# PROJECT 10073 RECORD CARD

| 1. DATE | 2. LOCATION | 12. CONCLUSIONS |
|---|---|---|
| 14 June 1963 | OS ECHO (Atlantic) | ☐ Was Balloon<br>☐ Probably Balloon<br>☐ Possibly Balloon |
| **3. DATE-TIME GROUP**<br>Local _____<br>GMT 14/2301Z | **4. TYPE OF OBSERVATION**<br>☒ Ground-Visual ☐ Ground-Radar<br>☐ Air-Visual ☐ Air-Intercept Radar | ☐ Was Aircraft<br>☐ Probably Aircraft<br>☐ Possibly Aircraft |
| **5. PHOTOS**<br>☐ Yes<br>☒ No | **6. SOURCE**<br>Military | ☐ Was Astronomical<br>☐ Probably Astronomical<br>☐ Possibly Astronomical |
| **7. LENGTH OF OBSERVATION** | **8. NUMBER OF OBJECTS** / **9. COURSE** | ☒ Other Satellite ECHO I<br>☐ Insufficient Data for Evaluation<br>☐ Unknown |
| Not reported | one / NE | |

**10. BRIEF SUMMARY OF SIGHTING**

Satellite in transit from SW to NE.
1st mag. Estimated altitude 75 deg 30 min max.

**11. COMMENTS**

ECHO I. ECHO crossed equator at 2236Z at 74.41W and reached peak of orbit at 2304Z. This would place the Satellite in the area of the sighting.

ATIC FORM 329 (REV 26 SEP 52)

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE BRANCH
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 192 (15 Jun 63) A/rij

ACTION: NIN-9

INFO : XOP-1, XOPX-4, SAF-OS-3, ARMY-2, NAVY-2, CMC-8, JCS-35,
DIA-25, DIA/CIIC-2, OSD-15, NSA-7, CIA-11 (125)

SMB E 007

ZCZCHQA293ZCECA008-
OO RUEAHQ
DE RUEGUF 002
ZNR
O 142331Z
FM COMEASTAREA
TO RUCKHC/CINCLANTFLT
RUWGALB/CINCNORAD ENT AFB COLO
RUEAYQ/COFS USAF WASHDC
RUCKDT/COMASWFORLANT
RUEGUH/COMEASTSEAFRON
RCEOM/CANCOMARLANT
RCCSC/CANAIRDEF
INFO RUECJD/COMDT COGARD

P 142322Z
FM OS ECHO
TO COMEASTAREA
GR18
BT
UNCLAS. MERINT.

2301Z OBSERVED APPARENT SATELLITE TRANSIT SW TO NE. FIRST MAGNITUDE. EST MAX HEIGHT 75 DEGREES 30 MINUTES.

BT

NOTE: Adv cy to NIN, XOPX & DIA.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS

JUNE 5, 1963

SATELLITE 1960 IOTA 1, ECHO I

These predictions are based on orbital elements revised on June 5, 1963
$T_o$ = June 4.0, times are in days, U.T.
Argument of perigee = 276°306 + 3°387 $(t-T_o)$
Right ascension of ascending node = 203°044 - 3°2982 $(t-T_o)$

Inclination = 47°2357
Eccentricity = $0.044912 + 6.22 \times 10^{-4}\ (t-T_o)$
Semi-major axis = 7.842655 megameters
Mean anomaly (Rev.) = $0.32350 + 12.498859\ (t-T_o) + 3.0853 \times 10^{-4}\ (t-T_o)^2$

SATELLITE 1960 IOTA 1
FOR OTHER LATITUDES

| EQUATOR S-N TIME (UT) | EQUATOR S-N LONG. (W) | LAT. | SOUTH-NORTH TIME CORR. | SOUTH-NORTH LONG. CORR. | SOUTH-NORTH HT. (MI) | SOUTH-NORTH BEAR. (N-E) | NORTH-SOUTH TIME CORR. | NORTH-SOUTH LONG. CORR. | NORTH-SOUTH HT. (MI) | NORTH-SOUTH BEAR. (N-E) |
|---|---|---|---|---|---|---|---|---|---|---|
| **JUNE 8, 1963** | | | | | | | | | | |
| 1 35.0 | 90.67 | 47.4 | 29.9 | -82.43 | 1135 | 90.0° | 29.9 | -82.46 | 1135 | 90.0° |
| 3 34.1 | 118.79 | 45.0 | 24.2 | -60.68 | 1103 | 72.3° | 35.6 | -104.27 | 1147 | 107.7° |
| 5 28.2 | 148.90 | 40.0 | 19.8 | -45.43 | 1065 | 60.7° | 40.2 | -119.41 | 1141 | 119.4° |
| 7 20.3 | 178.02 | 35.0 | 16.5 | -35.86 | 1031 | 54.0° | 43.5 | -128.95 | 1126 | 126.1° |
| 9 10.4 | 207.14 | 30.0 | 13.7 | -28.56 | 999 | 48.4° | 46.3 | -134.22 | 1112 | 130.7° |
| 11 14.5 | 236.26 | 20.0 | 8.4 | -17.32 | 938 | 43.7° | 51.6 | -147.46 | 1071 | 136.4° |
| 13 4.6 | 265.37 | 0. | 0. | 0. | 828 | 40.0° | 60.9 | -164.59 | 971 | 140.1° |
| 15 4.7 | 294.49 | -20.0 | -8.4 | 17.41 | 740 | 43.8° | -45.4 | 148.98 | 842 | 136.3° |
| 16 59.8 | 323.61 | -30.0 | -12.9 | 28.78 | 708 | 49.5° | -40.7 | 137.64 | 807 | 130.5° |
| 18 54.9 | 352.73 | -35.0 | -15.3 | 36.16 | 696 | 54.1° | -38.7 | 130.31 | 780 | 126.0° |
| 20 50.0 | 21.84 | -40.0 | -18.1 | 45.84 | 687 | 60.8° | -35.9 | 120.65 | 752 | 119.2° |
| 22 45.1 | 50.96 | -45.0 | -21.8 | 61.19 | 689 | 72.4° | -31.4 | 105.32 | 721 | 107.6° |
| | | -47.4 | -26.4 | 83.24 | 698 | 90.0° | -26.6 | 83.28 | 699 | 90.0° |
| **JUNE 9, 1963** | | | | | | | | | | |
| 0 40.2 | 40.08 | 47.4 | 29.7 | -82.56 | 1133 | 90.0° | 29.8 | -82.60 | 1133 | 90.0° |
| 2 35.3 | 109.19 | 45.0 | 24.1 | -60.69 | 1097 | 72.3° | 35.5 | -104.30 | 1140 | 107.7° |
| 4 30.4 | 138.31 | 40.0 | 19.7 | -45.48 | 1056 | 60.7° | 40.0 | -119.44 | 1136 | 119.4° |
| 6 25.5 | 167.42 | 35.0 | 16.4 | -35.88 | 1021 | 54.0° | 43.4 | -128.98 | 1126 | 126.1° |
| 8 20.6 | 196.54 | 30.0 | 13.6 | -28.58 | 987 | 48.4° | 46.4 | -134.26 | 1121 | 130.7° |
| 10 15.7 | 225.66 | 20.0 | 8.7 | -17.33 | 925 | 43.7° | 51.6 | -147.42 | 1082 | 136.4° |
| 12 10.8 | 254.77 | 0. | 0. | 0. | 814 | 40.0° | 60.9 | -164.60 | 985 | 140.1° |
| 14 5.9 | 283.89 | -20.0 | -8.4 | 17.42 | 729 | 43.8° | -45.4 | 148.98 | 874 | 136.3° |
| 16 1.0 | 313.00 | -30.0 | -12.8 | 28.79 | 700 | 49.5° | -40.7 | 137.67 | 819 | 130.6° |
| 17 56.1 | 342.12 | -35.0 | -15.2 | 36.18 | 689 | 54.1° | -38.1 | 130.32 | 789 | 126.0° |
| 19 51.2 | 11.24 | -40.0 | -18.1 | 45.86 | 682 | 60.8° | -35.3 | 120.66 | 759 | 119.2° |
| 21 46.3 | 40.35 | -45.0 | -21.8 | 61.21 | 682 | 72.4° | -31.5 | 105.34 | 726 | 107.6° |
| 23 41.3 | 69.47 | -47.4 | -26.4 | 83.26 | 691 | 90.0° | -26.6 | 83.30 | 697 | 90.0° |
| **JUNE 10, 1963** | | | | | | | | | | |
| 0 36.4 | 98.58 | 47.4 | 29.6 | -82.69 | 1129 | 90.0° | 29.6 | -82.93 | 1129 | 90.0° |
| 2 31.9 | 127.70 | 45.0 | 24.0 | -60.86 | 1089 | 72.3° | 35.3 | -104.34 | 1130 | 107.7° |
| 4 26.6 | 156.81 | 40.0 | 19.6 | -45.48 | 1049 | 60.7° | 39.9 | -119.48 | 1131 | 119.4° |
| 7 21.7 | 185.93 | 35.0 | 16.3 | -35.81 | 1008 | 54.0° | 43.3 | -129.01 | 1143 | 126.1° |
| 9 16.8 | 215.04 | 30.0 | 13.5 | -28.60 | 974 | 48.4° | 46.2 | -134.27 | 1130 | 130.7° |
| 11 11.9 | 244.16 | 20.0 | 8.7 | -17.34 | 918 | 43.7° | 51.5 | -147.45 | 1094 | 136.4° |
| 13 7.0 | 273.27 | 0. | 0. | 0. | 800 | 40.0° | 60.8 | -164.61 | 999 | 140.2° |
| 15 2.1 | 302.38 | -20.0 | -8.3 | 17.43 | 718 | 43.8° | -45.4 | 148.99 | 887 | 136.3° |
| 16 57.2 | 331.50 | -30.0 | -12.7 | 28.81 | 691 | 49.5° | -40.7 | 137.66 | 829 | 130.6° |
| 18 52.2 | 0.61 | -35.0 | -15.2 | 36.19 | 682 | 54.1° | -38.1 | 130.33 | 799 | 126.0° |
| 20 47.3 | 29.73 | -40.0 | -18.0 | 45.88 | 678 | 60.8° | -35.2 | 120.68 | 768 | 119.2° |
| 22 42.4 | 58.84 | -45.0 | -21.7 | 61.23 | 680 | 72.4° | -31.3 | 104.36 | 732 | 107.6° |
| | | -47.4 | -26.4 | 83.28 | 693 | 90.0° | -26.6 | 83.32 | 699 | 90.0° |
| **JUNE 11, 1963** | | | | | | | | | | |
| 0 37.5 | 87.94 | 47.4 | 29.5 | -82.32 | 1125 | 90.0° | 29.5 | -82.96 | 1125 | 90.0° |
| 2 32.6 | 117.07 | 45.0 | 23.9 | -60.89 | 1081 | 72.3° | 35.2 | -104.37 | 1128 | 107.7° |
| 4 27.7 | 146.19 | 40.0 | 19.6 | -45.51 | 1035 | 60.7° | 39.8 | -119.51 | 1124 | 119.4° |
| 6 22.8 | 175.38 | 35.0 | 16.2 | -35.93 | 998 | 54.0° | 43.2 | -129.05 | 1108 | 126.1° |
| 8 17.8 | 204.41 | 30.0 | 13.5 | -28.67 | 965 | 48.4° | 46.1 | -134.30 | 1110 | 130.7° |
| 10 12.9 | 233.52 | 20.0 | 8.6 | -17.35 | 898 | 43.7° | 51.4 | -147.43 | 1085 | 136.4° |
| 12 8.0 | 262.64 | 0. | 0. | 0. | 786 | 40.0° | 60.8 | -164.62 | 1013 | 140.2° |
| 14 3.1 | 291.75 | -20.0 | -8.3 | 17.44 | 706 | 43.8° | -45.4 | 148.99 | 900 | 136.3° |
| 15 58.2 | 320.86 | -30.0 | -12.7 | 28.82 | 684 | 49.5° | -40.6 | 137.69 | 840 | 130.6° |
| 17 53.3 | 349.98 | -35.0 | -15.1 | 36.21 | 677 | 54.1° | -38.0 | 130.34 | 809 | 126.0° |
| 19 48.3 | 19.09 | -40.0 | -17.9 | 45.90 | 674 | 60.8° | -35.1 | 120.69 | 778 | 119.2° |
| 21 43.4 | 48.20 | -45.0 | -21.7 | 61.25 | 680 | 72.4° | -31.2 | 105.36 | 738 | 107.6° |
| 23 38.5 | 77.31 | -47.4 | -26.4 | 83.30 | 701 | 90.0° | -26.4 | 83.34 | 701 | 90.0° |

SATELLITE 1960 IOTA 1
FOR OTHER LATITUDES

| EQUATOR S-N TIME (UT) | EQUATOR S-N LONG. (W) | LAT. | SOUTH-NORTH TIME CORR. | SOUTH-NORTH LONG. CORR. | SOUTH-NORTH HT. (MI) | SOUTH-NORTH BEAR. (N-E) | NORTH-SOUTH TIME CORR. | NORTH-SOUTH LONG. CORR. | NORTH-SOUTH HT. (MI) | NORTH-SOUTH BEAR. (N-E) |
|---|---|---|---|---|---|---|---|---|---|---|
| **JUNE 12, 1963** | | | | | | | | | | |
| 1 33.6 | 106.43 | 47.4 | 29.3 | -82.56 | 1119 | 90.0° | 29.3 | -82.60 | 1119 | 90.0° |
| 3 28.7 | 135.54 | 45.0 | 23.7 | -60.73 | 1071 | 72.3° | 35.0 | -104.41 | 1149 | 107.7° |
| 5 23.7 | 164.65 | 40.0 | 19.3 | -45.54 | 1073 | 60.7° | 39.6 | -119.55 | 1157 | 119.4° |
| 7 18.8 | 193.76 | 35.0 | 16.1 | -35.95 | 983 | 54.0° | 43.0 | -129.08 | 1154 | 126.1° |
| 9 13.9 | 222.88 | 30.0 | 13.4 | -28.64 | 946 | 48.4° | 46.0 | -136.34 | 1149 | 130.7° |
| 11 9.0 | 251.99 | 20.0 | 8.6 | -17.37 | 881 | 43.7° | 51.2 | -147.50 | 1116 | 136.4° |
| 13 4.1 | 281.10 | 0. | 0. | 0. | 772 | 40.0° | 60.7 | -164.65 | 1028 | 140.2° |
| 14 59.1 | 310.21 | -20.0 | -8.2 | 17.45 | 698 | 43.8° | -45.4 | 148.98 | 915 | 136.3° |
| 16 54.2 | 339.32 | -30.0 | -12.6 | 28.84 | 677 | 49.5° | -40.6 | 137.69 | 853 | 130.6° |
| 18 49.3 | 8.44 | -35.0 | -15.0 | 36.23 | 671 | 54.1° | -38.0 | 130.35 | 821 | 126.0° |
| 20 44.4 | 37.55 | -40.0 | -17.8 | 45.92 | 671 | 60.8° | -35.1 | 120.70 | 786 | 119.2° |
| 22 39.4 | 66.66 | -45.0 | -21.6 | 61.26 | 679 | 72.4° | -31.1 | 105.39 | 745 | 107.6° |
| | | -47.4 | -26.3 | 83.32 | 705 | 90.0° | -26.3 | 83.36 | 705 | 90.0° |
| **JUNE 13, 1963** | | | | | | | | | | |
| 0 34.5 | 95.77 | 47.4 | 29.2 | -82.60 | 1113 | 90.0° | 29.2 | -82.64 | 1113 | 90.0° |
| 2 29.6 | 124.88 | 45.0 | 23.6 | -60.76 | 1062 | 72.3° | 34.9 | -104.45 | 1147 | 107.7° |
| 4 24.7 | 153.99 | 40.0 | 19.2 | -45.57 | 1011 | 60.8° | 39.5 | -119.59 | 1159 | 119.4° |
| 6 19.7 | 183.10 | 35.0 | 16.0 | -35.98 | 970 | 54.0° | 42.9 | -129.12 | 1159 | 126.1° |
| 8 14.8 | 212.21 | 30.0 | 13.3 | -28.66 | 933 | 48.4° | 45.8 | -136.37 | 1152 | 130.7° |
| 10 9.9 | 241.32 | 20.0 | 8.5 | -17.38 | 866 | 43.7° | 51.1 | -147.53 | 1126 | 136.4° |
| 12 5.0 | 270.44 | 0. | 0. | 0. | 759 | 40.0° | 60.6 | -164.67 | 1041 | 140.2° |
| 14 0.0 | 299.55 | -20.0 | -8.2 | 17.46 | 689 | 43.8° | -45.4 | 148.98 | 928 | 136.3° |
| 15 55.1 | 328.66 | -30.0 | -12.6 | 28.85 | 671 | 49.5° | -40.6 | 137.69 | 866 | 130.6° |
| 17 50.2 | 357.77 | -35.0 | -15.0 | 36.24 | 667 | 54.1° | -38.0 | 130.35 | 832 | 126.0° |
| 19 45.3 | 26.88 | -40.0 | -17.8 | 45.93 | 668 | 60.8° | -35.0 | 120.71 | 796 | 119.3° |
| 21 40.3 | 55.99 | -45.0 | -21.5 | 61.28 | 680 | 72.4° | -31.1 | 105.41 | 753 | 107.6° |
| 23 35.4 | 85.10 | -47.4 | -26.3 | 83.33 | 709 | 90.0° | -26.3 | 83.37 | 709 | 90.0° |
| **JUNE 14, 1963** | | | | | | | | | | |
| 1 30.5 | 114.21 | 47.4 | 29.0 | -82.64 | 1106 | 90.0° | 29.0 | -82.68 | 1106 | 90.0° |
| 3 25.5 | 143.32 | 45.0 | 23.5 | -60.79 | 1050 | 72.3° | 34.7 | -104.50 | 1144 | 107.7° |
| 5 20.6 | 172.43 | 40.0 | 19.1 | -45.60 | 997 | 60.7° | 39.3 | -119.63 | 1160 | 119.4° |
| 7 15.7 | 201.54 | 35.0 | 15.9 | -36.00 | 955 | 54.0° | 42.7 | -129.17 | 1162 | 126.1° |
| 9 10.7 | 230.65 | 30.0 | 13.2 | -28.68 | 917 | 48.4° | 45.7 | -136.42 | 1158 | 130.7° |
| 11 5.8 | 259.76 | 20.0 | 8.6 | -17.39 | 851 | 43.7° | 51.0 | -147.57 | 1134 | 136.4° |
| 13 0.9 | 288.86 | 0. | 0. | 0. | 744 | 40.0° | 60.5 | -164.69 | 1064 | 140.2° |
| 14 56.0 | 317.97 | -20.0 | -8.2 | 17.47 | 680 | 43.8° | -45.5 | 148.97 | 944 | 136.3° |
| 16 51.0 | 347.08 | -30.0 | -12.5 | 28.87 | 665 | 49.5° | -40.6 | 137.69 | 880 | 130.6° |
| 18 46.1 | 16.19 | -35.0 | -14.9 | 36.26 | 663 | 54.1° | -38.0 | 130.36 | 845 | 126.0° |
| 20 41.2 | 45.30 | -40.0 | -17.7 | 45.95 | 667 | 60.8° | -35.0 | 120.72 | 808 | 119.3° |
| 22 36.2 | 74.41 | -45.0 | -21.5 | 61.30 | 682 | 72.4° | -31.1 | 105.42 | 762 | 107.6° |
| | | -47.4 | -26.2 | 83.35 | 715 | 90.0° | -26.2 | 83.39 | 715 | 90.0° |
| **JUNE 15, 1963** | | | | | | | | | | |
| 0 31.3 | 103.52 | 47.4 | 28.9 | -82.68 | 1098 | 90.0° | 28.9 | -82.72 | 1098 | 90.0° |
| 2 26.3 | 132.63 | 45.0 | 23.3 | -60.81 | 1039 | 72.3° | 34.5 | -104.54 | 1140 | 107.7° |
| 4 21.4 | 161.74 | 40.0 | 19.0 | -45.62 | 986 | 60.7° | 39.1 | -119.68 | 1159 | 119.4° |
| 6 16.5 | 190.84 | 35.0 | 15.8 | -36.02 | 941 | 54.0° | 42.5 | -129.21 | 1165 | 126.1° |
| 8 11.5 | 219.95 | 30.0 | 13.1 | -28.70 | 903 | 48.4° | 45.5 | -136.46 | 1163 | 130.7° |
| 10 6.6 | 249.06 | 20.0 | 8.4 | -17.41 | 836 | 43.7° | 50.8 | -147.61 | 1144 | 136.4° |
| 12 1.7 | 278.17 | 0. | 0. | 0. | 733 | 40.0° | 60.4 | -164.72 | 1069 | 140.2° |
| 13 56.7 | 307.28 | -20.0 | -8.1 | 17.48 | 672 | 43.8° | -45.5 | 148.96 | 938 | 136.3° |
| 15 51.8 | 336.38 | -30.0 | -12.5 | 28.88 | 660 | 49.5° | -40.6 | 137.69 | 893 | 130.6° |
| 17 46.9 | 5.49 | -35.0 | -14.9 | 36.27 | 660 | 54.1° | -38.0 | 130.35 | 858 | 126.0° |
| 19 41.9 | 34.60 | -40.0 | -17.7 | 45.96 | 666 | 60.8° | -35.0 | 120.72 | 819 | 119.3° |
| 21 37.0 | 63.71 | -45.0 | -21.4 | 61.31 | 684 | 72.4° | -31.0 | 105.42 | 771 | 107.6° |
| 23 32.0 | 92.81 | -47.4 | -26.2 | 83.36 | 721 | 90.0° | -26.2 | 83.40 | 721 | 90.0° |