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DR-376  
November 1968

AD

AD 844677

METEOROLOGICAL DATA REPORT

NIKE-HYDAC STV, SR-077  
(24 October 1968)

BY

GEORGE M. FUGATE

ATMOSPHERIC SCIENCES RESEARCH OFFICE  
WHITE SANDS MISSILE RANGE, NEW MEXICO

ECOM

UNITED STATES ARMY ELECTRONICS COMMAND

DEC 16 1968

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# ABSTRACT

Meteorological data gathered for the launching of Nike-Huac STV, SR-077, are presented for the Space and Missile Systems Organization, AFMDC, Holloman Air Force Base, New Mexico, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.

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## INTRODUCTION

Nike-Hydac STV, SR-077, was launched from Launch Complex 33, L-314, White Sands Missile Range (WSMR), New Mexico, at 0703 hours MDT, 24 October 1968.

Meteorological data used in conjunction with theoretical calculations to predict rocket impact were collected by the Meteorological Support Technical Area, Atmospheric Sciences Research Office, WSMR, New Mexico. The Ballistics Meteorologists for this firing were Harold M. Richart and George M. Fugate.

## DISCUSSION

Wind data for the first 216 feet above the surface were obtained from a system composed of five Aerovanes mounted on a 200-foot tower and cabled to two component wind indicators for each level.

From 216 to 4,000 feet above the surface, wind data were obtained from T-9 radar-tracked balloon ascents.

Temperature, pressure, and humidity data, along with upper wind data from 4,000 to 100,000 feet above the surface, were obtained from standard rawinsonde observations.

Mean wind component values in each ballistic zone were determined from vertical cross sections by the equal-area method.

Theoretical rocket performance values and ballistic factors as a function of altitude were provided by Meteorological Support Technical Area, WSMR, New Mexico, and are the basis for data appearing in Table I.

|                       |          |         |              |
|-----------------------|----------|---------|--------------|
| PAYLOAD               |          | 217     | Pounds       |
| CORIOUS DISPLACEMENT  | WEST     | 4.9     | Miles        |
| SECOND-STAGE IGNITION | TIME     | 20.0    | Seconds      |
|                       | ALTITUDE | 35,760  | Feet MSL     |
| PEAK                  | TIME     | 236     | Seconds      |
|                       | ALTITUDE | 716,000 | Feet MSL     |
| UNIT WIND EFFECT      | HEAD     | 2.158   | Miles/MPH    |
|                       | CROSS    | 2.244   | Miles/MPH    |
|                       | TAIL     | 2.167   | Miles/MPH    |
| TOWER TILT EFFECT     |          | 14.5    | Miles/Degree |

TABLE I. THEORETICAL ROCKET PERFORMANCE VALUES  
NIKE-HYDAC STV, SR-077

| LAYERS IN FEET<br>ABOVE GROUND | BALLISTIC<br>FACTORS |
|--------------------------------|----------------------|
| 15- 60                         | .126                 |
| 60- 108                        | .084                 |
| 108- 148                       | .053                 |
| 148- 184                       | .041                 |
| 184- 216                       | .026                 |
| 216- 300                       | .062                 |
| 300- 400                       | .058                 |
| 400- 600                       | .072                 |
| 600- 800                       | .058                 |
| 800-1000                       | .039                 |

| LAYERS IN FEET<br>ABOVE GROUND | BALLISTIC<br>FACTORS |
|--------------------------------|----------------------|
| 1000- 1400                     | .063                 |
| 1400- 2000                     | .066                 |
| 2000- 2500                     | .035                 |
| 2500- 3000                     | .028                 |
| 3000- 3500                     | .014                 |
| 3500- 4000                     | .005                 |
| 4000- 4160                     | -.003                |
| 4160- 9000                     | -.014                |
| 9000-15000                     | -.017                |
| 15000-21000                    | -.016                |

| LAYERS IN FEET<br>ABOVE GROUND | BALLISTIC<br>FACTORS |
|--------------------------------|----------------------|
| 21000-26000                    | ..013                |
| 26000-31770                    | -.016                |
| 31770-36000                    | .129                 |
| 36000-41000                    | .057                 |
| 41000-46000                    | .026                 |
| 46000-51000                    | .015                 |
| 51000-56000                    | .010                 |
| 56000-61000                    | .006                 |
| 61000-66000                    | .004                 |
| 66000-69330                    | .002                 |

TABLE II. BALLISTIC FACTORS  
NIKE-HYDAC STV, SR-077



| AERO-<br>VANE<br>NO. * | MEAN WIND COMPONENTS IN MILES PER HOUR |      |               |      |               |      |               |      |               |      |
|------------------------|----------------------------------------|------|---------------|------|---------------|------|---------------|------|---------------|------|
|                        | 1<br>0507 MDT                          |      | 2<br>0517 MDT |      | 3<br>0552 MDT |      | 4<br>0610 MDT |      | 5<br>0620 MDT |      |
|                        | N-S                                    | E-W  | N-S           | E-W  | N-S           | E-W  | N-S           | E-W  | N-S           | E-W  |
|                        |                                        |      |               |      |               |      |               |      |               |      |
| 1                      | 11.0S                                  | 3.0E | 15.0S         | 3.0W | 10.0S         | 2.0W | 8.0S          | 3.0W | 10.0S         | 5.0W |
| 2                      | 15.0                                   | 2.0  | 18.0          | 3.0  | 12.0          | 4.0  | 12.0          | 5.0  | 11.0          | 6.0  |
| 3                      | 19.0                                   | 2.0  | 18.0          | 0.0  | 14.0          | 3.0  | 14.0          | 3.0  | 14.0          | 4.0  |
| 4                      | 19.0                                   | 1.0  | 18.0          | 0.0  | 15.0          | 2.0  | 14.0          | 4.0  | 14.0          | 1.0  |
| 5                      | 20.0                                   | 1.0  | 22.0          | 1.0  | 17.0          | 2.0  | 16.0          | 3.0  | 12.0          | 2.0  |

| AERO-<br>VANE<br>NO. * | MEAN WIND COMPONENTS IN MILES PER HOUR |      |               |      |               |      |               |      |
|------------------------|----------------------------------------|------|---------------|------|---------------|------|---------------|------|
|                        | 6<br>0630 MDT                          |      | 7<br>0640 MDT |      | 8<br>0650 MDT |      | 9<br>0705 MDT |      |
|                        | N-S                                    | E-W  | N-S           | E-W  | N-S           | E-W  | N-S           | E-W  |
| 1                      | 8.0S                                   | 4.0W | 8.0S          | 0.0  | 8.0S          | 2.0W | 6.0S          | 4.0W |
| 2                      | 10.0                                   | 6.0  | 10.0          | 1.0W | 9.0           | 4.0  | 9.0           | 5.0  |
| 3                      | 12.0                                   | 5.0  | 8.0           | 0.0  | 10.0          | 3.0  | 10.0          | 4.0  |
| 4                      | 12.0                                   | 6.0  | 9.0           | 0.0  | 12.0          | 3.0  | 10.0          | 4.0  |
| 5                      | 15.0                                   | 5.0  | 13.0          | 2.0E | 12.0          | 2.0  | 12.0          | 4.0  |

TABLE III. ANEMOMETER WIND SPEED AND DIRECTION  
NIKE-HYDAC STV, SR-077

\* Heights corresponding to Aerovane Numbers: 1 = 35 Feet 3 = 128 Feet 5 = 200 Feet  
2 = 88 Feet 4 = 168 Feet

| LAYERS<br>IN FEET<br>ABOVE<br>GROUND | MEAN WIND COMPONENTS IN MILES PER HOUR |      |          |      |          |      |          |      |          |      |
|--------------------------------------|----------------------------------------|------|----------|------|----------|------|----------|------|----------|------|
|                                      | 1                                      |      | 2        |      | 3        |      | 4        |      | 5        |      |
|                                      | 0507 MDT                               |      | 0517 MDT |      | 0552 MDT |      | 0610 MDT |      | 0620 MDT |      |
|                                      | N-S                                    | E-W  | N-S      | E-W  | N-S      | E-W  | N-S      | E-W  | N-S      | E-W  |
| 216- 300                             | 19.0S                                  | 1.5E | 21.5S    | 0.0  | 16.5S    | 0.5W | 16.0S    | 3.0W | 11.0S    | 2.0W |
| 300- 400                             | 18.0                                   | 2.5  | 20.5     | 3.0E | 16.0     | 2.0E | 16.5     | 1.0  | 11.5     | 4.0  |
| 400- 600                             | 15.0                                   | 4.0  | 19.5     | 7.5  | 15.5     | 6.0  | 17.5     | 4.0E | 14.0     | 3.0E |
| 600- 800                             | 14.0                                   | 6.5  | 18.0     | 13.5 | 14.5     | 10.5 | 14.0     | 7.0  | 11.5     | 10.0 |
| 800-1000                             | 9.0                                    | 8.0  | 12.5     | 21.0 | 13.5     | 15.0 | 11.5     | 11.0 | 11.5     | 15.0 |
| 1000-1400                            | 6.0                                    | 11.0 | 8.0      | 23.0 | 11.5     | 21.0 | 11.5     | 22.0 | 11.5     | 21.0 |
| 1400-2000                            | 8.0                                    | 15.5 | 5.0      | 23.0 | 9.0      | 28.0 | 12.5     | 27.0 | 12.5     | 26.0 |
| 2000-2500                            | 4.0                                    | 17.5 | 3.0      | 24.5 | 11.0     | 21.0 | 11.0     | 19.0 | 15.5     | 24.0 |
| 2500-3000                            | 2.0                                    | 19.5 | 3.5      | 18.5 | 7.0      | 15.0 | 7.5      | 12.0 | 11.0     | 11.0 |
| 3000-3500                            | 1.0N                                   | 15.0 | 4.0      | 14.0 | 8.5      | 10.0 | 7.5      | 7.0  | 7.0      | 5.0  |
| 3500-4000                            | 2.0S                                   | 10.0 | 7.0      | 6.5  | 6.5      | 2.0  | 6.0      | 5.0  | 7.0      | 4.0  |

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA  
NIKE-HYDAC STV, SR-077

| LAYERS<br>IN FEET<br>ABOVE<br>GROUND | MEAN WIND COMPONENTS IN MILES PER HOUR |      |          |      |          |      |          |      |  |     |
|--------------------------------------|----------------------------------------|------|----------|------|----------|------|----------|------|--|-----|
|                                      | 6                                      |      | 7        |      | 8        |      | 9        |      |  | E-W |
|                                      | 0630 MDT                               |      | 0640 MDT |      | 0650 MDT |      | 0705 MDT |      |  |     |
|                                      | N-S                                    | E-W  | N-S      | E-W  | N-S      | E-W  | N-S      | E-W  |  |     |
| 216- 300                             | 15.0S                                  | 5.0W | 13.0S    | 2.0E | 12.0S    | 2.0W | 12.0S    | 4.0W |  |     |
| 300- 400                             | 13.0                                   | 4.0  | 11.0     | 1.0  | 12.0     | 2.0  | 11.5     | 3.5  |  |     |
| 400- 600                             | 13.5                                   | 3.0  | 11.5     | 2.0  | 12.5     | 2.0  | 11.0     | 0.0  |  |     |
| 600- 800                             | 15.5                                   | 4.0E | 12.0     | 1.0  | 13.5     | 3.0  | 10.0     | 5.0  |  |     |
| 800-1000                             | 17.0                                   | 10.0 | 11.0     | 5.0  | 10.0     | 6.0  | 9.5      | 9.0  |  |     |
| 1000-1400                            | 13.0                                   | 19.0 | 11.5     | 15.0 | 12.0     | 11.0 | 10.5     | 12.0 |  |     |
| 1400-2000                            | 13.5                                   | 26.0 | 11.5     | 26.0 | 12.5     | 22.0 | 12.0     | 23.0 |  |     |
| 2000-2500                            | 15.5                                   | 24.0 | 16.5     | 24.0 | 17.0     | 24.0 | 17.5     | 23.0 |  |     |
| 2500-3000                            | 12.5                                   | 15.0 | 15.0     | 15.0 | 16.5     | 18.0 | 16.5     | 14.0 |  |     |
| 3000-3500                            | 8.5                                    | 6.0  | 13.0     | 10.0 | 12.5     | 9.0  | 12.0     | 9.0  |  |     |
| 3500- 000                            | 7.5                                    | 4.0  | 8.5      | 4.0  | 7.5      | 6.0  | 8.5      | 5.0  |  |     |

TABLE IV. PILOT-BALLOON-RECORDED WIND DATA (CONT)  
NIKE-HYDAC STV, SR-077

| LAYERS<br>IN FEET<br>ABOVE<br>GROUND | MEAN WIND COMPONENTS IN KNOTS |       |          |      |     |     |
|--------------------------------------|-------------------------------|-------|----------|------|-----|-----|
|                                      | 1                             |       | 2        |      |     |     |
|                                      | 0730 MDT                      |       | 0705 MDT |      |     |     |
|                                      | N-S                           | E-W   | N-S      | E-W  | N-S | E-W |
| 4000-4160                            | 5.58                          | 4.38  | 1.5N     | 8.0E |     |     |
| 160-9000                             | 0.0                           | 8.0W  | 10.5     | 6.0W |     |     |
| 9000-15000                           | 13.0N                         | 5.0   | 17.0     | 6.0  |     |     |
| 15000-21000                          | 21.5                          | 8.0   | 26.0     | 0.0  |     |     |
| 21000-26000                          | 25.0                          | 9.0   | 31.0     | 0.0  |     |     |
| 26000-31770                          | 31.5                          | 5.5E  | 32.5     | 5.5E |     |     |
| 31770-36000                          | 31.5                          | 26.5E | 32.0     | 18.5 |     |     |
| 36000-41000                          | 36.5                          | 21.0  | 34.0     | 19.5 |     |     |
| 41000-46000                          | 31.5                          | 5.5W  | 40.0     | 0.0  |     |     |
| 46000-51000                          | 29.5                          | 5.0   | 32.0     | 0.0  |     |     |
| 51000-56000                          | 16.5                          | 3.0   | 17.0     | 0.0  |     |     |
| 56000-61000                          | 8.0                           | 1.5E  | 13.0     | 2.5E |     |     |
| 61000-66000                          | 5.0                           | 3.0W  | 3.5      | 2.0  |     |     |
| 66000-69330                          | 5.0                           | 0.0   | 2.5E     | 1.5  |     |     |

TABLE V. RAWINSONDE-MEASURED WIND DATA  
NIKE-HYDAC STV, SR-077

STATION ALTITUDE 3989.00 FEET MSL  
 14 OCT. 68  
 ASCENSION NO. 867

SIGNIFICANT LEVEL DATA  
 0820003904  
 WHITE SANDS SITE

WSTM SITE COORDINATES  
 488280.00 FEET E  
 185045.00 FEET N

TABLE VI

| PRESSURE GEOMETRIC ALTITUDE |          | TEMPERATURE |                     | REL. HUM. |
|-----------------------------|----------|-------------|---------------------|-----------|
| MILLIBARS                   | MSL FEET | AIR DEGREES | DEWPOINT CENTIGRADE |           |
| 885.3                       | 3989.0   | 11.8        | -3.6                | 34.0      |
| 875.0                       | 4311.0   | 13.0        | -2.1                | 35.0      |
| 850.0                       | 5108.1   | 11.3        | -3.2                | 36.0      |
| 826.0                       | 5895.0   | 12.5        | -3.3                | 33.0      |
| 732.0                       | 9180.9   | 7.0         | -7.8                | 34.0      |
| 710.0                       | 10012.8  | 7.0         | -8.6                | 32.0      |
| 648.0                       | 12452.8  | 0.9         | -12.9               | 35.0      |
| 616.0                       | 13789.1  | 0.4         | -14.1               | 33.0      |
| 530.0                       | 17762.8  | -6.5        | -19.5               | 35.0      |
| 422.0                       | 23429.1  | -18.2       | -31.3               | 31.0      |
| 304.0                       | 31160.1  | -38.9       | -50.1               | 30.0      |
| 220.0                       | 38180.7  | -57.1       | 0.                  | -0. **    |
| 172.0                       | 43159.3  | -69.9       | 0.                  | -0. **    |
| 144.0                       | 46640.0  | -70.5       | 0.                  | -0. **    |
| 132.0                       | 48334.2  | -72.5       | 0.                  | -0. **    |
| 130.0                       | 48630.1  | -72.5       | 0.                  | -0. **    |
| 124.0                       | 49557.2  | -67.5       | 0.                  | -0. **    |
| 91.0                        | 55694.2  | -68.1       | 0.                  | -0. **    |
| 82.0                        | 57785.1  | -62.7       | 0.                  | -0. **    |
| 71.0                        | 60695.0  | -65.6       | 0.                  | -0. **    |
| 47.0                        | 69137.0  | -57.4       | 0.                  | -0. **    |
| 40.0                        | 72486.7  | -59.6       | 0.                  | -0. **    |
| 37.0                        | 74108.8  | -56.8       | 0.                  | -0. **    |
| 33.0                        | 76492.4  | -59.1       | 0.                  | -0. **    |
| 29.0                        | 79194.4  | -55.3       | 0.                  | -0. **    |
| 11.0                        | 99917.0  | -49.6       | 0.                  | -0. **    |

\*\* RELATIVE HUMIDITY NOT SUPPLIED. ZERO VALUE ASSUMED FOR COMPUTATIONS.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0350 HRS MDT  
ASCENSION NO. 867

UPPER AIR DATA  
0820003904  
WHITE SANDS SITE

WSTM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE VII

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA<br>DIRECTION<br>DEGREES(TN) | SPEED |       | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|---------------------------------------|-------|-------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS |                                       | KNOTS | KNOTS |                           |
| 3989.0                            | 885.3                 | 11.8           | -3.6                   | 34.0                 | 1080.3                       | 657.9             |       | 210.0                                 | 7.0   |       | 1.000263                  |
| 4000.0                            | 884.9                 | 11.8           | -3.5                   | 34.0                 | 1079.7                       | 658.0             |       | 209.5                                 | 7.0   |       | 1.000263                  |
| 4500.0                            | 869.0                 | 12.6           | -2.4                   | 35.2                 | 1057.2                       | 658.9             |       | 184.8                                 | 8.2   |       | 1.000259                  |
| 5000.0                            | 853.3                 | 11.5           | -3.1                   | 35.9                 | 1042.1                       | 657.7             |       | 160.2                                 | 9.3   |       | 1.000255                  |
| 5500.0                            | 838.0                 | 11.9           | -3.3                   | 34.5                 | 1022.0                       | 658.1             |       | 135.6                                 | 10.5  |       | 1.000250                  |
| 6000.0                            | 822.8                 | 12.3           | -3.5                   | 33.0                 | 1022.1                       | 658.6             |       | 111.0                                 | 11.7  |       | 1.000245                  |
| 6500.0                            | 807.9                 | 11.5           | -4.2                   | 33.2                 | 986.8                        | 657.6             |       | 112.5                                 | 11.2  |       | 1.000241                  |
| 7000.0                            | 793.2                 | 10.7           | -4.8                   | 33.3                 | 971.8                        | 656.6             |       | 115.3                                 | 10.6  |       | 1.000237                  |
| 7500.0                            | 778.8                 | 9.8            | -5.5                   | 33.5                 | 957.0                        | 655.6             |       | 119.4                                 | 9.5   |       | 1.000232                  |
| 8000.0                            | 764.6                 | 9.0            | -6.2                   | 33.6                 | 942.5                        | 654.7             |       | 127.7                                 | 7.6   |       | 1.000228                  |
| 8500.0                            | 750.7                 | 8.2            | -6.9                   | 33.8                 | 928.1                        | 653.7             |       | 141.0                                 | 4.6   |       | 1.000224                  |
| 9000.0                            | 737.1                 | 7.3            | -7.6                   | 33.9                 | 914.0                        | 652.7             |       | 213.7                                 | 3.5   |       | 1.000220                  |
| 9500.0                            | 723.6                 | 7.0            | -8.1                   | 33.2                 | 898.4                        | 652.3             |       | 296.0                                 | 3.5   |       | 1.000216                  |
| 10000.0                           | 710.3                 | 7.0            | -8.6                   | 32.0                 | 881.9                        | 652.3             |       | 305.0                                 | 6.3   |       | 1.000212                  |
| 10500.0                           | 697.2                 | 5.8            | -9.4                   | 32.6                 | 869.4                        | 650.8             |       | 309.6                                 | 8.7   |       | 1.000208                  |
| 11000.0                           | 684.2                 | 4.5            | -10.3                  | 33.2                 | 857.2                        | 649.4             |       | 309.7                                 | 10.6  |       | 1.000205                  |
| 11500.0                           | 671.5                 | 3.3            | -11.2                  | 33.8                 | 845.2                        | 647.9             |       | 311.9                                 | 12.0  |       | 1.000201                  |
| 12000.0                           | 659.1                 | 2.0            | -12.1                  | 34.4                 | 833.3                        | 646.4             |       | 314.6                                 | 13.2  |       | 1.000198                  |
| 12500.0                           | 646.8                 | 0.9            | -12.9                  | 34.9                 | 821.3                        | 645.0             |       | 318.5                                 | 12.6  |       | 1.000194                  |
| 13000.0                           | 634.7                 | 0.7            | -13.4                  | 34.2                 | 806.5                        | 644.8             |       | 322.3                                 | 12.4  |       | 1.000191                  |
| 13500.0                           | 622.8                 | 0.5            | -13.8                  | 33.4                 | 791.9                        | 644.5             |       | 326.0                                 | 13.4  |       | 1.000187                  |
| 14000.0                           | 611.0                 | 0.0            | -14.3                  | 33.1                 | 778.3                        | 644.0             |       | 329.5                                 | 13.8  |       | 1.000184                  |
| 14500.0                           | 599.4                 | -0.9           | -15.0                  | 33.4                 | 766.0                        | 642.9             |       | 332.8                                 | 13.7  |       | 1.000180                  |
| 15000.0                           | 588.0                 | -1.7           | -15.7                  | 33.6                 | 753.9                        | 641.9             |       | 333.9                                 | 14.1  |       | 1.000177                  |
| 15500.0                           | 576.8                 | -2.6           | -16.4                  | 33.9                 | 742.0                        | 640.8             |       | 334.5                                 | 14.5  |       | 1.000174                  |
| 16000.0                           | 565.8                 | -3.5           | -17.1                  | 34.1                 | 730.3                        | 639.7             |       | 335.4                                 | 13.3  |       | 1.000171                  |
| 16500.0                           | 555.1                 | -4.4           | -17.8                  | 34.4                 | 718.8                        | 638.7             |       | 337.8                                 | 12.3  |       | 1.000168                  |
| 17000.0                           | 544.5                 | -5.3           | -18.5                  | 34.6                 | 707.5                        | 637.6             |       | 342.4                                 | 11.8  |       | 1.000165                  |
| 17500.0                           | 534.1                 | -6.1           | -19.2                  | 34.9                 | 696.3                        | 636.6             |       | 346.2                                 | 12.0  |       | 1.000162                  |
| 18000.0                           | 523.8                 | -7.1           | -20.1                  | 34.8                 | 685.3                        | 635.4             |       | 349.4                                 | 12.7  |       | 1.000159                  |

UPPER AIR DATA  
0820003904  
WHITE SANDS SITE

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT 68 0350 HRS MDT  
ASCENSION NO. 867

WSM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE VII (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES<br>CENTIGRADE | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|---------------------------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       |                                             |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 18500.0                           | 513.4                 | -8.1                                        | 34.4                 | 674.5                        | 634.2                      | 352.0                    | 14.3           | 1.000156                  |
| 19000.0                           | 503.3                 | -9.2                                        | 34.1                 | 653.8                        | 632.9                      | 354.4                    | 16.1           | 1.000153                  |
| 19500.0                           | 493.4                 | -10.2                                       | 33.7                 | 653.2                        | 631.7                      | 351.8                    | 17.4           | 1.000151                  |
| 20000.0                           | 483.7                 | -11.2                                       | 33.4                 | 642.9                        | 630.4                      | 348.5                    | 18.6           | 1.000148                  |
| 20500.0                           | 474.2                 | -12.2                                       | 33.0                 | 632.7                        | 629.2                      | 344.5                    | 20.1           | 1.000145                  |
| 21000.0                           | 464.8                 | -13.2                                       | 32.7                 | 622.7                        | 627.9                      | 340.5                    | 21.4           | 1.000143                  |
| 21500.0                           | 455.7                 | -14.3                                       | 32.3                 | 612.9                        | 626.7                      | 336.6                    | 21.9           | 1.000140                  |
| 22000.0                           | 446.7                 | -15.3                                       | 32.0                 | 603.2                        | 625.4                      | 333.2                    | 21.3           | 1.000138                  |
| 22500.0                           | 437.9                 | -16.3                                       | 31.6                 | 593.7                        | 624.2                      | 330.9                    | 18.8           | 1.000135                  |
| 23000.0                           | 429.3                 | -17.3                                       | 31.3                 | 584.4                        | 622.9                      | 331.2                    | 19.2           | 1.000133                  |
| 23500.0                           | 420.7                 | -18.4                                       | 31.0                 | 575.2                        | 621.6                      | 334.6                    | 22.9           | 1.000131                  |
| 24000.0                           | 411.9                 | -19.7                                       | 30.9                 | 556.1                        | 620.0                      | 337.8                    | 24.8           | 1.000128                  |
| 24500.0                           | 403.3                 | -21.1                                       | 30.9                 | 557.2                        | 618.3                      | 340.3                    | 25.7           | 1.000126                  |
| 25000.0                           | 394.8                 | -22.4                                       | 30.8                 | 548.4                        | 616.7                      | 341.2                    | 29.3           | 1.000124                  |
| 25500.0                           | 386.5                 | -23.7                                       | 30.7                 | 539.8                        | 615.0                      | 341.6                    | 33.2           | 1.000122                  |
| 26000.0                           | 378.4                 | -25.1                                       | 30.7                 | 531.3                        | 613.3                      | 340.1                    | 29.6           | 1.000120                  |
| 26500.0                           | 370.5                 | -26.4                                       | 30.6                 | 523.0                        | 611.7                      | 338.8                    | 26.6           | 1.000118                  |
| 27000.0                           | 362.7                 | -27.8                                       | 30.5                 | 514.8                        | 610.0                      | 337.6                    | 26.5           | 1.000116                  |
| 27500.0                           | 355.1                 | -29.1                                       | 30.5                 | 506.8                        | 608.3                      | 337.1                    | 26.5           | 1.000114                  |
| 28000.0                           | 347.6                 | -30.4                                       | 30.4                 | 498.9                        | 606.7                      | 337.9                    | 26.5           | 1.000112                  |
| 28500.0                           | 340.3                 | -31.8                                       | 30.3                 | 491.2                        | 605.0                      | 339.1                    | 26.0           | 1.000110                  |
| 29000.0                           | 333.2                 | -33.1                                       | 30.3                 | 483.6                        | 603.3                      | 340.7                    | 27.4           | 1.000108                  |
| 29500.0                           | 326.2                 | -34.5                                       | 30.2                 | 476.1                        | 601.6                      | 342.8                    | 28.0           | 1.000107                  |
| 30000.0                           | 319.3                 | -35.8                                       | 30.2                 | 468.7                        | 599.9                      | 345.6                    | 28.5           | 1.000105                  |
| 30500.0                           | 312.6                 | -37.1                                       | 30.1                 | 451.5                        | 598.2                      | 348.5                    | 28.9           | 1.000103                  |
| 31000.0                           | 306.1                 | -38.5                                       | 30.0                 | 454.4                        | 596.5                      | 351.7                    | 29.0           | 1.000102                  |
| 31500.0                           | 299.3                 | -39.8                                       | 28.5**               | 446.8                        | 594.9                      | 356.1                    | 29.5           | 1.000100                  |
| 32000.0                           | 292.5                 | -41.1                                       | 26.4**               | 439.1                        | 593.2                      | 1.5                      | 30.2           | 1.000098                  |
| 32500.0                           | 285.8                 | -42.4                                       | 24.3**               | 431.5                        | 591.5                      | 6.9                      | 30.6           | 1.000096                  |
| 33000.0                           | 279.3                 | -43.7                                       | 22.1**               | 424.0                        | 589.9                      | 12.2                     | 30.8           | 1.000095                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA  
0820003904  
WHITE SANDS SITE

STATION ALTITUDE 3900.00 FEET MSL  
24 OCT. 68 0350 HRS MDT  
ASCENSION NO. 867

WSTM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE VII (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 33500.0                           | 272.9                 | -45.0          | -58.8                  | 20.0**               | 416.7                        | 588.2                      | 16.8                     | 31.7           | 1.000093                  |
| 34000.0                           | 266.7                 | -46.3          | -60.8                  | 17.9**               | 409.6                        | 586.5                      | 20.9                     | 33.1           | 1.000091                  |
| 34500.0                           | 260.6                 | -47.6          | -62.8                  | 15.7**               | 402.6                        | 584.8                      | 23.6                     | 34.1           | 1.000090                  |
| 35000.0                           | 254.7                 | -48.9          | -65.0                  | 13.6**               | 395.7                        | 583.2                      | 25.1                     | 34.9           | 1.000088                  |
| 35500.0                           | 248.9                 | -50.2          | -67.3                  | 11.5**               | 388.9                        | 581.5                      | 26.0                     | 35.6           | 1.000087                  |
| 36000.0                           | 243.2                 | -51.4          | -69.8                  | 9.3**                | 382.3                        | 579.8                      | 25.9                     | 36.4           | 1.000085                  |
| 36500.0                           | 237.7                 | -52.7          | -72.6                  | 7.2**                | 375.8                        | 578.1                      | 25.9                     | 37.1           | 1.000084                  |
| 37000.0                           | 232.3                 | -54.0          | -76.0                  | 5.0**                | 369.4                        | 576.4                      | 26.5                     | 37.5           | 1.000082                  |
| 37500.0                           | 227.0                 | -55.3          | -80.4                  | 2.9**                | 363.1                        | 574.7                      | 27.1                     | 37.9           | 1.000081                  |
| 38000.0                           | 221.8                 | -56.6          | -88.9                  | 0.8**                | 357.0                        | 573.0                      | 27.9                     | 39.0           | 1.000079                  |
| 38500.0                           | 216.6                 | -57.9          | 0.                     | -0. **               | 350.6                        | 571.2                      | 28.6                     | 40.3           | 1.000078                  |
| 39000.0                           | 211.3                 | -59.2          | 0.                     | -0. **               | 344.1                        | 569.5                      | 29.7                     | 40.6           | 1.000077                  |
| 39500.0                           | 206.1                 | -60.5          | 0.                     | -0. **               | 337.7                        | 567.8                      | 30.9                     | 40.7           | 1.000075                  |
| 40000.0                           | 201.1                 | -61.8          | 0.                     | -0. **               | 331.4                        | 566.1                      | 30.9                     | 40.7           | 1.000074                  |
| 40500.0                           | 196.2                 | -63.1          | 0.                     | -0. **               | 325.3                        | 564.4                      | 30.9                     | 40.6           | 1.000072                  |
| 41000.0                           | 191.4                 | -64.5          | 0.                     | -0. **               | 319.3                        | 562.7                      | 29.7                     | 40.3           | 1.000071                  |
| 41500.0                           | 186.7                 | -65.6          | 0.                     | -0. **               | 313.5                        | 560.9                      | 28.6                     | 40.0           | 1.000070                  |
| 42000.0                           | 182.1                 | -66.9          | 0.                     | -0. **               | 307.7                        | 559.2                      | 25.7                     | 40.0           | 1.000069                  |
| 42500.0                           | 177.7                 | -68.2          | 0.                     | -0. **               | 302.1                        | 557.4                      | 22.5                     | 40.1           | 1.000067                  |
| 43000.0                           | 173.4                 | -69.5          | 0.                     | -0. **               | 296.6                        | 555.7                      | 19.5                     | 40.4           | 1.000066                  |
| 43500.0                           | 169.0                 | -70.8          | 0.                     | -0. **               | 289.8                        | 553.0                      | 16.9                     | 41.1           | 1.000065                  |
| 44000.0                           | 164.8                 | -70.0          | 0.                     | -0. **               | 282.7                        | 554.9                      | 14.3                     | 41.9           | 1.000063                  |
| 44500.0                           | 160.6                 | -70.1          | 0.                     | -0. **               | 275.7                        | 556.8                      | 12.6                     | 40.5           | 1.000061                  |
| 45000.0                           | 156.6                 | -70.2          | 0.                     | -0. **               | 268.8                        | 554.7                      | 11.1                     | 38.8           | 1.000060                  |
| 45500.0                           | 152.6                 | -70.3          | 0.                     | -0. **               | 262.2                        | 554.6                      | 8.8                      | 37.1           | 1.000058                  |
| 46000.0                           | 148.8                 | -70.4          | 0.                     | -0. **               | 255.7                        | 554.5                      | 3.3                      | 35.2           | 1.000057                  |
| 46500.0                           | 145.0                 | -70.5          | 0.                     | -0. **               | 249.3                        | 554.3                      | 357.8                    | 33.4           | 1.000056                  |
| 47000.0                           | 141.4                 | -70.9          | 0.                     | -0. **               | 243.6                        | 553.7                      | 352.0                    | 31.7           | 1.000054                  |
| 47500.0                           | 137.8                 | -71.5          | 0.                     | -0. **               | 238.1                        | 552.9                      | 345.8                    | 30.0           | 1.000053                  |
| 48000.0                           | 134.3                 | -72.1          | 0.                     | -0. **               | 232.7                        | 552.1                      | 339.6                    | 28.4           | 1.000052                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.



UPPER AIR DATA  
0820003904  
WHITE SANDS SITE

STATION ALTITUDE 3984.00 FEET MSL  
24 OCT. 68  
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WSTM SITE COORDINATES  
48850.00FEET E  
185045.00FEET N

TABLE VII (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 48500.0                           | 130.9                 | -72.5          | 0.                     | **                   | 227.3                        | 551.6                      | 337.2                    | 29.0           | 1.000051                  |
| 49000.0                           | 127.6                 | -70.5          | 0.                     | **                   | 219.3                        | 554.3                      | 335.5                    | 30.1           | 1.000049                  |
| 49500.0                           | 124.4                 | -67.8          | 0.                     | **                   | 211.0                        | 558.0                      | 336.0                    | 30.6           | 1.000047                  |
| 50000.0                           | 121.3                 | -67.5          | 0.                     | **                   | 205.5                        | 558.3                      | 339.8                    | 30.1           | 1.000046                  |
| 50500.0                           | 118.2                 | -67.6          | 0.                     | **                   | 200.4                        | 558.3                      | 343.7                    | 29.7           | 1.000045                  |
| 51000.0                           | 115.3                 | -67.6          | 0.                     | **                   | 195.5                        | 558.2                      | 345.0                    | 29.8           | 1.000044                  |
| 51500.0                           | 112.4                 | -67.7          | 0.                     | **                   | 190.7                        | 558.1                      | 345.9                    | 29.9           | 1.000042                  |
| 52000.0                           | 109.6                 | -67.7          | 0.                     | **                   | 186.0                        | 558.1                      | 346.3                    | 29.9           | 1.000041                  |
| 52500.0                           | 106.9                 | -67.8          | 0.                     | **                   | 181.4                        | 558.0                      | 345.2                    | 29.3           | 1.000040                  |
| 53000.0                           | 104.2                 | -67.8          | 0.                     | **                   | 176.9                        | 557.9                      | 344.2                    | 28.7           | 1.000039                  |
| 53500.0                           | 101.6                 | -67.9          | 0.                     | **                   | 172.5                        | 557.9                      | 344.5                    | 28.2           | 1.000038                  |
| 54000.0                           | 99.1                  | -67.9          | 0.                     | **                   | 168.3                        | 557.8                      | 345.9                    | 27.8           | 1.000037                  |
| 54500.0                           | 96.6                  | -68.0          | 0.                     | **                   | 164.1                        | 557.7                      | 347.3                    | 27.5           | 1.000037                  |
| 55000.0                           | 94.2                  | -68.0          | 0.                     | **                   | 160.1                        | 557.7                      | 348.0                    | 27.2           | 1.000036                  |
| 55500.0                           | 91.9                  | -68.1          | 0.                     | **                   | 156.1                        | 557.6                      | 348.6                    | 27.0           | 1.000035                  |
| 56000.0                           | 89.6                  | -67.3          | 0.                     | **                   | 151.7                        | 558.6                      | 348.7                    | 25.4           | 1.000034                  |
| 56500.0                           | 87.4                  | -66.0          | 0.                     | **                   | 147.0                        | 560.4                      | 346.8                    | 24.5           | 1.000033                  |
| 57000.0                           | 85.3                  | -64.7          | 0.                     | **                   | 142.5                        | 562.1                      | 345.0                    | 22.5           | 1.000032                  |
| 57500.0                           | 83.2                  | -63.4          | 0.                     | **                   | 138.2                        | 563.9                      | 342.8                    | 20.8           | 1.000031                  |
| 58000.0                           | 81.1                  | -62.9          | 0.                     | **                   | 134.5                        | 564.6                      | 340.5                    | 19.3           | 1.000030                  |
| 58500.0                           | 79.1                  | -63.4          | 0.                     | **                   | 131.5                        | 563.9                      | 338.2                    | 17.7           | 1.000029                  |
| 59000.0                           | 77.2                  | -63.9          | 0.                     | **                   | 128.6                        | 563.2                      | 338.8                    | 15.6           | 1.000029                  |
| 59500.0                           | 75.3                  | -64.4          | 0.                     | **                   | 125.7                        | 562.6                      | 339.6                    | 13.5           | 1.000028                  |
| 60000.0                           | 73.5                  | -64.9          | 0.                     | **                   | 122.9                        | 561.9                      | 342.2                    | 12.2           | 1.000027                  |
| 60500.0                           | 71.7                  | -65.4          | 0.                     | **                   | 120.2                        | 561.2                      | 348.3                    | 12.8           | 1.000027                  |
| 61000.0                           | 69.9                  | -65.3          | 0.                     | **                   | 117.3                        | 561.4                      | 354.4                    | 13.3           | 1.000026                  |
| 61500.0                           | 68.3                  | -64.8          | 0.                     | **                   | 114.2                        | 562.0                      | 355.6                    | 12.5           | 1.000025                  |
| 62000.0                           | 66.6                  | -64.3          | 0.                     | **                   | 111.1                        | 562.7                      | 355.2                    | 11.2           | 1.000025                  |
| 62500.0                           | 65.0                  | -63.8          | 0.                     | **                   | 108.2                        | 563.3                      | 355.3                    | 10.0           | 1.000024                  |
| 63000.0                           | 63.4                  | -62.4          | 0.                     | **                   | 105.4                        | 564.0                      | 358.8                    | 9.0            | 1.000023                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL

24 OCT. 68

ASCENSION NO. 867

0350 HRS MDT

UPPER AIR DATA

0820003904

WHITE SANDS SITE

WSTM SITE COORDINATES

488580.00FEET E

185045.00FEET N

TABLE VII (Cont)

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF SOUND |       | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------|-------|--------------------------|----------------|---------------------------|
|                                |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS          | KNOTS | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 63500.0                        | 61.9                  | -62.9          | 0.                     | -0. **               | 102.6                        | 564.6          |       | 2.2                      | 8.1            | 1.000023                  |
| 64000.0                        | 60.4                  | -62.4          | 0.                     | -0. **               | 99.9                         | 565.3          |       | 6.4                      | 7.0            | 1.000022                  |
| 64500.0                        | 59.0                  | -61.9          | 0.                     | -0. **               | 97.2                         | 565.9          |       | 11.0                     | 5.8            | 1.000022                  |
| 65000.0                        | 57.5                  | -61.4          | 0.                     | -0. **               | 94.7                         | 566.6          |       | 14.9                     | 4.8            | 1.000021                  |
| 65500.0                        | 56.1                  | -60.9          | 0.                     | -0. **               | 92.2                         | 567.2          |       | 14.2                     | 5.0            | 1.000021                  |
| 66000.0                        | 54.8                  | -60.4          | 0.                     | -0. **               | 89.7                         | 567.9          |       | 13.5                     | 5.2            | 1.000020                  |
| 66500.0                        | 53.5                  | -60.0          | 0.                     | -0. **               | 87.4                         | 568.5          |       | 354.8                    | 4.8            | 1.000019                  |
| 67000.0                        | 52.2                  | -59.5          | 0.                     | -0. **               | 85.1                         | 569.2          |       | 327.8                    | 4.0            | 1.000019                  |
| 67500.0                        | 50.9                  | -59.0          | 0.                     | -0. **               | 82.8                         | 569.8          |       | 303.8                    | 3.4            | 1.000018                  |
| 68000.0                        | 49.7                  | -58.5          | 0.                     | -0. **               | 80.6                         | 570.5          |       | 288.7                    | 3.4            | 1.000018                  |
| 68500.0                        | 48.5                  | -58.0          | 0.                     | -0. **               | 78.5                         | 571.1          |       | 273.7                    | 3.4            | 1.000017                  |
| 69000.0                        | 47.3                  | -57.5          | 0.                     | -0. **               | 76.5                         | 571.8          |       | 263.2                    | 3.2            | 1.000017                  |
| 69500.0                        | 46.2                  | -57.6          | 0.                     | -0. **               | 74.7                         | 571.6          |       | 253.9                    | 3.0            | 1.000017                  |
| 70000.0                        | 45.1                  | -58.0          | 0.                     | -0. **               | 73.0                         | 571.2          |       | 246.8                    | 2.7            | 1.000016                  |
| 70500.0                        | 44.0                  | -58.3          | 0.                     | -0. **               | 71.4                         | 570.7          |       | 248.0                    | 2.0            | 1.000016                  |
| 71000.0                        | 43.0                  | -58.6          | 0.                     | -0. **               | 69.8                         | 570.3          |       | 249.2                    | 1.2            | 1.000016                  |
| 71500.0                        | 41.9                  | -59.0          | 0.                     | -0. **               | 68.2                         | 569.9          |       | 256.1                    | 1.0            | 1.000015                  |
| 72000.0                        | 40.9                  | -59.3          | 0.                     | -0. **               | 66.7                         | 569.4          |       | 271.9                    | 1.8            | 1.000015                  |
| 72500.0                        | 40.0                  | -59.6          | 0.                     | -0. **               | 65.2                         | 569.0          |       | 287.7                    | 2.6            | 1.000015                  |
| 73000.0                        | 39.0                  | -58.7          | 0.                     | -0. **               | 63.4                         | 570.2          |       | 296.0                    | 2.8            | 1.000014                  |
| 73500.0                        | 38.1                  | -57.9          | 0.                     | -0. **               | 61.7                         | 571.3          |       | 297.7                    | 2.3            | 1.000014                  |
| 74000.0                        | 37.2                  | -57.0          | 0.                     | -0. **               | 59.9                         | 572.5          |       | 299.4                    | 1.8            | 1.000013                  |
| 74500.0                        | 36.3                  | -57.2          | 0.                     | -0. **               | 58.6                         | 572.2          |       | 317.7                    | 1.7            | 1.000013                  |
| 75000.0                        | 35.5                  | -57.7          | 0.                     | -0. **               | 57.3                         | 571.6          |       | 344.6                    | 1.9            | 1.000013                  |
| 75500.0                        | 34.6                  | -58.1          | 0.                     | -0. **               | 56.1                         | 571.0          |       | 11.4                     | 2.0            | 1.000012                  |
| 76000.0                        | 33.8                  | -58.6          | 0.                     | -0. **               | 54.9                         | 570.3          |       | 39.6                     | 2.3            | 1.000012                  |
| 76500.0                        | 33.0                  | -59.1          | 0.                     | -0. **               | 53.7                         | 569.7          |       | 68.0                     | 2.5            | 1.000012                  |
| 77000.0                        | 32.2                  | -58.4          | 0.                     | -0. **               | 52.3                         | 570.6          |       | 96.5                     | 2.7            | 1.000012                  |
| 77500.0                        | 31.4                  | -57.7          | 0.                     | -0. **               | 50.9                         | 571.6          |       | 67.2                     | 2.1            | 1.000011                  |
| 78000.0                        | 30.7                  | -57.0          | 0.                     | -0. **               | 49.5                         | 572.5          |       | 32.2                     | 1.3            | 1.000011                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA  
082000Z904  
WHITE SANDS SITE

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT 68 0350 HRS MDT  
ASCENSION NO. 867

WSTM SITE COORDINATES  
48580.00 FEET E  
185045.00 FEET N

TABLE VII (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES<br>CENTIGRADE | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|---------------------------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       |                                             |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 78500.0                           | 30.0                  | -56.3                                       | -0. **               | 48.2                         | 573.4                      | 356.9                    | 0.6            | 1.000011                  |
| 79000.0                           | 29.3                  | -55.6                                       | -0. **               | 46.9                         | 574.4                      | 314.0                    | 2.4            | 1.000010                  |
| 79500.0                           | 28.6                  | -55.2                                       | -0. **               | 45.7                         | 574.8                      | 271.1                    | 4.1            | 1.000010                  |
| 80000.0                           | 27.9                  | -55.1                                       | -0. **               | 44.6                         | 575.0                      | 234.2                    | 5.8            | 1.000010                  |
| 80500.0                           | 27.3                  | -54.9                                       | -0. **               | 43.6                         | 575.2                      | 231.7                    | 7.3            | 1.000010                  |
| 81000.0                           | 26.7                  | -54.8                                       | -0. **               | 42.5                         | 575.4                      | 229.3                    | 8.7            | 1.000009                  |
| 81500.0                           | 26.0                  | -54.7                                       | -0. **               | 41.5                         | 575.5                      | 227.0                    | 10.3           | 1.000009                  |
| 82000.0                           | 25.4                  | -54.5                                       | -0. **               | 40.5                         | 575.7                      | 225.4                    | 12.6           | 1.000009                  |
| 82500.0                           | 24.8                  | -54.4                                       | -0. **               | 39.6                         | 575.9                      | 223.7                    | 14.8           | 1.000009                  |
| 83000.0                           | 24.3                  | -54.3                                       | -0. **               | 38.6                         | 576.1                      | 223.2                    | 16.2           | 1.000009                  |
| 83500.0                           | 23.7                  | -54.1                                       | -0. **               | 37.7                         | 576.3                      | 223.7                    | 16.9           | 1.000008                  |
| 84000.0                           | 23.2                  | -54.0                                       | -0. **               | 36.8                         | 576.5                      | 224.2                    | 17.6           | 1.000008                  |
| 84500.0                           | 22.6                  | -53.8                                       | -0. **               | 35.9                         | 576.6                      | 227.2                    | 18.9           | 1.000008                  |
| 85000.0                           | 22.1                  | -53.7                                       | -0. **               | 35.1                         | 576.8                      | 231.1                    | 20.4           | 1.000008                  |
| 85500.0                           | 21.6                  | -53.6                                       | -0. **               | 34.3                         | 577.0                      | 235.1                    | 21.9           | 1.000008                  |
| 86000.0                           | 21.1                  | -53.4                                       | -0. **               | 33.4                         | 577.2                      | 239.0                    | 22.4           | 1.000007                  |
| 86500.0                           | 20.6                  | -53.3                                       | -0. **               | 32.7                         | 577.4                      | 242.9                    | 22.9           | 1.000007                  |
| 87000.0                           | 20.1                  | -53.2                                       | -0. **               | 31.9                         | 577.5                      | 246.6                    | 23.5           | 1.000007                  |
| 87500.0                           | 19.7                  | -53.0                                       | -0. **               | 31.1                         | 577.7                      | 249.3                    | 24.7           | 1.000007                  |
| 88000.0                           | 19.2                  | -52.9                                       | -0. **               | 30.4                         | 577.9                      | 251.9                    | 26.0           | 1.000007                  |
| 88500.0                           | 18.8                  | -52.7                                       | -0. **               | 29.7                         | 578.1                      | 253.2                    | 26.7           | 1.000007                  |
| 89000.0                           | 18.3                  | -52.6                                       | -0. **               | 29.0                         | 578.3                      | 252.2                    | 26.2           | 1.000006                  |
| 89500.0                           | 17.9                  | -52.5                                       | -0. **               | 28.3                         | 578.4                      | 251.2                    | 25.7           | 1.000006                  |
| 90000.0                           | 17.5                  | -52.3                                       | -0. **               | 27.6                         | 578.6                      | 250.0                    | 25.2           | 1.000006                  |
| 90500.0                           | 17.1                  | -52.2                                       | -0. **               | 26.9                         | 578.8                      | 248.6                    | 24.8           | 1.000006                  |
| 91000.0                           | 16.7                  | -52.1                                       | -0. **               | 26.3                         | 579.0                      | 247.3                    | 24.4           | 1.000006                  |
| 91500.0                           | 16.3                  | -51.9                                       | -0. **               | 25.7                         | 579.2                      | 246.6                    | 24.3           | 1.000006                  |
| 92000.0                           | 15.9                  | -51.8                                       | -0. **               | 25.1                         | 579.3                      | 246.2                    | 24.3           | 1.000006                  |
| 92500.0                           | 15.6                  | -51.6                                       | -0. **               | 24.5                         | 579.5                      | 245.7                    | 24.2           | 1.000005                  |
| 93000.0                           | 15.2                  | -51.5                                       | -0. **               | 23.9                         | 579.7                      | 247.6                    | 25.3           | 1.000005                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0350 HRS MDT  
ASCENSION NO. 867

UPPER AIR DATA  
0820003904  
WHITE SANDS SITE

WSTM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE VII (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 93500.0                           | 14.9                  | -51.4          | 0.                     | -0. **               | 23.3                         | 579.9                      | 249.5                    | 26.5           | 1.000005                  |
| 94000.0                           | 14.5                  | -51.2          | 0.                     | -0. **               | 22.8                         | 580.1                      | 251.3                    | 27.4           | 1.000005                  |
| 94500.0                           | 14.2                  | -51.1          | 0.                     | -0. **               | 22.2                         | 580.2                      | 252.2                    | 27.8           | 1.000005                  |
| 95000.0                           | 13.8                  | -51.0          | 0.                     | -0. **               | 21.7                         | 580.4                      | 253.1                    | 28.2           | 1.000005                  |
| 95500.0                           | 13.5                  | -50.8          | 0.                     | -0. **               | 21.2                         | 580.6                      | 254.0                    | 28.9           | 1.000005                  |
| 96000.0                           | 13.2                  | -50.7          | 0.                     | -0. **               | 20.7                         | 580.8                      | 255.0                    | 30.0           | 1.000005                  |
| 96500.0                           | 12.9                  | -50.5          | 0.                     | -0. **               | 20.2                         | 581.0                      | 255.9                    | 31.1           | 1.000004                  |
| 97000.0                           | 12.6                  | -50.4          | 0.                     | -0. **               | 19.7                         | 581.1                      |                          |                | 1.000004                  |
| 97500.0                           | 12.3                  | -50.3          | 0.                     | -0. **               | 19.3                         | 581.3                      |                          |                | 1.000004                  |
| 98000.0                           | 12.0                  | -50.1          | 0.                     | -0. **               | 18.8                         | 581.5                      |                          |                | 1.000004                  |
| 98500.0                           | 11.8                  | -50.0          | 0.                     | -0. **               | 18.4                         | 581.7                      |                          |                | 1.000004                  |
| 99000.0                           | 11.5                  | -49.9          | 0.                     | -0. **               | 17.9                         | 581.9                      |                          |                | 1.000004                  |
| 99500.0                           | 11.2                  | -49.7          | 0.                     | -0. **               | 17.5                         | 582.0                      |                          |                | 1.000004                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0350 HRS MDT  
ASCENSION NO. 867

MANDATORY LEVELS  
0820003904  
WHITE SANDS SITE

TABLE VIII

| PRESSURE GEOPOTENTIAL |        | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | WIND DATA                |                |
|-----------------------|--------|----------------|------------------------|----------------------|--------------------------|----------------|
| MILLIBARS             | FEET   | AIR<br>DEGREES | CENPOINT<br>CENTIGRADE |                      | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |
| 850.0                 | 5107.  | 11.3           | -3.2                   | 36.                  | 154.9                    | 9.6            |
| 800.0                 | 6770.  | 11.0           | -4.5                   | 33.                  | 113.8                    | 10.9           |
| 750.0                 | 8527.  | 8.1            | -6.9                   | 34.                  | 141.8                    | 4.5            |
| 700.0                 | 10389. | 6.1            | -9.2                   | 32.                  | 309.6                    | 8.3            |
| 650.0                 | 12362. | 1.1            | -12.7                  | 35.                  | 317.4                    | 12.8           |
| 600.0                 | 14469. | -0.8           | -15.0                  | 33.                  | 332.7                    | 13.7           |
| 550.0                 | 16732. | -4.8           | -18.1                  | 35.                  | 340.0                    | 12.1           |
| 500.0                 | 19171. | -9.5           | -22.5                  | 34.                  | 353.8                    | 16.7           |
| 450.0                 | 21815. | -14.9          | -28.0                  | 32.                  | 334.0                    | 22.1           |
| 400.0                 | 24704. | -21.6          | -34.4                  | 31.                  | 340.9                    | 27.1           |
| 350.0                 | 27879. | -30.0          | -42.0                  | 30.                  | 337.8                    | 26.5           |
| 300.0                 | 31409. | -39.6          | -51.1                  | 29.**                | 355.6                    | 29.4           |
| 250.0                 | 35411. | -49.9          | -66.9                  | 12.**                | 26.0                     | 35.5           |
| 200.0                 | 40065. | -62.1          | 0.                     | -0.**                | 30.9                     | 40.7           |
| 175.0                 | 42729. | -69.0          | 0.                     | -0.**                | 20.4                     | 40.1           |
| 150.0                 | 45738. | -70.4          | 0.                     | -0.**                | 5.1                      | 35.8           |
| 125.0                 | 49278. | -68.3          | 0.                     | -0.**                | 335.1                    | 30.7           |
| 100.0                 | 53683. | -67.9          | 0.                     | -0.**                | 345.4                    | 27.9           |
| 80.0                  | 58120. | -63.2          | 0.                     | -0.**                | 339.2                    | 18.4           |
| 70.0                  | 60798. | -65.3          | 0.                     | -0.**                | 354.1                    | 13.3           |
| 60.0                  | 63899. | -62.3          | 0.                     | -0.**                | 7.2                      | 6.8            |
| 50.0                  | 67626. | -58.6          | 0.                     | -0.**                | 293.4                    | 3.4            |
| 40.0                  | 71232. | -59.6          | 0.                     | -0.**                | 287.2                    | 2.6            |
| 30.0                  | 78182. | -56.3          | 0.                     | -0.**                | 358.9                    | 0.6            |
| 25.0                  | 82003. | -54.4          | 0.                     | -0.**                | 224.3                    | 14.0           |
| 20.0                  | 86707. | -53.1          | 0.                     | -0.**                | 247.0                    | 23.6           |
| 15.0                  | 92814. | -51.4          | 0.                     | -0.**                | 248.5                    | 25.8           |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
14 OCT. 68  
SCENSION NO. 868

SIGNIFICANT LEVEL DATA  
0800003904  
WHITE SANDS SITE

WSTM SITE COORDINATES  
488580.00FEET E  
185C45.00FEET N

TABLE IX

| PRESSURE GEOMETRIC |                      | TEMPERATURE    |                        | REL. HUM. |
|--------------------|----------------------|----------------|------------------------|-----------|
| MILLIBARS          | ALTITUDE<br>MSL FEET | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |           |
| 887.0              | 3989.0               | 9.0            | -2.0                   | 46.0      |
| 877.0              | 4298.9               | 11.7           | 0.2                    | 45.0      |
| 764.0              | 8052.7               | 6.5            | -2.6                   | 52.0      |
| 740.0              | 8911.0               | 5.0            | -5.7                   | 46.0      |
| 732.0              | 9203.6               | 7.1            | -6.3                   | 38.0      |
| 583.0              | 15260.2              | -1.1           | -15.4                  | 33.0      |
| 524.0              | 18027.8              | -6.9           | -18.9                  | 38.0      |
| 496.0              | 19433.3              | -8.3           | -22.9                  | 30.0      |
| 484.0              | 20057.2              | -9.3           | -25.8                  | 25.0      |
| 410.0              | 24203.0              | -18.4          | -33.3                  | 26.0      |
| 295.0              | 31954.7              | -39.2          | -50.1                  | 31.0      |
| 240.0              | 36494.1              | -50.8          | 0.                     | -0. **    |
| 184.0              | 42027.8              | -63.7          | 0.                     | -0. **    |
| 147.0              | 46465.4              | -73.0          | 0.                     | -0. **    |
| 140.0              | 47414.0              | -70.6          | 0.                     | -0. **    |
| 124.0              | 49775.4              | -72.7          | 0.                     | -0. **    |
| 117.0              | 50913.1              | -68.2          | 0.                     | -0. **    |
| 102.0              | 53632.0              | -67.8          | 0.                     | -0. **    |
| 92.0               | 55695.8              | -64.5          | 0.                     | -0. **    |
| 82.0               | 58008.9              | -65.8          | 0.                     | -0. **    |
| 75.0               | 59804.2              | -64.2          | 0.                     | -0. **    |
| 63.0               | 63326.4              | -64.2          | 0.                     | -0. **    |
| 61.0               | 63984.9              | -60.0          | 0.                     | -0. **    |
| 54.0               | 66488.3              | -61.6          | 0.                     | -0. **    |
| 43.0               | 71204.0              | -56.7          | 0.                     | -0. **    |
| 30.0               | 78763.2              | -55.7          | 0.                     | -0. **    |
| 27.0               | 80995.9              | -53.0          | 0.                     | -0. **    |
| 21.0               | 86311.9              | -56.6          | 0.                     | -0. **    |
| 16.0               | 92073.6              | -52.5          | 0.                     | -0. **    |
| 11.0               | 100111.3             | -51.4          | 0.                     | -0. **    |
| 7.1                | 109711.7             | -43.0          | 0.                     | -0. **    |

\*\* RELATIVE HUMIDITY NOT SUPPLIED. ZERO VALUE ASSUMED FOR COMPUTATIONS.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0705 HRS MDT  
ASCENSION NO. 868

UPPER AIR DATA  
08000003904  
WHITE SANDS SITE

WSM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE X

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF       |  | WIND DATA<br>DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------|--|---------------------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | SOUND<br>KNOTS |  |                                       |                |                           |
| 3989.0                            | 887.0                 | 9.0            | -2.0                   | 46.0                 | 1092.9                       | 654.8          |  | 210.0                                 | 6.0            | 1.000269                  |
| 4090.0                            | 886.6                 | 9.1            | -1.9                   | 46.0                 | 1092.0                       | 654.9          |  | 209.6                                 | 6.1            | 1.000269                  |
| 4500.0                            | 870.5                 | 11.4           | 0.0                    | 45.4                 | 1063.0                       | 657.7          |  | 190.9                                 | 8.3            | 1.000265                  |
| 5000.0                            | 854.7                 | 10.7           | -0.3                   | 46.3                 | 1046.2                       | 656.9          |  | 172.2                                 | 10.5           | 1.000261                  |
| 5500.0                            | 839.1                 | 10.0           | -0.7                   | 47.2                 | 1029.7                       | 656.1          |  | 153.5                                 | 12.7           | 1.000257                  |
| 6000.0                            | 823.9                 | 9.3            | -1.0                   | 48.2                 | 1013.5                       | 655.3          |  | 134.7                                 | 14.9           | 1.000253                  |
| 6500.0                            | 808.9                 | 8.7            | -1.4                   | 49.1                 | 997.5                        | 654.5          |  | 123.7                                 | 15.5           | 1.000248                  |
| 7000.0                            | 794.1                 | 8.0            | -1.8                   | 50.0                 | 981.8                        | 653.7          |  | 126.9                                 | 13.3           | 1.000244                  |
| 7500.0                            | 779.7                 | 7.3            | -2.2                   | 51.0                 | 966.3                        | 652.9          |  | 133.3                                 | 10.0           | 1.000240                  |
| 8000.0                            | 765.5                 | 6.6            | -2.6                   | 51.9                 | 951.1                        | 652.0          |  | 143.1                                 | 5.6            | 1.000236                  |
| 8500.0                            | 751.4                 | 5.7            | -4.2                   | 48.9                 | 936.7                        | 651.0          |  | 86.2                                  | 3.7            | 1.000231                  |
| 9000.0                            | 737.6                 | 5.6            | -5.8                   | 43.6                 | 919.9                        | 650.8          |  | 353.0                                 | 3.2            | 1.000224                  |
| 9500.0                            | 723.9                 | 6.7            | -6.7                   | 37.8                 | 899.5                        | 652.0          |  | 330.7                                 | 5.7            | 1.000218                  |
| 10000.0                           | 710.4                 | 6.0            | -7.5                   | 37.3                 | 885.0                        | 651.2          |  | 325.7                                 | 9.0            | 1.000214                  |
| 10500.0                           | 697.2                 | 5.3            | -8.2                   | 36.9                 | 870.7                        | 650.4          |  | 326.6                                 | 11.6           | 1.000210                  |
| 11000.0                           | 684.2                 | 4.7            | -9.0                   | 36.5                 | 856.6                        | 649.6          |  | 327.1                                 | 14.0           | 1.000206                  |
| 11500.0                           | 671.5                 | 4.0            | -9.7                   | 36.1                 | 842.8                        | 648.8          |  | 323.0                                 | 15.4           | 1.000202                  |
| 12000.0                           | 659.0                 | 3.3            | -10.5                  | 35.7                 | 829.2                        | 647.9          |  | 320.4                                 | 16.5           | 1.000198                  |
| 12500.0                           | 646.7                 | 2.6            | -11.2                  | 35.3                 | 815.8                        | 647.1          |  | 320.7                                 | 16.9           | 1.000195                  |
| 13000.0                           | 634.7                 | 2.0            | -12.0                  | 34.9                 | 802.6                        | 646.3          |  | 322.3                                 | 17.2           | 1.000191                  |
| 13500.0                           | 622.9                 | 1.3            | -12.7                  | 34.5                 | 789.7                        | 645.5          |  | 324.9                                 | 17.0           | 1.000188                  |
| 14000.0                           | 611.3                 | 0.6            | -13.5                  | 34.0                 | 776.9                        | 644.7          |  | 328.4                                 | 17.1           | 1.000184                  |
| 14500.0                           | 599.9                 | -0.1           | -14.2                  | 33.6                 | 764.4                        | 643.9          |  | 332.3                                 | 17.3           | 1.000181                  |
| 15000.0                           | 588.7                 | -0.7           | -15.0                  | 33.2                 | 752.1                        | 643.0          |  | 334.3                                 | 17.4           | 1.000177                  |
| 15500.0                           | 577.6                 | -1.6           | -15.7                  | 33.4                 | 740.3                        | 642.0          |  | 335.9                                 | 17.4           | 1.000174                  |
| 16000.0                           | 566.6                 | -2.7           | -16.3                  | 34.3                 | 729.0                        | 640.8          |  | 335.8                                 | 17.7           | 1.000171                  |
| 16500.0                           | 555.8                 | -3.7           | -16.9                  | 35.2                 | 717.9                        | 639.5          |  | 335.4                                 | 18.1           | 1.000168                  |
| 17000.0                           | 545.2                 | -4.7           | -17.6                  | 36.1                 | 706.9                        | 638.3          |  | 337.4                                 | 19.0           | 1.000166                  |
| 17500.0                           | 534.8                 | -5.8           | -18.2                  | 37.0                 | 696.2                        | 637.0          |  | 339.6                                 | 19.8           | 1.000163                  |
| 18000.0                           | 524.6                 | -6.8           | -18.9                  | 37.9                 | 685.6                        | 635.7          |  | 343.0                                 | 20.1           | 1.000160                  |

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0705 HRS MDT  
ASCENSION NO. 868

UPPER AIR DATA  
0800003904  
WHITE SANDS SITE  
TABLE X (Cont)

WSTM SITE COORDINATES  
40°58'00" N  
185°04'50" W

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES<br>CENTIGRADE | TEMPERATURE<br>DEWPOINT<br>CENTIGRADE | REL.HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|---------------------------------------------|---------------------------------------|---------------------|------------------------------|----------------------------|--------------------------|----------------|---------------------------|
|                                   |                       |                                             |                                       |                     |                              |                            | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 18500.0                           | 514.4                 | -7.4                                        | -20.2                                 | 35.3                | 673.8                        | 635.1                      | 346.5                    | 20.5           | 1.000157                  |
| 19000.0                           | 504.5                 | -7.9                                        | -21.6                                 | 32.5                | 662.0                        | 634.5                      | 350.6                    | 21.3           | 1.000153                  |
| 19500.0                           | 494.7                 | -8.4                                        | -23.2                                 | 29.5                | 650.6                        | 633.8                      | 353.5                    | 21.9           | 1.000150                  |
| 20000.0                           | 485.1                 | -9.2                                        | -25.5                                 | 25.5                | 640.0                        | 632.8                      | 353.8                    | 22.0           | 1.000147                  |
| 20500.0                           | 475.5                 | -10.3                                       | -26.6                                 | 25.1                | 629.9                        | 631.5                      | 354.1                    | 22.8           | 1.000144                  |
| 21000.0                           | 466.1                 | -11.4                                       | -27.5                                 | 25.2                | 620.0                        | 630.2                      | 354.2                    | 24.5           | 1.000142                  |
| 21500.0                           | 456.8                 | -12.5                                       | -28.4                                 | 25.3                | 610.3                        | 628.8                      | 354.5                    | 25.9           | 1.000139                  |
| 22000.0                           | 447.8                 | -13.6                                       | -29.2                                 | 25.5                | 600.7                        | 627.5                      | 355.1                    | 26.8           | 1.000137                  |
| 22500.0                           | 438.9                 | -14.7                                       | -30.2                                 | 25.6                | 591.4                        | 626.2                      | 355.6                    | 27.6           | 1.000135                  |
| 23000.0                           | 430.2                 | -15.8                                       | -31.1                                 | 25.7                | 582.1                        | 624.8                      | 356.0                    | 28.3           | 1.000132                  |
| 23500.0                           | 421.7                 | -16.9                                       | -32.0                                 | 25.8                | 573.1                        | 623.5                      | 355.9                    | 28.7           | 1.000130                  |
| 24000.0                           | 413.3                 | -18.0                                       | -32.9                                 | 26.0                | 564.1                        | 622.1                      | 355.0                    | 28.7           | 1.000128                  |
| 24500.0                           | 404.9                 | -19.2                                       | -33.9                                 | 26.2                | 555.3                        | 620.6                      | 354.1                    | 28.7           | 1.000126                  |
| 25000.0                           | 396.4                 | -20.5                                       | -35.0                                 | 26.5                | 546.5                        | 619.0                      | 353.6                    | 28.9           | 1.000124                  |
| 25500.0                           | 388.0                 | -21.9                                       | -36.0                                 | 26.8                | 537.9                        | 617.3                      | 353.5                    | 29.2           | 1.000121                  |
| 26000.0                           | 379.9                 | -23.2                                       | -37.1                                 | 27.2                | 529.4                        | 615.6                      | 354.2                    | 29.7           | 1.000119                  |
| 26500.0                           | 371.9                 | -24.6                                       | -38.1                                 | 27.5                | 521.1                        | 614.0                      | 354.9                    | 30.2           | 1.000117                  |
| 27000.0                           | 364.1                 | -25.9                                       | -39.2                                 | 27.8                | 513.0                        | 612.3                      | 355.2                    | 30.7           | 1.000115                  |
| 27500.0                           | 356.4                 | -27.2                                       | -40.3                                 | 28.1                | 504.9                        | 610.7                      | 355.5                    | 31.0           | 1.000114                  |
| 28000.0                           | 348.9                 | -28.6                                       | -41.4                                 | 28.4                | 497.0                        | 609.0                      | 355.5                    | 30.7           | 1.000112                  |
| 28500.0                           | 341.6                 | -29.9                                       | -42.5                                 | 28.8                | 489.3                        | 607.3                      | 355.5                    | 30.6           | 1.000110                  |
| 29000.0                           | 334.4                 | -31.3                                       | -43.6                                 | 29.1                | 481.7                        | 605.6                      | 356.4                    | 30.9           | 1.000108                  |
| 29500.0                           | 327.4                 | -32.6                                       | -44.6                                 | 29.4                | 474.2                        | 603.9                      | 357.4                    | 31.2           | 1.000106                  |
| 30000.0                           | 320.5                 | -34.0                                       | -45.7                                 | 29.7                | 466.8                        | 602.2                      | 359.0                    | 31.0           | 1.000105                  |
| 30500.0                           | 313.8                 | -35.3                                       | -46.8                                 | 30.1                | 459.6                        | 600.6                      | 0.8                      | 30.5           | 1.000103                  |
| 31000.0                           | 307.2                 | -36.6                                       | -48.0                                 | 30.4                | 452.5                        | 598.9                      | 3.4                      | 28.2           | 1.000101                  |
| 31500.0                           | 300.8                 | -38.0                                       | -49.1                                 | 30.7                | 445.5                        | 597.1                      | 5.0                      | 26.3           | 1.000100                  |
| 32000.0                           | 294.4                 | -39.3                                       | -50.3                                 | 30.7**              | 438.6                        | 595.4                      | 5.8                      | 29.8           | 1.000098                  |
| 32500.0                           | 287.8                 | -40.6                                       | -52.4                                 | 27.3**              | 431.1                        | 593.8                      | 5.7                      | 33.2           | 1.000096                  |
| 33000.0                           | 281.3                 | -41.9                                       | -54.7                                 | 23.9**              | 423.8                        | 592.2                      | 6.3                      | 33.8           | 1.000095                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.



STATION ALTITUDE 3989.00 FEET MSL

24 OCT. 68

ASCENSION NO. 868

UPPER AIR DATA

0800003904

WHITE SANDS SITE

MSTM SITE COORDINATES

48580.00 FEET N

189045.00 FEET W

0705 HRS MDT

TABLE X (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA<br>DIRECTION<br>DEGREES (TN) | SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|----------------------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS |                                        |                |                           |
| 33500.0                           | 275.0                 | -43.1          | -57.0                  | 20.4**               | 416.6                        | 590.5             |       | 6.8                                    | 34.3           | 1.000093                  |
| 34000.0                           | 268.8                 | -44.4          | -59.6                  | 17.0**               | 409.5                        | 588.9             |       | 6.7                                    | 37.6           | 1.000091                  |
| 34500.0                           | 262.8                 | -45.7          | -62.3                  | 13.6**               | 402.5                        | 587.2             |       | 6.7                                    | 40.8           | 1.000090                  |
| 35000.0                           | 256.9                 | -47.0          | -65.5                  | 10.2**               | 395.7                        | 585.6             |       | 9.5                                    | 37.3           | 1.000088                  |
| 35500.0                           | 251.1                 | -48.3          | -69.5                  | 6.8**                | 389.0                        | 583.9             |       | 12.3                                   | 33.9           | 1.000087                  |
| 36000.0                           | 245.5                 | -49.5          | -75.1                  | 3.4**                | 382.4                        | 582.3             |       | 15.2                                   | 34.1           | 1.000085                  |
| 36500.0                           | 239.9                 | -50.8          | 0.                     | -0. **               | 376.0                        | 580.6             |       | 18.0                                   | 34.4           | 1.000084                  |
| 37000.0                           | 234.2                 | -52.0          | 0.                     | -0. **               | 369.0                        | 579.1             |       | 19.7                                   | 35.9           | 1.000082                  |
| 37500.0                           | 228.7                 | -53.1          | 0.                     | -0. **               | 362.2                        | 577.5             |       | 21.6                                   | 37.2           | 1.000081                  |
| 38000.0                           | 223.3                 | -54.3          | 0.                     | -0. **               | 355.4                        | 576.0             |       | 24.4                                   | 37.9           | 1.000079                  |
| 38500.0                           | 218.0                 | -55.5          | 0.                     | -0. **               | 348.9                        | 574.5             |       | 26.8                                   | 38.9           | 1.000078                  |
| 39000.0                           | 212.8                 | -56.6          | 0.                     | -0. **               | 342.4                        | 572.9             |       | 27.9                                   | 41.7           | 1.000076                  |
| 39500.0                           | 207.7                 | -57.8          | 0.                     | -0. **               | 336.1                        | 571.4             |       | 28.9                                   | 44.1           | 1.000075                  |
| 40000.0                           | 202.8                 | -59.0          | 0.                     | -0. **               | 329.9                        | 569.8             |       | 28.8                                   | 41.2           | 1.000073                  |
| 40500.0                           | 198.0                 | -60.1          | 0.                     | -0. **               | 323.9                        | 568.3             |       | 28.7                                   | 38.3           | 1.000072                  |
| 41000.0                           | 193.3                 | -61.3          | 0.                     | -0. **               | 317.9                        | 566.7             |       | 26.4                                   | 39.0           | 1.000071                  |
| 41500.0                           | 188.7                 | -62.5          | 0.                     | -0. **               | 312.1                        | 565.2             |       | 23.8                                   | 40.2           | 1.000069                  |
| 42000.0                           | 184.2                 | -63.6          | 0.                     | -0. **               | 306.4                        | 563.6             |       | 26.4                                   | 40.4           | 1.000068                  |
| 42500.0                           | 179.7                 | -64.7          | 0.                     | -0. **               | 300.3                        | 562.2             |       | 32.1                                   | 39.9           | 1.000067                  |
| 43000.0                           | 175.2                 | -65.7          | 0.                     | -0. **               | 294.3                        | 560.8             |       | 35.3                                   | 40.4           | 1.000066                  |
| 43500.0                           | 170.8                 | -66.8          | 0.                     | -0. **               | 288.4                        | 559.4             |       | 35.1                                   | 42.1           | 1.000064                  |
| 44000.0                           | 166.5                 | -67.8          | 0.                     | -0. **               | 282.6                        | 557.9             |       | 35.1                                   | 43.1           | 1.000063                  |
| 44500.0                           | 162.4                 | -68.9          | 0.                     | -0. **               | 276.9                        | 556.5             |       | 35.8                                   | 42.5           | 1.000062                  |
| 45000.0                           | 158.3                 | -69.9          | 0.                     | -0. **               | 271.4                        | 555.1             |       | 35.8                                   | 41.8           | 1.000060                  |
| 45500.0                           | 154.4                 | -71.0          | 0.                     | -0. **               | 266.0                        | 553.6             |       | 27.9                                   | 40.6           | 1.000059                  |
| 46000.0                           | 150.5                 | -72.0          | 0.                     | -0. **               | 260.7                        | 552.2             |       | 20.0                                   | 39.5           | 1.000058                  |
| 46500.0                           | 146.7                 | -72.9          | 0.                     | -0. **               | 255.3                        | 551.0             |       | 15.1                                   | 39.1           | 1.000057                  |
| 47000.0                           | 143.0                 | -71.6          | 0.                     | -0. **               | 247.3                        | 552.7             |       | 10.7                                   | 38.9           | 1.000055                  |
| 47500.0                           | 139.4                 | -70.7          | 0.                     | -0. **               | 239.8                        | 554.1             |       | 3.8                                    | 37.8           | 1.000053                  |
| 48000.0                           | 135.8                 | -71.1          | 0.                     | -0. **               | 234.3                        | 553.5             |       | 355.2                                  | 36.3           | 1.000052                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0705 HRS MDT  
ASCENSION NO. 868

UPPER AIR DATA  
WHITT 0003904  
SIT

WSTM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE X (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 48500.0                           | 132.4                 | -71.6          | 0.                     | -0. **               | 228.8                        | 552.8             | 348.2 | 35.5                     | 1.000051       |                           |
| 49000.0                           | 129.0                 | -72.0          | 0.                     | -0. **               | 223.5                        | 552.2             | 343.6 | 35.9                     | 1.000050       |                           |
| 49500.0                           | 125.8                 | -72.5          | 0.                     | -0. **               | 218.3                        | 551.6             | 340.3 | 36.1                     | 1.000049       |                           |
| 50000.0                           | 122.6                 | -71.8          | 0.                     | -0. **               | 212.1                        | 552.5             | 341.6 | 36.0                     | 1.000047       |                           |
| 50500.0                           | 119.5                 | -69.8          | 0.                     | -0. **               | 204.8                        | 555.2             | 343.1 | 35.9                     | 1.000046       |                           |
| 51000.0                           | 116.5                 | -68.2          | 0.                     | -0. **               | 198.0                        | 557.5             | 348.1 | 36.8                     | 1.000044       |                           |
| 51500.0                           | 113.6                 | -68.1          | 0.                     | -0. **               | 193.0                        | 557.6             | 353.2 | 37.6                     | 1.000043       |                           |
| 52000.0                           | 110.8                 | -68.0          | 0.                     | -0. **               | 188.1                        | 557.7             | 354.2 | 36.6                     | 1.000042       |                           |
| 52500.0                           | 108.0                 | -68.0          | 0.                     | -0. **               | 183.4                        | 557.8             | 354.3 | 35.1                     | 1.000041       |                           |
| 53000.0                           | 105.3                 | -67.9          | 0.                     | -0. **               | 178.8                        | 557.9             | 354.5 | 33.4                     | 1.000040       |                           |
| 53500.0                           | 102.7                 | -67.8          | 0.                     | -0. **               | 174.2                        | 558.0             | 354.7 | 31.6                     | 1.000039       |                           |
| 54000.0                           | 100.1                 | -67.2          | 0.                     | -0. **               | 169.4                        | 558.8             | 355.1 | 29.5                     | 1.000038       |                           |
| 54500.0                           | 97.7                  | -66.4          | 0.                     | -0. **               | 164.6                        | 559.9             | 355.7 | 26.3                     | 1.000037       |                           |
| 55000.0                           | 95.3                  | -65.6          | 0.                     | -0. **               | 159.9                        | 560.9             | 356.3 | 23.1                     | 1.000036       |                           |
| 55500.0                           | 92.9                  | -64.8          | 0.                     | -0. **               | 155.4                        | 562.0             | 356.9 | 20.7                     | 1.000035       |                           |
| 56000.0                           | 90.6                  | -64.7          | 0.                     | -0. **               | 151.4                        | 562.2             | 357.5 | 18.3                     | 1.000034       |                           |
| 56500.0                           | 88.4                  | -65.0          | 0.                     | -0. **               | 147.9                        | 561.8             | 357.4 | 17.5                     | 1.000033       |                           |
| 57000.0                           | 86.2                  | -65.2          | 0.                     | -0. **               | 144.5                        | 561.5             | 356.5 | 18.0                     | 1.000032       |                           |
| 57500.0                           | 84.1                  | -65.5          | 0.                     | -0. **               | 141.1                        | 561.1             | 355.6 | 18.8                     | 1.000031       |                           |
| 58000.0                           | 82.0                  | -65.8          | 0.                     | -0. **               | 137.8                        | 560.7             | 354.5 | 20.4                     | 1.000031       |                           |
| 58500.0                           | 80.0                  | -65.4          | 0.                     | -0. **               | 134.2                        | 561.3             | 353.4 | 22.1                     | 1.000030       |                           |
| 59000.0                           | 78.1                  | -64.9          | 0.                     | -0. **               | 130.6                        | 561.9             | 353.3 | 22.7                     | 1.000029       |                           |
| 59500.0                           | 76.1                  | -64.5          | 0.                     | -0. **               | 127.1                        | 562.5             | 353.4 | 23.1                     | 1.000028       |                           |
| 60000.0                           | 74.3                  | -64.2          | 0.                     | -0. **               | 123.9                        | 562.9             | 353.7 | 22.5                     | 1.000028       |                           |
| 60500.0                           | 72.5                  | -64.2          | 0.                     | -0. **               | 120.8                        | 562.9             | 354.5 | 20.8                     | 1.000027       |                           |
| 61000.0                           | 70.7                  | -64.2          | 0.                     | -0. **               | 117.9                        | 562.9             | 355.3 | 18.9                     | 1.000026       |                           |
| 61500.0                           | 69.0                  | -64.2          | 0.                     | -0. **               | 115.0                        | 562.9             | 356.0 | 15.9                     | 1.000026       |                           |
| 62000.0                           | 67.3                  | -64.2          | 0.                     | -0. **               | 112.2                        | 562.9             | 356.7 | 12.9                     | 1.000025       |                           |
| 62500.0                           | 65.6                  | -64.2          | 0.                     | -0. **               | 109.4                        | 562.9             | 1.2   | 11.7                     | 1.000024       |                           |
| 63000.0                           | 64.0                  | -64.2          | 0.                     | -0. **               | 106.8                        | 562.9             | 7.6   | 11.4                     | 1.000024       |                           |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68  
ASCENSION NO. 658

UPPER AIR DATA  
0800003904  
WHITF SANDS SITE

WSTM SITE COORDINATES  
488580.00FEET E  
185045.00FEET N

TABLE X (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA<br>DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|---------------------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS |                                       |                |                           |
| 63500.0                           | 62.5                  | -63.1          | 0.                     | -0. **               | 103.6                        | 564.3             |       | 13.8                                  | 10.9           | 1.000023                  |
| 64000.0                           | 61.0                  | -60.0          | 0.                     | -0. **               | 99.6                         | 568.5             |       | 14.9                                  | 9.6            | 1.000022                  |
| 64500.0                           | 59.5                  | -60.3          | 0.                     | -0. **               | 97.4                         | 568.0             |       | 25.9                                  | 8.4            | 1.000022                  |
| 65000.0                           | 58.1                  | -60.6          | 0.                     | -0. **               | 95.2                         | 567.6             |       | 33.5                                  | 7.7            | 1.000021                  |
| 65500.0                           | 56.7                  | -61.0          | 0.                     | -0. **               | 93.0                         | 567.2             |       | 41.8                                  | 7.2            | 1.000021                  |
| 66000.0                           | 55.3                  | -61.3          | 0.                     | -0. **               | 90.9                         | 566.8             |       | 49.3                                  | 6.7            | 1.000020                  |
| 66500.0                           | 54.0                  | -61.6          | 0.                     | -0. **               | 88.9                         | 566.4             |       | 53.6                                  | 5.9            | 1.000020                  |
| 67000.0                           | 52.7                  | -61.1          | 0.                     | -0. **               | 86.5                         | 567.1             |       | 57.8                                  | 5.2            | 1.000019                  |
| 67500.0                           | 51.4                  | -60.5          | 0.                     | -0. **               | 84.3                         | 567.7             |       | 62.4                                  | 4.3            | 1.000019                  |
| 68000.0                           | 50.2                  | -60.0          | 0.                     | -0. **               | 82.1                         | 568.4             |       | 67.1                                  | 3.4            | 1.000018                  |
| 68500.0                           | 49.0                  | -59.5          | 0.                     | -0. **               | 79.9                         | 569.1             |       | 70.3                                  | 2.6            | 1.000018                  |
| 69000.0                           | 47.8                  | -59.0          | 0.                     | -0. **               | 77.8                         | 569.8             |       | 51.2                                  | 2.6            | 1.000017                  |
| 69500.0                           | 46.7                  | -58.5          | 0.                     | -0. **               | 75.8                         | 570.5             |       | 32.0                                  | 2.7            | 1.000017                  |
| 70000.0                           | 45.6                  | -58.0          | 0.                     | -0. **               | 73.8                         | 571.2             |       | 19.0                                  | 2.4            | 1.000016                  |
| 70500.0                           | 44.5                  | -57.4          | 0.                     | -0. **               | 71.9                         | 571.9             |       | 12.3                                  | 1.9            | 1.000016                  |
| 71000.0                           | 43.4                  | -56.9          | 0.                     | -0. **               | 70.0                         | 572.6             |       | 5.5                                   | 1.4            | 1.000016                  |
| 71500.0                           | 42.4                  | -56.7          | 0.                     | -0. **               | 68.2                         | 572.9             |       | 38.6                                  | 1.2            | 1.000015                  |
| 72000.0                           | 41.4                  | -56.6          | 0.                     | -0. **               | 66.6                         | 573.0             |       | 74.7                                  | 1.0            | 1.000015                  |
| 72500.0                           | 40.4                  | -56.5          | 0.                     | -0. **               | 65.0                         | 573.1             |       | 107.5                                 | 1.0            | 1.000014                  |
| 73000.0                           | 39.5                  | -56.5          | 0.                     | -0. **               | 63.5                         | 573.1             |       | 133.5                                 | 1.7            | 1.000014                  |
| 73500.0                           | 38.5                  | -56.4          | 0.                     | -0. **               | 62.0                         | 573.1             |       | 159.5                                 | 2.3            | 1.000014                  |
| 74000.0                           | 37.6                  | -56.3          | 0.                     | -0. **               | 60.5                         | 573.1             |       | 136.2                                 | 2.1            | 1.000013                  |
| 74500.0                           | 36.9                  | -56.3          | 0.                     | -0. **               | 59.0                         | 573.1             |       | 95.0                                  | 1.6            | 1.000013                  |
| 75000.0                           | 35.9                  | -56.2          | 0.                     | -0. **               | 57.6                         | 573.5             |       | 57.4                                  | 1.1            | 1.000013                  |
| 75500.0                           | 35.0                  | -56.1          | 0.                     | -0. **               | 56.3                         | 573.6             |       | 102.6                                 | 1.6            | 1.000013                  |
| 76000.0                           | 34.2                  | -56.1          | 0.                     | -0. **               | 54.9                         | 573.7             |       | 147.8                                 | 2.2            | 1.000012                  |
| 76500.0                           | 33.4                  | -56.0          | 0.                     | -0. **               | 53.6                         | 573.8             |       | 183.6                                 | 2.7            | 1.000012                  |
| 77000.0                           | 32.6                  | -55.9          | 0.                     | -0. **               | 52.3                         | 573.9             |       | 175.3                                 | 3.1            | 1.000012                  |
| 77500.0                           | 31.9                  | -55.9          | 0.                     | -0. **               | 51.1                         | 574.0             |       | 167.0                                 | 3.5            | 1.000011                  |
| 78000.0                           | 31.1                  | -55.8          | 0.                     | -0. **               | 49.9                         | 574.1             |       | 161.3                                 | 4.0            | 1.000011                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0705 HRS MDT  
ASCENSION NO. 868

UPPER AIR DATA  
Q800003904  
WHITE SANDS SITE

WSTM SITE COORDINATES  
488580.00FEET E  
1R5045.00FEET N

TABLE X (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 78500.0                           | 30.4                  | -55.7          | 0.                     | -0. **               | 48.7                         | 574.1             | 165.0 | 5.0                      | 1.000011       |                           |
| 79000.0                           | 29.7                  | -55.4          | 0.                     | -0. **               | 47.5                         | 574.6             | 168.7 | 6.0                      | 1.000011       |                           |
| 79500.0                           | 29.0                  | -54.8          | 0.                     | -0. **               | 46.2                         | 575.4             | 170.9 | 6.5                      | 1.000010       |                           |
| 80000.0                           | 28.3                  | -54.2          | 0.                     | -0. **               | 45.0                         | 576.2             | 168.9 | 5.8                      | 1.000010       |                           |
| 80500.0                           | 27.6                  | -53.6          | 0.                     | -0. **               | 43.9                         | 577.0             | 166.8 | 5.2                      | 1.000010       |                           |
| 81000.0                           | 27.0                  | -53.0          | 0.                     | -0. **               | 42.7                         | 577.7             | 170.3 | 4.7                      | 1.000010       |                           |
| 81500.0                           | 26.4                  | -53.3          | 0.                     | -0. **               | 41.8                         | 577.3             | 188.3 | 5.1                      | 1.000009       |                           |
| 82000.0                           | 25.7                  | -53.7          | 0.                     | -0. **               | 40.9                         | 576.8             | 206.4 | 5.4                      | 1.000009       |                           |
| 82500.0                           | 25.1                  | -54.0          | 0.                     | -0. **               | 40.0                         | 576.4             | 220.9 | 5.7                      | 1.000009       |                           |
| 83000.0                           | 24.6                  | -54.4          | 0.                     | -0. **               | 39.1                         | 576.0             | 227.0 | 5.8                      | 1.000009       |                           |
| 83500.0                           | 24.0                  | -54.7          | 0.                     | -0. **               | 38.3                         | 575.5             | 233.2 | 5.9                      | 1.000009       |                           |
| 84000.0                           | 23.4                  | -55.0          | 0.                     | -0. **               | 37.4                         | 575.1             | 240.8 | 6.4                      | 1.000008       |                           |
| 84500.0                           | 22.9                  | -55.4          | 0.                     | -0. **               | 36.6                         | 574.6             | 251.7 | 7.8                      | 1.000008       |                           |
| 85000.0                           | 22.3                  | -55.7          | 0.                     | -0. **               | 35.8                         | 574.2             | 262.6 | 9.2                      | 1.000008       |                           |
| 85500.0                           | 21.8                  | -56.1          | 0.                     | -0. **               | 35.0                         | 573.7             | 272.1 | 10.5                     | 1.000008       |                           |
| 86000.0                           | 21.3                  | -56.4          | 0.                     | -0. **               | 34.3                         | 573.3             | 276.7 | 11.5                     | 1.000008       |                           |
| 86500.0                           | 20.8                  | -56.5          | 0.                     | -0. **               | 33.5                         | 573.2             | 281.3 | 12.5                     | 1.000007       |                           |
| 87000.0                           | 20.3                  | -56.1          | 0.                     | -0. **               | 32.6                         | 573.6             | 285.9 | 13.5                     | 1.000007       |                           |
| 87500.0                           | 19.9                  | -55.8          | 0.                     | -0. **               | 31.8                         | 574.1             | 284.9 | 14.8                     | 1.000007       |                           |
| 88000.0                           | 19.4                  | -55.4          | 0.                     | -0. **               | 31.0                         | 574.6             | 283.0 | 16.1                     | 1.000007       |                           |
| 88500.0                           | 18.9                  | -55.0          | 0.                     | -0. **               | 30.3                         | 575.1             | 281.0 | 17.4                     | 1.000007       |                           |
| 89000.0                           | 18.5                  | -54.7          | 0.                     | -0. **               | 29.5                         | 575.5             | 279.6 | 18.5                     | 1.000007       |                           |
| 89500.0                           | 18.1                  | -54.3          | 0.                     | -0. **               | 28.8                         | 576.0             | 279.4 | 19.4                     | 1.000006       |                           |
| 90000.0                           | 17.6                  | -54.0          | 0.                     | -0. **               | 28.0                         | 576.5             | 279.2 | 20.4                     | 1.000006       |                           |
| 90500.0                           | 17.2                  | -53.6          | 0.                     | -0. **               | 27.4                         | 576.9             | 279.0 | 21.3                     | 1.000006       |                           |
| 91000.0                           | 16.8                  | -53.3          | 0.                     | -0. **               | 26.7                         | 577.4             | 274.9 | 21.8                     | 1.000006       |                           |
| 91500.0                           | 16.4                  | -52.9          | 0.                     | -0. **               | 26.0                         | 577.9             | 270.2 | 22.3                     | 1.000006       |                           |
| 92000.0                           | 16.1                  | -52.6          | 0.                     | -0. **               | 25.4                         | 578.3             | 265.4 | 22.8                     | 1.000006       |                           |
| 92500.0                           | 15.7                  | -52.4          | 0.                     | -0. **               | 24.8                         | 578.5             | 262.2 | 23.3                     | 1.000006       |                           |
| 93000.0                           | 15.3                  | -52.4          | 0.                     | -0. **               | 24.2                         | 578.6             | 262.1 | 24.0                     | 1.000005       |                           |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68 0705 HRS MDT  
ASCENSION NO. 868

UPPER AIR DATA  
0800003904  
WHITE SANDS SITE

WSTM SITE COORDINATES  
488580.00 FEET E  
185045.00 FEET N

TABLE X (Cont.)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS |                | WIND DATA |          | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|----------------------------|----------------|-----------|----------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | DIRECTION<br>DEGREES(TN)   | SPEED<br>KNOTS |           |          |                           |
| 93500.0                           | 15.0                  | -52.3          | 0.                     | -0. **               | 23.6                         | 578.7                      | 261.9          | 24.6      | 1.000005 |                           |
| 94000.0                           | 14.6                  | -52.2          | 0.                     | -0. **               | 23.1                         | 578.7                      | 261.8          | 25.3      | 1.000005 |                           |
| 94500.0                           | 14.3                  | -52.2          | 0.                     | -0. **               | 22.5                         | 578.8                      | 260.7          | 25.5      | 1.000005 |                           |
| 95000.0                           | 14.0                  | -52.1          | 0.                     | -0. **               | 22.0                         | 578.9                      | 259.4          | 25.6      | 1.000005 |                           |
| 95500.0                           | 13.6                  | -52.0          | 0.                     | -0. **               | 21.5                         | 579.0                      | 258.1          | 25.7      | 1.000005 |                           |
| 96000.0                           | 13.3                  | -52.0          | 0.                     | -0. **               | 21.0                         | 579.1                      | 257.3          | 25.8      | 1.000005 |                           |
| 96500.0                           | 13.0                  | -51.9          | 0.                     | -0. **               | 20.5                         | 579.2                      | 258.0          | 25.8      | 1.000005 |                           |
| 97000.0                           | 12.7                  | -51.8          | 0.                     | -0. **               | 20.0                         | 579.3                      | 258.6          | 25.9      | 1.000004 |                           |
| 97500.0                           | 12.4                  | -51.8          | 0.                     | -0. **               | 19.6                         | 579.4                      | 259.2          | 26.0      | 1.000004 |                           |
| 98000.0                           | 12.1                  | -51.7          | 0.                     | -0. **               | 19.1                         | 579.5                      | 259.2          | 27.0      | 1.000004 |                           |
| 98500.0                           | 11.9                  | -51.6          | 0.                     | -0. **               | 18.6                         | 579.5                      | 258.9          | 28.3      | 1.000004 |                           |
| 99000.0                           | 11.6                  | -51.6          | 0.                     | -0. **               | 18.2                         | 579.6                      | 258.6          | 29.6      | 1.000004 |                           |
| 99500.0                           | 11.3                  | -51.5          | 0.                     | -0. **               | 17.8                         | 579.7                      | 258.3          | 31.0      | 1.000004 |                           |
| 100000.0                          | 11.1                  | -51.4          | 0.                     | -0. **               | 17.4                         | 579.8                      | 258.0          | 32.5      | 1.000004 |                           |
| 100500.0                          | 10.8                  | -51.1          | 0.                     | -0. **               | 17.0                         | 580.3                      | 257.7          | 34.0      | 1.000004 |                           |
| 101000.0                          | 10.6                  | -50.6          | 0.                     | -0. **               | 16.5                         | 580.9                      | 257.4          | 35.5      | 1.000004 |                           |
| 101500.0                          | 10.3                  | -50.2          | 0.                     | -0. **               | 16.1                         | 581.4                      | 257.9          | 36.1      | 1.000004 |                           |
| 102000.0                          | 10.1                  | -49.7          | 0.                     | -0. **               | 15.7                         | 582.0                      | 258.8          | 36.2      | 1.000004 |                           |
| 102500.0                          | 9.9                   | -49.3          | 0.                     | -0. **               | 15.4                         | 582.6                      | 259.8          | 36.3      | 1.000003 |                           |
| 103000.0                          | 9.6                   | -48.9          | 0.                     | -0. **               | 15.0                         | 583.1                      | 260.7          | 36.4      | 1.000003 |                           |
| 103500.0                          | 9.4                   | -48.4          | 0.                     | -0. **               | 14.6                         | 583.7                      | 261.6          | 36.6      | 1.000003 |                           |
| 104000.0                          | 9.2                   | -48.0          | 0.                     | -0. **               | 14.3                         | 584.3                      | 262.4          | 36.8      | 1.000003 |                           |
| 104500.0                          | 9.0                   | -47.6          | 0.                     | -0. **               | 13.9                         | 584.8                      | 263.2          | 37.0      | 1.000003 |                           |
| 105000.0                          | 8.8                   | -47.1          | 0.                     | -0. **               | 13.6                         | 585.4                      | 263.3          | 36.2      | 1.000003 |                           |
| 105500.0                          | 8.6                   | -46.7          | 0.                     | -0. **               | 13.2                         | 586.0                      | 261.8          | 33.6      | 1.000003 |                           |
| 106000.0                          | 8.4                   | -46.2          | 0.                     | -0. **               | 12.9                         | 586.5                      | 260.3          | 31.0      | 1.000003 |                           |
| 106500.0                          | 8.2                   | -45.8          | 0.                     | -0. **               | 12.6                         | 587.1                      | 258.8          | 28.4      | 1.000003 |                           |
| 107000.0                          | 8.0                   | -45.4          | 0.                     | -0. **               | 12.3                         | 587.7                      |                |           | 1.000003 |                           |
| 107500.0                          | 7.9                   | -44.9          | 0.                     | -0. **               | 12.0                         | 588.2                      |                |           | 1.000003 |                           |
| 108000.0                          | 7.7                   | -44.5          | 0.                     | -0. **               | 11.7                         | 588.8                      |                |           | 1.000003 |                           |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
 24 OCT. 68  
 ASCENSION NO. 868

UPPER AIR DATA  
 08000003904  
 WHITE SANDS SITE

WSTM SITE COORDINATES  
 488580.00FEET E  
 185045.00FEET N

TABLE X (Cont)

| GEOMETRIC<br>ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND |       | WIND DATA                |                | INDEX<br>OF<br>REFRACTION |
|-----------------------------------|-----------------------|----------------|------------------------|----------------------|------------------------------|-------------------|-------|--------------------------|----------------|---------------------------|
|                                   |                       | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |                              | KNOTS             | KNOTS | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |                           |
| 108500.0                          | 7.5                   | -44.1          | 0.                     | -0. **               | 11.4                         | 589.4             |       |                          |                | 1.000003                  |
| 109000.0                          | 7.3                   | -43.6          | 0.                     | -0. **               | 11.1                         | 589.9             |       |                          |                | 1.000002                  |
| 109500.0                          | 7.2                   | -43.2          | 0.                     | -0. **               | 10.9                         | 590.5             |       |                          |                | 1.000002                  |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.00 FEET MSL  
24 OCT. 68  
ASCENSION NO. 868

MANDATORY LEVELS  
08000003904  
WHITE SANDS SITE

0705 HRS MDT

WSTM SITE COORDINATES  
488180.00 FEET E  
185045.00 FEET N

TABLE XI

| PRESSURE GEOPOTENTIAL |         | TEMPERATURE    |                        | REL. HUM.<br>PERCENT | WIND DATA                |                |
|-----------------------|---------|----------------|------------------------|----------------------|--------------------------|----------------|
| MILLIBARS             | FEET    | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      | DIRECTION<br>DEGREES(TN) | SPEED<br>KNOTS |
| 850.0                 | 5154.   | 10.5           | -0.4                   | 47.                  | 166.3                    | 11.2           |
| 800.0                 | 6805.   | 8.2            | -1.7                   | 50.                  | 125.7                    | 11.2           |
| 750.0                 | 8545.   | 5.6            | -4.4                   | 49.                  | 76.9                     | 3.7            |
| 700.0                 | 10401.  | 5.5            | -8.1                   | 37.                  | 326.4                    | 11.1           |
| 650.0                 | 12379.  | 2.8            | -11.0                  | 35.                  | 320.6                    | 16.8           |
| 600.0                 | 14494.  | -0.1           | -14.2                  | 34.                  | 332.3                    | 17.3           |
| 550.0                 | 16764.  | -4.3           | -17.3                  | 36.                  | 336.5                    | 18.6           |
| 500.0                 | 19209.  | -8.1           | -22.3                  | 31.                  | 352.4                    | 21.6           |
| 450.0                 | 21870.  | -13.3          | -29.1                  | 29.                  | 355.0                    | 26.6           |
| 400.0                 | 24775.  | -20.0          | -34.5                  | 26.                  | 353.8                    | 28.8           |
| 350.0                 | 27971.  | -28.4          | -41.2                  | 20.                  | 355.5                    | 30.7           |
| 300.0                 | 31525.  | -38.1          | -49.2                  | 31.                  | 5.8                      | 26.8           |
| 250.0                 | 35551.  | -48.5          | -70.3                  | 6.**                 | 13.0                     | 33.9           |
| 200.0                 | 40246.  | -59.7          | 0.                     | -0.**                | 28.7                     | 39.3           |
| 175.0                 | 42945.  | -65.8          | 0.                     | -0.**                | 35.3                     | 40.5           |
| 150.0                 | 45970.  | -72.2          | 0.                     | -0.**                | 18.9                     | 39.3           |
| 125.0                 | 49499.  | -72.6          | 0.                     | -0.**                | 340.6                    | 36.1           |
| 100.0                 | 53882.  | -67.2          | 0.                     | -0.**                | 355.1                    | 29.4           |
| 80.0                  | 58335.  | -65.4          | 0.                     | -0.**                | 353.6                    | 22.1           |
| 70.0                  | 61013.  | -64.2          | 0.                     | -0.**                | 355.6                    | 17.7           |
| 60.0                  | 64121.  | -60.2          | 0.                     | -0.**                | 23.8                     | 8.8            |
| 50.0                  | 67841.  | -59.9          | 0.                     | -0.**                | 67.7                     | 3.3            |
| 40.0                  | 72460.  | -56.5          | 0.                     | -0.**                | 118.5                    | 1.3            |
| 30.0                  | 78460.  | -55.7          | 0.                     | -0.**                | 166.9                    | 5.5            |
| 25.0                  | 82300.  | -54.1          | 0.                     | -0.**                | 222.4                    | 5.7            |
| 20.0                  | 86966.  | -55.9          | 0.                     | -0.**                | 285.6                    | 14.3           |
| 15.0                  | 93031.  | -52.3          | 0.                     | -0.**                | 261.9                    | 24.6           |
| 10.0                  | 101666. | -49.6          | 0.                     | -0.**                | 259.1                    | 36.2           |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

| RELEASE TIME<br>(MDT) |       | SECOND-STAGE IMPACT DISPLACEMENT IN MILES DUE TO WIND |      |       |       |             |       |       |       |       |      | AZI-<br>MUTH<br>(DEG-<br>REES) | THEORETICAL IMPACT<br>FROM LAUNCHER<br>(IN MILES) |  |  |
|-----------------------|-------|-------------------------------------------------------|------|-------|-------|-------------|-------|-------|-------|-------|------|--------------------------------|---------------------------------------------------|--|--|
|                       |       | 15-216 FT                                             |      |       |       | 216-4000 FT |       |       |       | TOTAL |      |                                |                                                   |  |  |
|                       |       | N-S                                                   |      | E-W   |       | N-S         |       | E-W   |       | N-S   |      |                                |                                                   |  |  |
| RAWIN-<br>SONDE       | PIBAL | N-S                                                   | E-W  | N-S   | E-W   | N-S         | E-W   | N-S   | E-W   | RANGE | N-S  | E-W                            |                                                   |  |  |
| 0350                  | 0507  | 10.6S                                                 | 2.3W | 13.1S | 10.2E | 15.7N       | 12.3E | 8.0S  | 24.1E | 359.7 | 70.6 | 70.6N                          | 0.4W                                              |  |  |
| 0350                  | 0517  | 12.3S                                                 | 1.5W | 14.4S | 16.5E | 15.7N       | 12.3E | 11.0S | 27.3E | 357.6 | 67.7 | 67.6N                          | 2.8W                                              |  |  |
| 0350                  | 0552  | 8.9S                                                  | 2.0W | 14.5S | 14.9E | 15.7N       | 12.3E | 7.7S  | 25.2E | 359.4 | 70.9 | 70.9N                          | 0.7W                                              |  |  |
| 0350                  | 0610  | 8.1S                                                  | 2.7W | 15.2S | 12.8E | 15.7N       | 12.3E | 7.6S  | 22.4E | 358.3 | 71.0 | 71.0N                          | 2.1W                                              |  |  |
| 0350                  | 0620  | 8.3S                                                  | 3.3W | 13.2S | 12.3E | 15.7N       | 12.3E | 5.8S  | 21.3E | 357.5 | 72.9 | 72.8N                          | 3.2W                                              |  |  |
| 0350                  | 0630  | 7.3S                                                  | 3.7W | 15.8S | 14.0E | 15.7N       | 12.3E | 7.4S  | 22.6E | 358.5 | 71.2 | 71.2N                          | 1.9W                                              |  |  |
| 0350                  | 0640  | 6.5S                                                  | 0.1W | 13.7S | 11.4E | 15.7N       | 12.3E | 4.5S  | 21.6E | 359.3 | 74.1 | 74.1N                          | 0.9W                                              |  |  |
| 0350                  | 0650  | 6.7S                                                  | 2.1W | 14.2S | 9.7E  | 15.7N       | 12.3E | 5.7S  | 19.9E | 356.4 | 73.5 | 73.4N                          | 4.6W                                              |  |  |
| 0705*                 | 0705* | 4.8S                                                  | 3.2W | 13.4S | 10.0E | 15.3N       | 9.4E  | 2.9S  | 16.2E | 353.9 | 76.2 | 75.7N                          | 8.3W                                              |  |  |

\*Post-Shoot Data

| LAUNCHER SETTING (ELEVATION 34.4 DEGREES QE) | AZI-<br>MUTH<br>(DEG-<br>REES) | MILES FROM LAUNCHER |       |       |
|----------------------------------------------|--------------------------------|---------------------|-------|-------|
|                                              |                                | RANGE               | N-S   | E-W   |
| NO WIND IMPACT                               | 346.0                          | 81.0                | 78.6N | 19.6W |
| PREDICTED SECOND-STAGE IMPACT                | 343.0                          | 82.3                | 78.6N | 24.5W |
| SECOND-STAGE IMPACT, RECOVERY                | 358.0                          | 71.0                | 71.0N | 2.5W  |
| PREDICTED BOOSTER IMPACT                     | 348.9                          | 90.3                | 89.6N | 17.5W |
| ACTUAL BOOSTER IMPACT                        | 356.0                          | 1.1                 | 1.1N  | 0.8W  |
|                                              | N/A                            | N/A                 | N/A   | N/A   |

TABLE XII. IMPACT PREDICTION DATA  
NI/E-HYDAC STV, SN-077



UNCLASSIFIED

Security Classification

## DOCUMENT CONTROL DATA - R &amp; D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

|                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                     |                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
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| 13. ABSTRACT<br><br><p>➤ Meteorological data gathered for the launching of Nike-Hydac STV, SR-077, are presented for the Space and Missile Systems Organization, AFMDC, Holloman Air Force Base, New Mexico, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.</p> |  |                                                                                                                                                     |                         |

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