCA 1833.79 KM | PALT 95.7004 KM | PER 191.134 MIN |
| (APO 3240.54 KM | AALT 1502.45 KM | TA 355.239 DEG |
| (LAT 356.571 DEG | LONG 21.9677 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

| | |
|------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 183, 04 HR, 51 MIN GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5A19 TAPE NO. 468Y
 (225 ITEM NO. 109
 (5.2 EPOCH DAY ~~120~~, 2 ' 33 ' 0.000 GMT SEQ. NO. N.A.
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X -972.85265 KM DX -.27030244 KM/SEC
 (Y -2622.0587 KM DY -.56313513 KM/SEC
 (Z 960.22810 KM DZ -.99653247 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 161.1 M DX .08108 M/S X 161.1 M DX .0811 M/S
 (Y 270.5 M DY .24086 M/S Y 270.5 M DY .2409 M/S
 (Z 506.0 M DZ .09432 M/S Z 506.0 M DZ .0943 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2536.67 KM ECC .276960 APF 1.44003 DEG
 (LAN 19.9349 DEG INC 85.4044 DEG TFP 3631.41 SEC
 (RCA 1834.11 KM PALT 96.0193 KM PER 191.078 MIN
 (APO 3239.22 KM AALT 1501.13 KM TA 138.660 DEG
 (LAT 39.7457 DEG LONG 196.102 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 183 , 04 HR , 56 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V18 TAPE NO. 626Y

5.2 EPOCH DAY ~~120~~ ²²⁵, 7 : 54 : 0.000 GMT ITEM NO. 110

HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 653.77544 | KM | DX | -.16420661 | KM/SEC |
| Y | 1593.4333 | KM | DY | -.63542488 | KM/SEC |
| Z | 631.80748 | KM | DZ | 1.7267153 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 12.78 | M | DX | .10618 | M/S | X | 12.78 | M | DX | .1062 | M/S |
| Y | 51.57 | M | DY | .09929 | M/S | Y | 51.57 | M | DY | .0993 | M/S |
| Z | 116.1 | M | DZ | .03267 | M/S | Z | 116.1 | M | DZ | .0327 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2537.04 | KM | ECC | .277009 | APF | 1.49761 | DEG | |
| LAN | 16.9831 | DEG | INC | 85.2692 | DEG | TFP | -39.0548 | SEC |
| RCA | 1834.26 | KM | PALT | 96.1683 | KM | PER | 191.121 | MIN |
| APO | 3239.82 | KM | AALT | 1501.73 | KM | TA | 357.746 | DEG |
| LAT | 359.247 | DEG | LONG | 16.9208 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3349.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 708Y ITEM NO. 110

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 199, 03 HR, 57 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|------|----------|------------|
| 5.1 O.D. IDENTIFICATION NO. | 5V19 | TAPE NO. | 626Y |
| | 225 | ITEM NO. | 110 |
| 5.2 EPOCH DAY | 11 | 0 | 0.000 GMT |
| | HR | MIN | SEC |
| | | | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | |
|---|--------------|----|-------------------|
| X | 679.36758 KM | DX | -.00404280 KM/SEC |
| Y | 1726.9276 KM | DY | -.23869039 KM/SEC |
| Z | 90.589125 KM | DZ | 1.8133231 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 35.43 M | DX | .12291 M/S | X | 35.43 M | DX | .1229 M/S |
| Y | 43.72 M | DY | .17518 M/S | Y | 43.72 M | DY | .1752 M/S |
| Z | 236.4 M | DZ | .00885 M/S | Z | 236.4 M | DZ | .0088 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | |
|-----|-------------|------|-------------|-----|--------------|
| SMA | 2537.25 KM | ECC | .277000 | APF | 1.55183 DEG |
| LAN | 15.2792 DEG | INC | 85.2936 DEG | TFP | -343.922 SEC |
| RCA | 1834.43 KM | PALT | 96.3419 KM | PER | 191.144 MIN |
| APO | 3240.07 KM | AALT | 1501.98 KM | TA | 340.324 DEG |
| LAT | 341.939 DEG | LONG | 13.7409 DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 708Y ITEM NO. 110

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 199, 04 HR, 01 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A20
ZZ5TAPE NO. 392Y
ITEM NO. 1115.2 EPOCH DAY ~~120~~, 18 ' 29 ' 0.000 GMT
HR MIN SECSEQ. NO. 111
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -985.03503 | KM | DX | -.26265908 | KM/SEC |
| Y | -2644.0896 | KM | DY | -.54093718 | KM/SEC |
| Z | 911.06931 | KM | DZ | -1.0061872 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 85.86 M | DX | .03560 M/S | X | 85.86 M | DX | .0356 M/S |
| Y | 110.5 M | DY | .10352 M/S | Y | 110.5 M | DY | .1035 M/S |
| Z | 216.8 M | DZ | .03812 M/S | Z | 216.8 M | DZ | .0381 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2536.40 | KM | ECC | .276638 | APF | 1.76708 | DEG |
| LAN | 11.1599 | DEG | INC | 85.4067 | DEG | TFP | 3665.17 |
| RCA | 1834.73 | KM | PALT | 96.6433 | KM | PER | 191.048 |
| APO | 3238.06 | KM | AALT | 1499.97 | KM | TA | 139.397 |
| LAT | 38.6876 | DEG | LONG | 187.471 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3098.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 286Y ITEM NO. 111

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 199, 06 HR, 46 MIN GMTPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|---|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 5V21 | TAPE NO. | 392Y |
| | | ITEM NO. | 111 |
| 5.2 EPOCH | DAY ²²⁵ 120 , 20 : 49 : 0.000 GMT | SEQ. NO. | 111 |
| | HR MIN SEC | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 452.63583 | KM | DX | -.44323497 | KM/SEC |
| Y | 951.53646 | KM | DY | -1.2882951 | KM/SEC |
| Z | 1586.4079 | KM | DZ | 1.1662047 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 96.39 | M | DX | .08742 | M/S | X | 96.39 | M | DX | .0874 | M/S |
| Y | 321.7 | M | DY | .18135 | M/S | Y | 321.7 | M | DY | .1813 | M/S |
| Z | 263.6 | M | DZ | .26651 | M/S | Z | 263.6 | M | DZ | .2665 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2537.15 | KM | ECC | .276786 | APF | 1.84206 | DEG |
| LAN | 9.87292 | DEG | INC | 85.3990 | DEG | TFP | 600.020 |
| RCA | 1834.91 | KM | PALT | 96.8162 | KM | PER | 191.133 |
| APO | 3239.40 | KM | AALT | 1501.31 | KM | TA | 33.7452 |
| LAT | 35.4553 | DEG | LONG | 13.1582 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 286Y ITEM NO. 111

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 199, 06 HR, 49 MIN
 PREPARED BY: J.E.HEDWALL 0000
 GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V22 TAPE NO. 687Y
 225 ITEM NO. 112

5.2 EPOCH DAY ~~120~~, 23 ' 54 ' 0.000 GMT SEQ. NO. 112
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 589.02139 | KM | DX | -.30044866 | KM/SEC |
| Y | 1366.5966 | KM | DY | -.96908247 | KM/SEC |
| Z | 1092.4989 | KM | DZ | 1.5327726 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 34.96 | M | DX | .10592 | M/S | X | 34.96 | M | DX | .1059 | M/S |
| Y | 144.1 | M | DY | .17422 | M/S | Y | 144.1 | M | DY | .1742 | M/S |
| Z | 199.6 | M | DZ | .11543 | M/S | Z | 199.6 | M | DZ | .1154 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2536.91 | KM | ECC | .276699 | APF | 1.85494 | DEG | |
| LAN | 8.18602 | DEG | INC | 85.3804 | DEG | TFP | 236.059 | SEC |
| RCA | 1834.95 | KM | PALT | 96.8601 | KM | PER | 191.106 | MIN |
| APO | 3238.87 | KM | AALT | 1500.78 | KM | TA | 13.5583 | DEG |
| LAT | 15.3619 | DEG | LONG | 9.45804 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/288 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -1061.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 069Y ITEM NO. 112

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 DAY 199 , 07 HR , 47 MIN GMT O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V23.2

TAPE NO. 687Y

5.2 EPOCH DAY ²²⁶~~120~~, 3 ' 2 ' 0.000 GMT

ITEM NO. 112

HR MIN SEC

SEQ. NO. 112

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 636.22113 | KM | DX | -.21155020 | KM/SEC |
| Y | 1525.5569 | KM | DY | -.75998315 | KM/SEC |
| Z | 798.18108 | KM | DZ | 1.6693742 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 38.80 | M | DX | .12000 | M/S | X | 38.80 | M | DX | .1200 | M/S |
| Y | 162.5 | M | DY | .27075 | M/S | Y | 162.5 | M | DY | .2707 | M/S |
| Z | 329.6 | M | DZ | .12714 | M/S | Z | 329.6 | M | DZ | .1271 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2536.63 | KM | ECC | .276604 | APF | 1.88755 | DEG | |
| LAN | 6.46381 | DEG | INC | 85.3899 | DEG | TFP | 52.0784 | SEC |
| RCA | 1834.99 | KM | PALT | 96.9005 | KM | PER | 191.074 | MIN |
| APO | 3238.27 | KM | AALT | 1500.18 | KM | TA | 3.00251 | DEG |
| LAT | 4.87420 | DEG | LONG | 6.85780 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 069Y ITEM NO. 112

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 199 , 07 HR , 51 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V24 TAPE NO. 219Y
 226 ITEM NO. 113
 5.2 EPOCH DAY ~~120~~, 6 ' 10 ' 0.000 GMT SEQ. NO. 113
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 666.94941 | KM | DX | -.11843479 | KM/SEC |
| Y | 1643.8527 | KM | DY | -.52899075 | KM/SEC |
| Z | 483.07373 | KM | DZ | 1.7625911 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 30.36 | M | DX | .13109 | M/S | X | 30.36 | M | DX | .1311 | M/S |
| Y | 40.47 | M | DY | .10485 | M/S | Y | 40.47 | M | DY | .1048 | M/S |
| Z | 105.5 | M | DZ | .02391 | M/S | Z | 105.5 | M | DZ | .0239 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2537.07 | KM | ECC | .276682 | APF | 1.91956 | DEG | |
| LAN | 4.73085 | DEG | INC | 85.3367 | DEG | TFP | -131.681 | SEC |
| RCA | 1835.11 | KM | PALT | 97.0207 | KM | PER | 191.124 | MIN |
| APO | 3239.03 | KM | AALT | 1500.94 | KM | TA | 352.417 | DEG |
| LAT | 354.355 | DEG | LONG | 4.26889 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4256.7

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 314Y ITEM NO. 113

5.10 REMARKS: MAP TIME REPORT.

TIME OF REPORT: DAY 199, 08 HR, 52 MIN
 PREPARED BY: GEO.S.GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5V25 | TAPE NO. 219Y |
| 226 | ITEM NO. 113 |
| 5.2 EPOCH DAY 120 , 9 ' 38 ' 0.000 GMT | SEQ. NO. 113 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|----------------|----------------------|
| X 312.49162 KM | DX -.51973405 KM/SEC |
| Y 559.23289 KM | DY -1.4349607 KM/SEC |
| Z 1872.8310 KM | DZ .83140488 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 105.0 M | DX .10162 M/S | X 105.0 M | DX .1016 M/S |
| Y 156.4 M | DY .06010 M/S | Y 156.4 M | DY .0601 M/S |
| Z 73.07 M | DZ .11451 M/S | Z 73.07 M | DZ .1145 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 2535.97 KM | ECC .276369 | APF 1.94763 DEG |
| LAN 2.82022 DEG | INC 85.3277 DEG | TFP 884.981 SEC |
| RCA 1835.11 KM | PALT 97.0153 KM | PER 190.999 MIN |
| APO 3236.83 KM | AALT 1498.74 KM | TA 48.4399 DEG |
| LAT 50.1581 DEG | LONG 8.44118 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 314Y ITEM NO. 113

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 199, 08 HR, 55 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5A21 226 | TAPE NO. 219Y |
| | ITEM NO. 113 |
| 5.2 EPOCH DAY 126 , 10 ' 24 ' 0.000 GMT | SEQ. NO. 113 |
| HR MIN SEC | COMPUTER B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -984.25641 KM | DX -.26481766 KM/SEC |
| Y -2633.6855 KM | DY -.54853827 KM/SEC |
| Z 923.52358 KM | DZ -1.0046074 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 149.1 M | DX .04644 M/S | X 149.1 M | DX .0464 M/S |
|-----------|---------------|-----------|--------------|

| | | | |
|-----------|---------------|-----------|--------------|
| Y 83.84 M | DY .06313 M/S | Y 83.84 M | DY .0631 M/S |
| Z 119.7 M | DZ .02061 M/S | Z 119.7 M | DZ .0206 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 2536.27 KM | ECC .276499 | APF 1.94270 DEG |
| LAN 2.39817 DEG | INC 85.3233 DEG | TFP 3644.79 SEC |
| RCA 1835.00 KM | PALT 96.9058 KM | PER 191.034 MIN |
| APO 3237.55 KM | AALT 1499.46 KM | TA 138.942 DEG |
| LAT 38.9602 DEG | LONG 178.605 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | |
|----------------------------------|------------|
| 5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|----------------------------------|------------|

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

| | |
|-----------------------------------|--------------|
| 5.9 RESIDUAL PLOTS: TAPE NO. 314Y | ITEM NO. 113 |
|-----------------------------------|--------------|

5.10 REMARKS: MAP TIME REPORT.

| | |
|--|--|
| TIME OF REPORT: DAY 199, 08 HR, 58 MIN | PREPARED BY: GEO.S.GOODWIN O.D. ANALYST |
|--|--|

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V26.1

TAPE NO. 441Y

5.2 EPOCH DAY ²²⁶~~120~~, 12 : 39 : 0.000 GMT
HR MIN SECITEM NO. 114
SEQ. NO. ~~114~~
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 574.36085 | KM | DX | -.32263948 | KM/SEC |
| Y | 1319.3420 | KM | DY | -1.0189536 | KM/SEC |
| Z | 1164.2957 | KM | DZ | 1.4907281 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 64.45 | M | DX | .16041 | M/S | X | 64.45 | M | DX | .1604 | M/S |
| Y | 83.10 | M | DY | .10509 | M/S | Y | 83.10 | M | DY | .1051 | M/S |
| Z | 108.5 | M | DZ | .06690 | M/S | Z | 108.5 | M | DZ | .0669 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2536.73 | KM | ECC | .276565 | APF | 1.96602 | DEG | |
| LAN | 1.17694 | DEG | INC | 85.3653 | DEG | TFP | 281.725 | SEC |
| RCA | 1835.16 | KM | PALT | 97.0674 | KM | PER | 191.085 | MIN |
| APO | 3238.30 | KM | AALT | 1500.21 | KM | TA | 16.1502 | DEG |
| LAT | 18.0549 | DEG | LONG | 2.69124 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7728B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5645.6

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 186 , 04 HR , 29 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V27A

TAPE NO. 441Y

ITEM NO. 114

5.2 EPOCH DAY ~~126~~, 15 ' 43 ' 0.000 GMT
HR MIN SECSEQ. NO. ~~114~~
COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

X 667.50063 KM
Y 1648.6163 KM
Z 468.19311 KMDX -.11287497 KM/SEC
DY -.51870657 KM/SEC
DZ 1.7654618 KM/SEC

5.4 STANDARD DEVIATIONS

A PRIORI

X 63.73 M DX .16279 M/S X 63.73 M DX .1628 M/S
Y 61.76 M DY .16230 M/S Y 61.76 M DY .1623 M/S
Z 190.2 M DZ .03955 M/S Z 190.2 M DZ .0395 M/S

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

SMA 2536.88 KM ECC .276584 APF 1.96962 DEG
LAN 359.500 DEG INC 85.3783 DEG TFP -141.012 SEC
RCA 1835.22 KM PALT 97.1280 KM PER 191.102 MIN
APO 3238.54 KM AALT 1500.45 KM TA 351.882 DEG
LAT 353.872 DEG LONG 359.003 DEG

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 186 , 04 HR , 32 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V27B

TAPE NO. 941Y

(226

ITEM NO. 115

(5.2 EPOCH DAY ~~120~~, 18 ' 54 ' 0.000 GMTSEQ. NO. ~~115~~

(HR MIN SEC

COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|-----|-----------|----|----|------------|--------|
| (X | 667.89979 | KM | DX | -.11179620 | KM/SEC |
| (Y | 1649.8713 | KM | DY | -.51560538 | KM/SEC |
| (Z | 464.14288 | KM | DZ | 1.7662961 | KM/SEC |

(5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|-----|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| (X | 33.70 | M | DX | .14645 | M/S | X | 33.70 | M | DX | .1465 | M/S |
| (Y | 40.79 | M | DY | .09023 | M/S | Y | 40.79 | M | DY | .0902 | M/S |
| (Z | 127.0 | M | DZ | .02303 | M/S | Z | 127.0 | M | DZ | .0230 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-------|---------|-----|------|---------|-----|---------|----------|-----|
| (SMA | 2537.14 | KM | ECC | .276614 | APF | 1.96429 | DEG | |
| (LAN | 357.749 | DEG | INC | 85.3731 | DEG | TFP | -143.219 | SEC |
| (RCA | 1835.34 | KM | PALT | 97.2462 | KM | PER | 191.132 | MIN |
| (APO | 3238.95 | KM | AALT | 1500.86 | KM | TA | 351.756 | DEG |
| (LAT | 353.741 | DEG | LONG | 357.241 | DEG | | | |

(5.6 LUNAR HARMONICS USED: LRC 7/288 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 4823.9

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:
DAY 183 , 09 HR , 30 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V28

TAPE NO. 941Y

(~~226~~
226

ITEM NO. 115

(5.2 EPOCH DAY ~~126~~, 22 ' 1 ' 0.000 GMT
HR MIN SECSEQ. NO. 115
COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|-----|-----------|----|----|------------|--------|
| (X | 679.28547 | KM | DX | .01559641 | KM/SEC |
| (Y | 1736.3280 | KM | DY | -.19720712 | KM/SEC |
| (Z | 29.246593 | KM | DZ | 1.8129130 | KM/SEC |

(5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|-----|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| (X | 51.06 | M | DX | .16179 | M/S | X | 51.06 | M | DX | .1618 | M/S |
| (Y | 37.92 | M | DY | .17237 | M/S | Y | 37.92 | M | DY | .1724 | M/S |
| (Z | 249.7 | M | DZ | .00597 | M/S | Z | 249.7 | M | DZ | .0060 | M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-------|---------|-----|------|---------|-----|---------|----------|-----|
| (SMA | 2536.90 | KM | ECC | .276510 | APF | 1.93849 | DEG | |
| (LAN | 356.041 | DEG | INC | 85.3944 | DEG | TFP | -384.863 | SEC |
| (RCA | 1835.42 | KM | PALT | 97.3329 | KM | PER | 191.105 | MIN |
| (APO | 3238.38 | KM | AALT | 1500.29 | KM | TA | 338.050 | DEG |
| (LAT | 340.056 | DEG | LONG | 354.365 | DEG | | | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT:

PREPARED BY: J.E.HEDWALL 0000

(DAY 183 , 09 HR , 35 MIN GMT

O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V29 TAPE NO. 941Y
 (227 ITEM NO. 115
 (5.2 EPOCH DAY ~~121~~, 1 20 0.000 GMT SEQ. NO. ~~115~~
 (HR MIN SEC COMPUTER G

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 626.92722 KM DX -.23255208 KM/SEC
 (Y 1492.9249 KM DY -.81049047 KM/SEC
 (Z 867.91895 KM DZ 1.6411610 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X 74.89 M DX .18640 M/S X 74.89 M DX .1864 M/S
 (Y 167.3 M DY .24119 M/S Y 167.3 M DY .2412 M/S

(Z 339.7 M DZ .13983 M/S Z 339.7 M DZ .1398 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2536.58 KM ECC .276419 APF 1.95716 DEG
 (LAN 354.225 DEG INC 85.3947 DEG TFP 93.0170 SEC
 (RCA 1835.42 KM PALT 97.3285 KM PER 191.068 MIN
 (APO 3237.74 KM AALT 1499.65 KM TA 5.35818 DEG
 (LAT 7.29159 DEG LONG 354.815 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

(TIME OF REPORT: PREPARED BY: J.E.HEDWALL 0000
 (DAY 183, 09 HR, 40 MIN GMT O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|---|-------------------------|
| (5.1 O.D. IDENTIFICATION NO. 5A22 | TAPE NO. 941Y |
| (227 | ITEM NO. 115 |
| (5.2 EPOCH DAY 121 , 2 ' 19 ' 0.000 GMT | SEQ. NO. 115 |
| (HR MIN SEC | COMPUTER G |

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-------------------|----------------------|
| (X -977.95787 KM | DX -.26749362 KM/SEC |
| (Y -2627.9732 KM | DY -.55429223 KM/SEC |
| (Z 935.47130 KM | DZ -1.0026327 KM/SEC |

(5.4 STANDARD DEVIATIONS A PRIORI

| | |
|---------------------------|------------------------|
| (X 155.2 M DX .08047 M/S | X 155.2 M DX .0805 M/S |
| (Y 122.7 M DY .11007 M/S | Y 122.7 M DY .1101 M/S |
| (Z 252.0 M DZ .04853 M/S | Z 252.0 M DZ .0485 M/S |

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-------------------|------------------|-----------------|
| (SMA 2536.25 KM | ECC .276329 | APF 1.94611 DEG |
| (LAN 353.684 DEG | INC 85.3936 DEG | TFP 3633.12 SEC |
| (RCA 1835.41 KM | PALT 97.3165 KM | PER 191.031 MIN |
| (APO 3237.08 KM | AALT 1498.99 KM | TA 138.672 DEG |
| (LAT 39.2301 DEG | LONG 169.912 DEG | |

(5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

| | |
|------------------------------------|------------|
| (5.7 DATA ARC LENGTH: 0 HRS 0 MIN | SOS= -.0E+ |
|------------------------------------|------------|

(5.8 DATA SUMMARY:

| (STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|-----------|-----------|------------|-----------|---------------|--------------------|-------|
| (0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

| | |
|--------------------------------|-------------------------------|
| (TIME OF REPORT: | PREPARED BY: J.E.HEDWALL 0000 |
| (DAY 183 , 09 HR , 44 MIN GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V30

TAPE NO. 155Y

ITEM NO. 116

5.2 EPOCH DAY ~~121~~ 227, 4 15 0.000 GMT
HR MIN SEC

SEQ. NO. 116

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 616.18317 | KM | DX | .23757101 | KM/SEC |
| Y | 1684.8417 | KM | DY | .39033597 | KM/SEC |
| Z | -825.29362 | KM | DZ | 1.6802254 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 130.7 | M | DX | .12259 | M/S | X | 130.7 | M | DX | .1226 | M/S |
| Y | 64.15 | M | DY | .13506 | M/S | Y | 64.15 | M | DY | .1351 | M/S |
| Z | 210.5 | M | DZ | .06636 | M/S | Z | 210.5 | M | DZ | .0664 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2535.72 | KM | ECC | .276144 | APF | 1.96454 | DEG | |
| LAN | 352.618 | DEG | INC | 85.3715 | DEG | TFP | -868.547 | SEC |
| RCA | 1835.50 | KM | PALT | 97.4084 | KM | PER | 190.972 | MIN |
| APO | 3235.95 | KM | AALT | 1497.86 | KM | TA | 312.393 | DEG |
| LAT | 314.548 | DEG | LONG | 347.900 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 5306.1

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 641Y ITEM NO. 116

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 200, 05 HR, 16 MINPREPARED BY: J.E.HEDWALL 0003
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|--|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 5V31 | TAPE NO. | 155Y |
| 5.2 EPOCH | DAY ²²⁷ 121 , 7 ' 53 ' 0.000 GMT | ITEM NO. | 116 |
| | HR MIN SEC | SEQ. NO. | 116 |
| | | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 381.53934 | KM | DX | -.48713096 | KM/SEC |
| Y | 749.12371 | KM | DY | -1.3780055 | KM/SEC |
| Z | 1750.3090 | KM | DZ | .99017607 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 141.8 M | DX | .13409 M/S | X | 141.8 M | DX | .1341 M/S |
| Y | 266.5 M | DY | .11291 M/S | Y | 266.5 M | DY | .1129 M/S |
| Z | 183.3 M | DZ | .22660 M/S | Z | 183.3 M | DZ | .2266 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2536.20 | KM | ECC | .276164 | APF | 1.97546 | DEG |
| LAN | 350.634 | DEG | INC | 85.3956 | TFP | 750.023 | SEC |
| RCA | 1835.79 | KM | PALT | 97.7023 | KM | PER | 191.025 |
| APO | 3236.60 | KM | AALT | 1498.51 | KM | TA | 41.5938 |
| LAT | 43.3937 | DEG | LONG | 355.001 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 641Y ITEM NO. 116

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|-------------------|
| TIME OF REPORT: | PREPARED BY: | J.E. REDWALL 0000 |
| DAY 200, 05 HR, 20 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V32 TAPE NO. 144Y
 227 ITEM NO. 117
 5.2 EPOCH DAY ~~121~~, 10 ' 53 ' 0.000 GMT SEQ. NO. 117
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 627.50747 | KM | DX | -.23609627 | KM/SEC |
| Y | 1495.7439 | KM | DY | -.80523011 | KM/SEC |
| Z | 863.29179 | KM | DZ | 1.6430312 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 49.31 | M | DX | .25019 | M/S | X | 49.31 | M | DX | .2502 | M/S |
| Y | 125.9 | M | DY | .16461 | M/S | Y | 125.9 | M | DY | .1646 | M/S |
| Z | 249.1 | M | DZ | .10117 | M/S | Z | 249.1 | M | DZ | .1012 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2536.85 | KM | ECC | .276320 | APF | 2.00557 | DEG | |
| LAN | 348.969 | DEG | INC | 85.2312 | DEG | TFP | 89.3271 | SEC |
| RCA | 1835.87 | KM | PALT | 97.7760 | KM | PER | 191.099 | MIN |
| APO | 3237.83 | KM | AALT | 1499.74 | KM | TA | 5.14380 | DEG |
| LAT | 7.12449 | DEG | LONG | 349.567 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -25889

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 543Y ITEM NO. 117

5.10 REMARKS: MAP TIME REPORT.

TIME OF REPORT: DAY 200, 07 HR, 05 MIN
 PREPARED BY: GEO. S. GOODWIN
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|-------------------------|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 5V33 | TAPE NO. | 813Y |
| | 227 | ITEM NO. | 118 |
| 5.2 EPOCH | DAY 121 , 17 | 0.000 | GMT |
| | HR MIN SEC | | |
| | | SEQ. NO. | 118 |
| | | COMPUTER | B |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 640.89052 | KM | DX | -.20758954 | KM/SEC |
| Y | 1542.7370 | KM | DY | -.73185575 | KM/SEC |
| Z | 762.75113 | KM | DZ | 1.6816142 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 39.79 M | DX | .10865 M/S | X | 39.79 M | DX | .1086 M/S |
| Y | 101.0 M | DY | .18668 M/S | Y | 101.0 M | DY | .1867 M/S |
| Z | 225.0 M | DZ | .08165 M/S | Z | 225.0 M | DZ | .0817 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2536.72 | KM | ECC | .276113 | APF | 2.05824 | DEG |
| LAN | 345.484 | DEG | INC | 85.1712 | TFP | 27.0795 | SEC |
| RCA | 1836.30 | KM | PALT | 98.2090 | KM | PER | 191.084 |
| APO | 3237.14 | KM | AALT | 1499.05 | KM | TA | 1.60557 |
| LAT | 3.65079 | DEG | LONG | 345.793 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -7421.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 483Y ITEM NO. 118

5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.E.HEDWALL 0000 |
| DAY 200 , 08 HR , 12 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V34

TAPE NO. 813Y

5.2 EPOCH DAY ~~122~~²²⁷, 20 ' 21 ' 0.000 GMT
 HR MIN SEC

ITEM NO. 118
 SEQ. NO. 118
 COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 675.75812 | KM | DX | -.08199061 | KM/SEC |
| Y | 1682.4658 | KM | DY | -.42567608 | KM/SEC |
| Z | 344.74317 | KM | DZ | 1.7866402 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 48.36 M | DX | .11896 M/S | X | 48.36 M | DX | .1190 M/S |
| Y | 85.48 M | DY | .28769 M/S | Y | 85.48 M | DY | .2877 M/S |
| Z | 363.6 M | DZ | .05452 M/S | Z | 363.6 M | DZ | .0545 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|-----|
| SMA | 2536.57 | KM | ECC | .275963 | APF | 2.07300 | DEG |
| LAN | 343.776 | DEG | INC | 85.1891 | TFP | -212.563 | SEC |
| RCA | 1836.57 | KM | PALT | 98.4836 | PER | 191.066 | MIN |
| APO | 3236.57 | KM | AALT | 1496.48 | TA | 347.801 | DEG |
| LAT | 349.910 | DEG | LONG | 342.917 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 483Y ITEM NO. 118

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 200, 08 HR, 15 MIN
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V35

TAPE NO. 272Y

227

ITEM NO. 119

5.2 EPOCH DAY ~~111~~, 23 ' 38 ' 0.000 GMT

SEQ. NO. 119

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 612.64546 | KM | DX | -.26185552 | KM/SEC |
| Y | 1447.6008 | KM | DY | -.87417609 | KM/SEC |
| Z | 958.52225 | KM | DZ | 1.6000705 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 55.21 M | DX | .16587 M/S | X | 55.21 M | DX | .1659 M/S |
| Y | 147.8 M | DY | .18272 M/S | Y | 147.8 M | DY | .1827 M/S |
| Z | 258.7 M | DZ | .12172 M/S | Z | 258.7 M | DZ | .1217 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2536.61 | KM | ECC | .275887 | APF | 2.06487 | DEG |
| LAN | 342.004 | DEG | INC | 85.3243 | DEG | TFP | 146.837 |
| RCA | 1836.79 | KM | PALT | 98.6989 | KM | PER | 191.072 |
| APO | 3236.42 | KM | AALT | 1498.33 | KM | TA | 8.45936 |
| LAT | 10.4689 | DEG | LONG | 342.870 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SCS= 752.82

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 732Y ITEM NO. 119

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:

DAY 201, 03 HR, 08 MIN

PREPARED BY:

GMT

J.E. HEDWALL 0000

O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V36 TAPE NO. 272Y
 5.2 EPOCH DAY ~~12~~²²⁸, 2 47 0.000 GMT ITEM NO. 119
 HR MIN SEC SEQ. NO. 119
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 640.50189 | KM | DX | -.20215993 | KM/SEC |
| Y | 1544.0986 | KM | DY | -.73313231 | KM/SEC |
| Z | 762.20126 | KM | DZ | 1.6809839 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 55.93 | M | DX | .19627 | M/S | X | 55.93 | M | DX | .1963 | M/S |
| Y | 181.6 | M | DY | .28875 | M/S | Y | 181.6 | M | DY | .2888 | M/S |
| Z | 399.7 | M | DZ | .14225 | M/S | Z | 399.7 | M | DZ | .1423 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2536.45 | KM | ECC | .275723 | APF | 2.08813 | DEG |
| LAN | 340.278 | DEG | INC | 85.3424 | TFP | 26.8239 | SEC |
| RCA | 1837.09 | KM | PALT | 99.0014 | PER | 191.054 | MIN |
| APO | 3235.81 | KM | AALT | 1497.72 | TA | 1.54354 | DEG |
| LAT | 3.61966 | DEG | LONG | 340.573 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/26B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 732Y ITEM NO. 119

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 201, 03 HR, 11 MIN
 PREPARED BY: J.E. HEDWALL 0000
 O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V37 TAPE NO. 046Y
 228 ITEM NO. 120
 5.2 EPOCH DAY ~~120~~, 5 ' 58 ' C.000 GMT SEQ. NO. 120
 HR MIN SEC COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 640.38612 | KM | DX | -.20374486 | KM/SEC |
| Y | 1543.5696 | KM | DY | -.73434773 | KM/SEC |
| Z | 763.98093 | KM | DZ | 1.6800137 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 37.90 | M | DX | .13075 | M/S | X | 37.90 | M | DX | .1308 | M/S |
| Y | 120.4 | M | DY | .18995 | M/S | Y | 120.4 | M | DY | .1899 | M/S |
| Z | 257.5 | M | DZ | .09167 | M/S | Z | 257.5 | M | DZ | .0917 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2536.32 | KM | ECC | .275586 | APF | 2.16383 | DEG | |
| LAN | 338.528 | DEG | INC | 85.3122 | DEG | TFP | 26.5289 | SEC |
| RCA | 1837.35 | KM | PALT | 99.2590 | KM | PER | 191.040 | MIN |
| APO | 3235.30 | KM | AALT | 1497.21 | KM | TA | 1.52617 | DEG |
| LAT | 3.67763 | DEG | LONG | 338.830 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -15566

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 011Y ITEM NO. 120

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: PREPARED BY: J.A.BEACON 0000
 DAY 200, 09 HR, 42 MIN GMT C.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A23

TAPE NO. 046Y

5.2 EPOCH DAY ²²⁸~~120~~, 10 ' 9 ' 0.000 GMT
HR MIN SEC

ITEM NO. 120

SEQ. NO. 120

COMPUTER 8

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -979.59497 | KM | DX | -.26609708 | KM/SEC |
| Y | -2624.5692 | KM | DY | -.55399976 | KM/SEC |
| Z | 930.46855 | KM | DZ | -1.0052851 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 128.4 | M | DX | .06417 | M/S | X | 128.4 | M | DX | .0642 | M/S |
| Y | 131.9 | M | DY | .13193 | M/S | Y | 131.9 | M | DY | .1319 | M/S |
| Z | 292.7 | M | DZ | .05599 | M/S | Z | 292.7 | M | DZ | .0560 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2535.84 | KM | ECC | .275262 | APF | 2.24140 | DEG | |
| LAN | 336.218 | DEG | INC | 85.3060 | DEG | TFP | 3626.33 | SEC |
| RCA | 1837.82 | KM | PALT | 99.7285 | KM | PER | 190.985 | MIN |
| APO | 3233.86 | KM | AALT | 1495.77 | KM | TA | 136.462 | DEG |
| LAT | 39.1395 | DEG | LONG | 152.386 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 011Y ITEM NO. 120

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 200, 09 HR, 45 MINPREPARED BY: J.A. BEACON 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V38
228
 5.2 EPOCH DAY ~~120~~, 12 ' 28 ' 0.000 GMT
HR MIN SEC
 TAPE NO. 456Y
 ITEM NO. 121
 SEQ. NO. 121
 COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 490.02498 | KM | DX | -.41245658 | KM/SEC |
| Y | 1063.7954 | KM | DY | -1.2257266 | KM/SEC |
| Z | 1480.5395 | KM | DZ | 1.2603820 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 72.88 | M | DX | .11454 | M/S | X | 72.88 | M | DX | .1145 | M/S |
| Y | 159.8 | M | DY | .10605 | M/S | Y | 159.8 | M | DY | .1061 | M/S |
| Z | 155.7 | M | DZ | .13861 | M/S | Z | 155.7 | M | DZ | .1386 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|-----|---------|-----|
| SMA | 2536.42 | KM | ECC | .275348 | | APF | 2.21295 | DEG |
| LAN | 334.978 | DEG | INC | 85.4301 | DEG | TFP | 506.725 | SEC |
| RCA | 1838.02 | KM | PALT | 99.9288 | KM | PER | 191.050 | MIN |
| APO | 3234.81 | KM | AALT | 1496.72 | KM | TA | 28.6142 | DEG |
| LAT | 30.7185 | DEG | LONG | 337.700 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS. 0 MIN SOS= 1622.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 921Y ITEM NO. 121

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|-----------------|
| TIME OF REPORT: | PREPARED BY: | J.A.BEACON 0000 |
| DAY 201, 04 HR, 54 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | |
|--|---------------|
| 5.1 O.D. IDENTIFICATION NO. 5A24 | TAPE NO. 446Y |
| 228 | ITEM NO. 122 |
| 5.2 EPOCH DAY 128 , 19 ' 42 ' 0.000 GMT | SEQ. NO. 122 |
| HR MIN SEC | COMPUTER G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | |
|-----------------|----------------------|
| X -986.82038 KM | DX -.26348748 KM/SEC |
| Y -2625.1512 KM | DY -.55037858 KM/SEC |
| Z 920.01011 KM | DZ -1.0079972 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | |
|-----------|---------------|-----------|--------------|
| X 139.6 M | DX .03682 M/S | X 139.6 M | DX .0368 M/S |
| Y 24.98 M | DY .01970 M/S | Y 24.98 M | DY .0197 M/S |
| Z 79.85 M | DZ .01978 M/S | Z 79.85 M | DZ .0198 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | |
|-----------------|------------------|-----------------|
| SMA 2535.42 KM | ECC .274894 | APF 2.42029 DEG |
| LAN 330.939 DEG | INC 85.1647 DEG | TFP 3628.59 SEC |
| RCA 1838.45 KM | PALT 100.357 KM | PER 190.937 MIN |
| APO 3232.39 KM | AALT 1494.30 KM | TA 138.505 DEG |
| LAT 38.9092 DEG | LONG 147.024 DEG | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SCS= 1919.2

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 973Y ITEM NO. 122

5.10 REMARKS: MAP TIME REPORT.

| | |
|--------------------------|----------------------------|
| TIME OF REPORT: | PREPARED BY: GEO.S.GOODWIN |
| DAY 201 , 06 HR , 16 MIN | GMT O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V40

TAPE NO. 446Y

5.2 EPOCH DAY ~~120~~ ²²⁹, 1 ' 6 ' 0.000 GMT
HR MIN SECITEM NO. 122
SEQ. NO. 122
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 610.87125 | KM | DX | -.27305436 | KM/SEC |
| Y | 1439.2166 | KM | DY | -.88619874 | KM/SEC |
| Z | 976.83781 | KM | DZ | 1.5892303 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 45.74 M | DX | .10373 M/S | X | 45.74 M | DX | .1037 M/S |
| Y | 127.6 M | DY | .17508 M/S | Y | 127.6 M | DY | .1751 M/S |
| Z | 217.8 M | DZ | .10595 M/S | Z | 217.8 M | DZ | .1059 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|-----|
| SMA | 2536.21 | KM | ECC | .274885 | APF | 2.48947 | DEG |
| LAN | 327.972 | DEG | INC | 85.1605 | TFP | 150.815 | SEC |
| RCA | 1839.04 | KM | PALT | 100.952 | PER | 191.026 | MIN |
| APO | 3233.37 | KM | AALT | 1495.28 | TA | 8.64800 | DEG |
| LAT | 11.0973 | DEG | LONG | 328.924 | | | |

5.6 LUNAR HARMONICS USED: LRC 7/288 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.00+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 973Y ITEM NO. 122

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|-----------------|
| TIME OF REPORT: | PREPARED BY: | GEO. S. GOODWIN |
| DAY 201, 06 HR, 20 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V41
229 TAPE NO. 4481
ITEM NO. 122
 5.2 EPOCH DAY ~~125~~, 4 ' 4 ' 0.000 GMT SEG. NO. 122
HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|-----------|--------|
| X | 669.44291 | KM | DX | .12193250 | KM/SEC |
| Y | 1750.9707 | KM | DY | .09730485 | KM/SEC |
| Z | -387.25074 | KM | DZ | 1.7789500 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| X | 71.54 | M | DX | .10522 | M/S | X | 71.54 | M | DX | .1052 | M/S |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 31.24 | M | DY | .27621 | M/S | Y | 31.24 | M | DY | .2762 | M/S |
| Z | 387.9 | M | DZ | .06065 | M/S | Z | 387.9 | M | DZ | .0607 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2535.69 | KM | ECC | .274653 | APF | 2.50197 | DEG | |
| LAN | 326.333 | DEG | INC | 85.1568 | DEG | TFP | -627.603 | SEC |
| RCA | 1839.25 | KM | PALT | 101.165 | KM | PER | 190.968 | MIN |
| APO | 3232.12 | KM | AALT | 1494.03 | KM | TA | 324.923 | DEG |
| LAT | 327.556 | DEG | LONG | 323.245 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 973Y ITEM NO. 122

5.10 REMARKS: MAP TIME REPORT.

| | | |
|------------------------|--------------|-----------------|
| TIME OF REPORT: | PREPARED BY: | GEO. S. GOODWIN |
| DAY 201, 06 HR, 23 MIN | GMT | O.D. ANALYST. |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V42A

TAPE NO. 985Y

229

ITEM NO. 0123

5.2 EPOCH DAY ~~120~~, 7 ' 22 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 123

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 676.65838 | KM | DX | -.09110542 | KM/SEC |
| Y | 1678.6770 | KM | DY | -.44638807 | KM/SEC |
| Z | 371.48145 | KM | DZ | 1.7793425 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 27.00 M | DX | .07147 M/S | X | 27.00 M | DX | .0715 M/S |
| Y | 30.17 M | DY | .07929 M/S | Y | 30.17 M | DY | .0793 M/S |
| Z | 101.7 M | DZ | .01648 M/S | Z | 101.7 M | DZ | .0165 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|
| SMA | 2536.00 | KM | ECC | .274742 | APF | 2.50991 | DEG |
| LAN | 324.522 | DEG | INC | 85.1711 | DEG | TFP | -205.960 |
| RCA | 1839.25 | KM | PALT | 101.160 | KM | PER | 191.002 |
| APO | 3232.74 | KM | AALT | 1494.65 | KM | TA | 348.209 |
| LAT | 350.752 | DEG | LONG | 323.734 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 780.94

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 186, 05 HR, 56 MINPREPARED BY: G. S. G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V42B

TAPE NO. 985Y

5.2 EPOCH DAY ²²⁹~~120~~, 10 33 0.000 GMT
HR MIN SEC

ITEM NO. 0123

SEQ. NO. 123

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 676.74517 | KM | DX | -.09258658 | KM/SEC |
| Y | 1677.6180 | KM | DY | -.44930425 | KM/SEC |
| Z | 375.58284 | KM | DZ | 1.7785914 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 31.06 M | DX | .08332 M/S | X | 31.06 M | DX | .0833 M/S |
| Y | 56.58 M | DY | .16068 M/S | Y | 56.58 M | DY | .1607 M/S |
| Z | 209.2 M | DZ | .03343 M/S | Z | 209.2 M | DZ | .0334 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|----------|---------|-----|
| SMA | 2535.89 | KM | ECC | .274683 | APF | 2.51881 | DEG | |
| LAN | 322.767 | DEG | INC | 85.1620 | TFP | -203.810 | SEC | |
| RCA | 1839.33 | KM | PALT | 101.236 | KM | PER | 190.991 | MIN |
| APO | 3232.46 | KM | AALT | 1494.37 | KM | TA | 348.332 | DEG |
| LAT | 350.884 | DEG | LONG | 321.989 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 186, 06 HR, 00 MINPREPARED BY: G.S.G.
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V43.2

TAPE NO. 985Y

229

ITEM NO. 0123

5.2 EPOCH DAY ~~120~~, 13 ' 40 ' 0.000 GMT
HR MIN SEC

SEQ. NO. 123

COMPUTER B

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | 684.32893 | KM | DX | .03075121 | KM/SEC |
| Y | 1747.2757 | KM | DY | -.13863085 | KM/SEC |
| Z | -51.781098 | KM | DZ | 1.8082272 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

X 38.66 M DX .10175 M/S X 38.66 M DX .1018 M/S

| | | | | | | | | | | | |
|---|-------|---|----|--------|-----|---|-------|---|----|-------|-----|
| Y | 28.94 | M | DY | .24438 | M/S | Y | 28.94 | M | DY | .2444 | M/S |
| Z | 333.4 | M | DZ | .00961 | M/S | Z | 333.4 | M | DZ | .0096 | M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|----------|-----|
| SMA | 2535.75 | KM | ECC | .274619 | APF | 2.51006 | DEG | |
| LAN | 321.046 | DEG | INC | 85.1564 | DEG | TFP | -441.079 | SEC |
| RCA | 1839.39 | KM | PALT | 101.297 | KM | PER | 190.975 | MIN |
| APO | 3232.12 | KM | AALT | 1494.03 | KM | TA | 335.020 | DEG |
| LAT | 337.615 | DEG | LONG | 319.046 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28 MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: ~~NOT AVAILABLE~~

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 186 , 06 HR , 05 MINPREPARED BY: G.S.GOODWIN
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5A25

TAPE NO. 452Y

~~124~~
229

ITEM NO. 124

5.2 EPOCH DAY ~~124~~, 17 ' 56 ' 0.000 GMT

SEQ. NO. 124

HR MIN SEC

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|------------|----|----|------------|--------|
| X | -946.05293 | KM | DX | -.29438469 | KM/SEC |
| Y | -2524.9630 | KM | DY | -.63289802 | KM/SEC |
| Z | 1082.2373 | KM | DZ | -.97669321 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 83.67 M | DX | .02217 M/S | X | 83.67 M | DX | .0222 M/S |
| Y | 57.54 M | DY | .04396 M/S | Y | 57.54 M | DY | .0440 M/S |
| Z | 106.7 M | DZ | .02649 M/S | Z | 106.7 M | DZ | .0265 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|
| SMA | 2535.49 | KM | ECC | .274451 | APF | 2.52253 | DEG |
| LAN | 318.668 | DEG | INC | 85.0703 | DEG | TFP | 3462.47 |
| RCA | 1839.62 | KM | PALT | 101.529 | KM | PER | 190.945 |
| APC | 3231.35 | KM | AALT | 1493.26 | KM | TA | 134.706 |
| LAT | 42.5754 | DEG | LONG | 134.123 | DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= 3343.2

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 287Y ITEM NO. 124

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 201 , 07 HR , 25 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V45.1

TAPE NO. 452Y

5.2 EPOCH DAY ~~229~~ ²²⁹, 23 ' 29 ' 0.000 GMT
HR MIN SECITEM NO. 124
SEQ. NO. 124
COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 476.46403 | KM | DX | -.43456021 | KM/SEC |
| Y | 1033.0313 | KM | DY | -1.2415780 | KM/SEC |
| Z | 1513.9844 | KM | DZ | 1.2302827 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 90.13 M | DX | .07080 M/S | X | 90.13 M | DX | .0708 M/S |
| Y | 272.4 M | DY | .17400 M/S | Y | 272.4 M | DY | .1740 M/S |
| Z | 255.0 M | DZ | .23179 M/S | Z | 255.0 M | DZ | .2318 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2535.38 | KM | ECC | .274291 | APF | 2.49428 | DEG | |
| LAN | 315.608 | DEG | INC | 85.0313 | TFP | 529.063 | SEC | |
| RCA | 1839.95 | KM | PALT | 101.859 | KM | PER | 190.933 | MIN |
| APO | 3230.81 | KM | AALT | 1492.72 | KM | TA | 29.7735 | DEG |
| LAT | 32.1320 | DEG | LONG | 318.738 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 287Y ITEM NO. 124

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT:
DAY 201, 07 HR, 28 MINPREPARED BY: J.E.HEDWALL 0000
O.D. ANALYST

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

| | | | |
|-----------------------------|---|----------|------|
| 5.1 O.D. IDENTIFICATION NO. | 5V46 | TAPE NO. | 849Y |
| | 230 | ITEM NO. | 125 |
| 5.2 EPOCH | DAY 120 , 2 ' 37 ' 0.000 GMT | SEQ. NO. | 125 |
| | HR MIN SEC | COMPUTER | G |

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | |
|---|--------------|----|-------------------|
| X | 547.28818 KM | DX | -.36884112 KM/SEC |
| Y | 1239.3586 KM | DY | -1.0923833 KM/SEC |
| Z | 1280.6364 KM | DZ | 1.4130130 KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 27.53 M | DX | .05907 M/S | X | 27.53 M | DX | .0591 M/S |
| Y | 70.99 M | DY | .06548 M/S | Y | 70.99 M | DY | .0655 M/S |
| Z | 79.32 M | DZ | .05769 M/S | Z | 79.32 M | DZ | .0577 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | |
|-----|-------------|------|-------------|-----|-------------|
| SMA | 2535.57 KM | ECC | .274362 | APF | 2.46648 DEG |
| LAN | 313.874 DEG | INC | 64.9918 DEG | TFP | 352.890 SEC |
| RCA | 1839.91 KM | PALT | 101.817 KM | PER | 190.955 MIN |
| APQ | 3231.23 KM | AALT | 1493.14 KM | TA | 20.0723 DEG |
| LAT | 22.4679 DEG | LONG | 315.951 DEG | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN S0S= 2239.8

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000C00 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 057Y ITEM NO. 125

5.10 REMARKS: MAP TIME REPORT.

| | | | |
|-----------------|------------------------|--------------|---------------|
| TIME OF REPORT: | DAY 201, 08 HR, 58 MIN | PREPARED BY: | GEO.S.GOODWIN |
| | | | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V48.

TAPE NO. 849Y

5.2 EPOCH DAY ~~120~~²³⁰, 8 : 58 : 0.000 GMT

ITEM NO. 125

SEQ. NO. 125

COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 566.70593 | KM | DX | -.34642771 | KM/SEC |
| Y | 1296.7388 | KM | DY | -1.0397595 | KM/SEC |
| Z | 1203.6918 | KM | DZ | 1.4639343 | KM/SEC |

5.4 STANDARD DEVIATIONS

A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 71.37 M | DX | .08317 M/S | X | 71.37 M | DX | .0832 M/S |
| Y | 207.2 M | DY | .20342 M/S | Y | 207.2 M | DY | .2034 M/S |
| Z | 276.6 M | DZ | .17533 M/S | Z | 276.6 M | DZ | .1753 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2535.58 | KM | ECC | .274320 | APF | 2.30508 | DEG | |
| LAN | 310.376 | DEG | INC | 84.9757 | TFP | 301.123 | SEC | |
| RCA | 1840.02 | KM | PALT | 101.931 | KM | PER | 190.956 | MIN |
| APO | 3231.15 | KM | AALT | 1493.06 | KM | TA | 17.1666 | DEG |
| LAT | 19.4735 | DEG | LONG | 312.158 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN SOS= -.0E+

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 057Y ITEM NO. 125

5.10 REMARKS: MAP TIME REPORT

| | | |
|------------------------|--------------|---------------|
| TIME OF REPORT: | PREPARED BY: | GEO.S.GOODWIN |
| DAY 201, 09 HR, 01 MIN | GMT | O.D. ANALYST |

5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

5.1 O.D. IDENTIFICATION NO. 5V49 TAPE NO. 564Y
 230 ITEM NO. 126
 5.2 EPOCH DAY ~~12~~, 12 ' 9 ' 0.000 GMT SEQ. NO. 126
 HR MIN SEC COMPUTER G

5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

| | | | | | |
|---|-----------|----|----|------------|--------|
| X | 565.62817 | KM | DX | -.34819967 | KM/SEC |
| Y | 1293.2233 | KM | DY | -1.0427272 | KM/SEC |
| Z | 1208.8060 | KM | DZ | 1.4608621 | KM/SEC |

5.4 STANDARD DEVIATIONS A PRIORI

| | | | | | | | |
|---|---------|----|------------|---|---------|----|-----------|
| X | 65.81 M | DX | .07957 M/S | X | 65.81 M | DX | .0796 M/S |
| Y | 187.5 M | DY | .18284 M/S | Y | 187.5 M | DY | .1828 M/S |
| Z | 249.9 M | DZ | .15975 M/S | Z | 249.9 M | DZ | .1598 M/S |

5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

| | | | | | | | | |
|-----|---------|-----|------|---------|-----|---------|---------|-----|
| SMA | 2535.53 | KM | ECC | .274289 | APF | 2.34151 | DEG | |
| LAN | 308.622 | DEG | INC | 84.9643 | DEG | TFP | 305.367 | SEC |
| RCA | 1840.07 | KM | PALT | 101.975 | KM | PER | 190.950 | MIN |
| APO | 3231.00 | KM | AALT | 1492.91 | KM | TA | 17.4046 | DEG |
| LAT | 19.6667 | DEG | LONG | 310.426 | DEG | | | |

5.6 LUNAR HARMONICS USED: LRC 7/28B MODIFIED

5.7 DATA ARC LENGTH: 0 HRS 0 MIN. SOS = -3950.3

5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

5.9 RESIDUAL PLOTS: TAPE NO. 404Y ITEM NO. 126

5.10 REMARKS: MAP TIME REPORT

TIME OF REPORT: DAY 232, 03 HR, 49 MIN GMT
 PREPARED BY: J.E.HEDWALL 0000
 O.D. ANALYST

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V50

TAPE NO. 802Y

(~~220~~
230

ITEM NO. 127

(5.2 EPOCH DAY ~~220~~, 18 ' 32 ' 0.000 GMT
HR MIN SEC

SEG. NO. 127

COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 540.64146 KM DX -.37883801 KM/SEC

(Y 1219.4259 KM DY -1.1070836 KM/SEC

(Z 1306.8689 KM DZ 1.3956781 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S

(Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S

(Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OFDATE)

(SMA 2535.44 KM ECC .274316 APF 2.28544 DEG

(LAN 305.093 DEG INC 84.9034 DEG TFP 375.014 SEC

(RCA 1839.93 KM PALT 101.839 KM PER 190.940 MIN

(APO 3230.95 KM AALT 1492.86 KM TA 21.3061 DEG

(LAT 23.4927 DEG LONG 307.315 DEG

(5.6 LUNAR HARMONICS USED: LRC 7/288 MODIFIED

(5.7 DATA ARC LENGTH: 0 HRS 0 MIN SCS= .00000

(5.8 DATA SUMMARY:

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS: TAPE NO. 985Y ITEM NO. 127

(5.10 REMARKS: MAP TIME REPORT

| | | |
|--------------------------|--------------|------------------|
| TIME OF REPORT: | PREPARED BY: | J.A. BEACON 0000 |
| DAY 203 , 04 HR , 31 MIN | GMT | O.D. ANALYST |

(5. ORBIT DETERMINATION REPORT (LUNAR ELLIPSE)

(5.1 O.D. IDENTIFICATION NO. 5V51 TAPE NO. 802Y
 (~~1~~ 230 ITEM NO. 127
 (5.2 EPOCH DAY ~~1~~, 21 ' 39 ' 0.000 GMT SEQ. NO. 127
 (HR MIN SEC COMPUTER B

(5.3 STATE VECTOR (SELENOCENTRIC 1950.0)

(X 618.11127 KM DX -.27332636 KM/SEC
 (Y 1452.9851 KM DY -.86292250 KM/SEC
 (Z 952.11892 KM DZ 1.6015213 KM/SEC

(5.4 STANDARD DEVIATIONS A PRIORI

(X .0000 M DX .00000 M/S X .0000 M DX .0000 M/S
 (Y .0000 M DY .00000 M/S Y .0000 M DY .0000 M/S
 (Z .0000 M DZ .00000 M/S Z .0000 M DZ .0000 M/S

(5.5 CORRESPONDING ORBITAL PARAMETERS (SELENOGRAPHIC TRUE OF DATE)

(SMA 2535.50 KM ECC .274323 APF 2.22831 DEG
 (LAN 303.376 DEG INC 84.8956 DEG TFP 140.015 SEC
 (RCA 1839.96 KM PALT 101.868 KM PER 190.947 MIN
 (APO 3231.05 KM AALT 1492.96 KM TA 8.02278 DEG
 (LAT 10.2100 DEG LONG 304.298 DEG

(5.6 LUNAR HARMONICS USED LRC 7/28B MODIFIED

(5.7 DATA ARC LENGTH' 0 HRS 0 MIN SCS= .00000

(5.8 DATA SUMMARY'

| STA NO. | DATA TYPE | START TIME | STOP TIME | NUMBER POINTS | STANDARD DEVIATION | MEAN |
|---------|-----------|------------|-----------|---------------|--------------------|-------|
| 0 | 000000 | 30/0000 | 30/0000 | 0 | .0000 | .0000 |

(5.9 RESIDUAL PLOTS' TAPE NO. 985Y ITEM NO. 127

(5.10 REMARKS' MAP TIME REPORT

(TIME OF REPORT' PREPARED BY' J.A. DEACON 0000
 (DAY 203 , 04 HR , 38 MIN GMT U.D. ANALYST

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