

AD-A137 318

19319A MLRS MISSILE NUMBERS 358 354 349 345 340 336  
ROUND NUMBERS 534/DL-... (U) ARMY ELECTRONICS RESEARCH  
AND DEVELOPMENT COMMAND WSMR NM ATM... D C KELLER  
NOV 83 ERADCOM/ASL-DR-1329

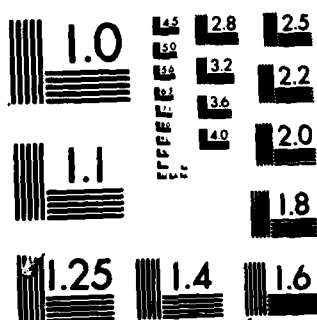
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

AD A 137318



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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE                                                                                                                                                                                                                                                            |                                     | READ INSTRUCTIONS<br>BEFORE COMPLETING FORM                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------|
| 1. REPORT NUMBER<br>DR 1329                                                                                                                                                                                                                                                          | 2. GOVT ACCESSION NO.<br>AD-A137318 | 3. RECIPIENT'S CATALOG NUMBER                                  |
| 4. TITLE (and Subtitle)<br>19319A MLRS, Missile Number 358,354,349,345,340,336.<br>Round Number 534/DL-49 THRU 539/DL-54                                                                                                                                                             |                                     | 5. TYPE OF REPORT & PERIOD COVERED                             |
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| 18. SUPPLEMENTARY NOTES                                                                                                                                                                                                                                                              |                                     |                                                                |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)                                                                                                                                                                                                   |                                     |                                                                |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>Meteorological data gathered for the launching of the 19319A MLRS, Missile<br>Number 358, 354, 349, 345, 340, 336, Round Number 534/DL-49 THRU 539/DL-54<br>are presented in tabular form.<br>↑ |                                     |                                                                |

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# CONTENTS

|                                                           | PAGE |
|-----------------------------------------------------------|------|
| INTRODUCTION - - - - -                                    | 1    |
| DISCUSSION - - - - -                                      | 1    |
| GENERAL AREA MAP - - - - -                                | 2    |
| LAUNCH AREA DIAGRAM - - - - -                             | 3    |
| TABLES:                                                   |      |
| 1. Surface Observations Taken at 1545 MST at LC-33 - - -  | 4    |
| 2. Launch and Impact Pilot-Balloon Measured Wind Data - - | 5    |
| 3. Aiming Computer Met Messages - - - - -                 | 6    |
| 4. WSD Significant Level Data at 1415 MST - - - - -       | 7    |
| 5. WSD Upper Air Data at 1415 MST - - - - -               | 8    |
| 6. WSD Mandatory Levels at 1415 MST - - - - -             | 9    |
| 7. LC-37 Significant Level Data at 1415 MST - - - - -     | 10   |
| 8. LC-37 Upper Air Data at 1415 MST - - - - -             | 11   |
| 9. LC-37 Mandatory Levels at 1415 MST - - - - -           | 12   |
| 10. WSD Significant Level Data at 1543 MST - - - - -      | 13   |
| 11. WSD Upper Air Data at 1543 MST - - - - -              | 14   |
| 12. WSD Mandatory Levels at 1543 MST - - - - -            | 15   |

## INTRODUCTION

19319A MLRS, Missile Numbers 358, 354, 349, 345, 340, and 336, Round Numbers 534/DL-49 Thru 539/DL-54, were launched from LC-33, White Sands Missile Range (WSMR), New Mexico, at 1543:05, 1543:09, 1543:14, 1543:18, 1543:23, and 1543:27 MST, 18 November 1983. The scheduled launch times were 1515 MST at a 4.5 second separation.

## DISCUSSION

Meteorological data were recorded and reduced by the White Sands Meteorological Team, Atmospheric Sciences Laboratory (ASL), White Sands Missile Range, New Mexico. The data were obtained by the following methods:

### 1. Observations

#### a. Surface

(1) Standard surface observations to include pressure, temperature ( $^{\circ}\text{C}$ ), relative humidity, dew point ( $^{\circ}\text{C}$ ), density ( $\text{gm}/\text{m}^3$ ), wind direction and speed, and cloud cover were made at the LC-33 Met Site at T-0 minutes.

(2) Monitor of wind speed and direction from one anemometer was provided in the launch control room.

#### b. Upper Air

(1) Low level wind data were obtained from pilot-balloon observations at:

### SITE AND ALTITUDE

|       |      |
|-------|------|
| LC-33 | 2 Km |
| Don   | 2 Km |

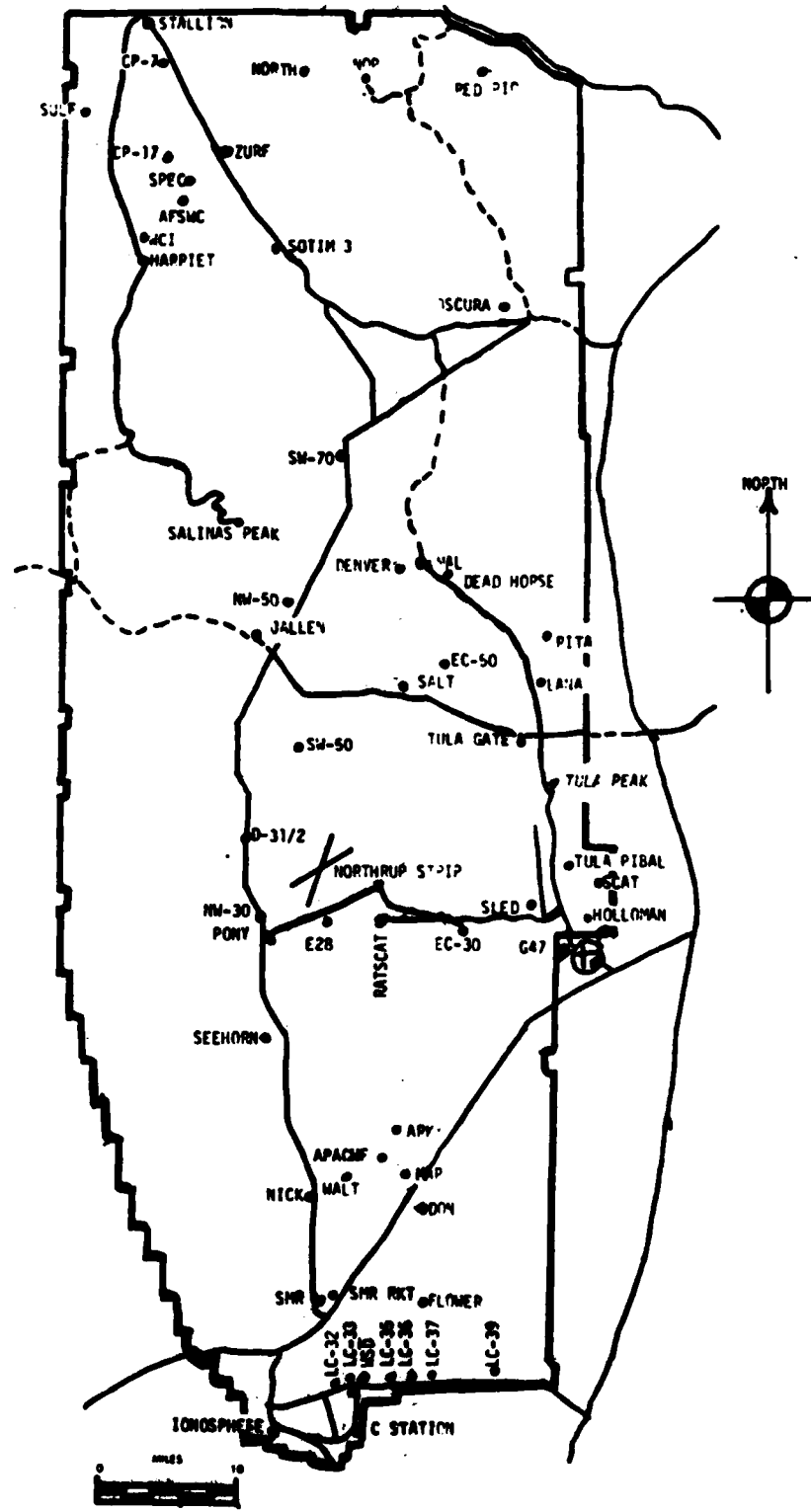
(2) Air structure data (rawinsonde) were collected at the following Met sites.

### SITE AND TIME

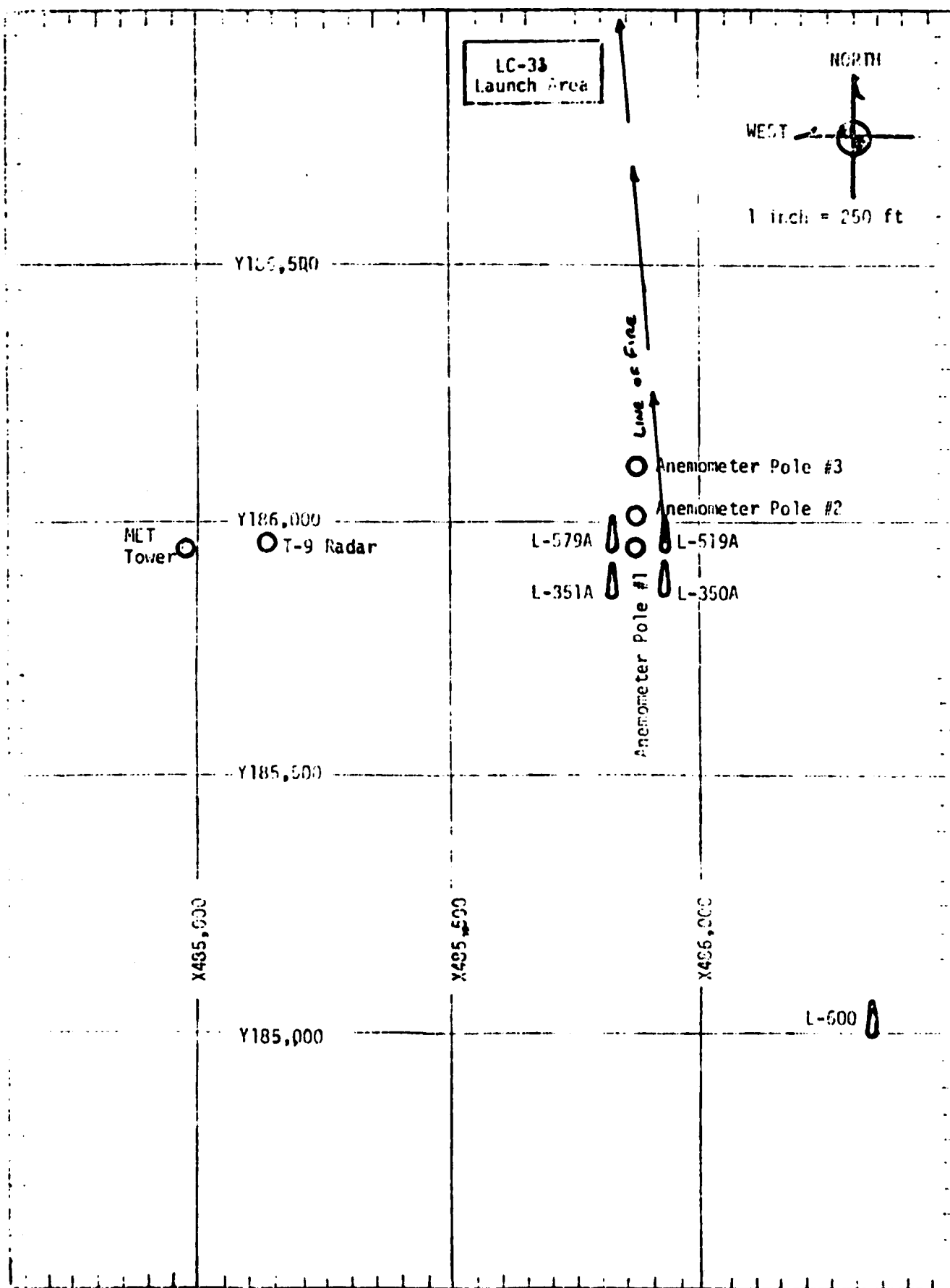
|       |          |
|-------|----------|
| WSD   | 1415 MST |
| LC-37 | 1415 MST |
| WSD   | 1543 MST |

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| Availability Codes |                                     |
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| A-1                |                                     |

# WSMR METEOROLOGICAL SITES







**LC-33**

83

49-3995-00

[illegible]

|                 |     |      |  |
|-----------------|-----|------|--|
| TIME:           | MST | 1945 |  |
| DRY BULB TEMP.  |     | 16.6 |  |
| WET BULB TEMP.  |     | 9.6  |  |
| WET BULB DEPR.  |     | 7.0  |  |
| DEW POINT       |     | 3.7  |  |
| RELATIVE HUMID. |     | 42   |  |

TABLE 2

T-TIME PILOT-BALLOON MEASURED WIND DATA

DATE 18 November 1983

SITE: LC-33

TIME: 1603 MST

WSTM COORDINATES:

X= 486,872.00

Y= 184,146.75

H= 3,981.15

SITE: Don

TIME 1546 MST

WSTM COORDINATES:

X= 511,988.37

Y= 247,396.36

H= 3,996.83

| LAYER MIDPOINT | DIRECTION | SPEED |
|----------------|-----------|-------|
| METERS AGL     | DEGREES   | KNOTS |
| SURFACE        | 260       | 30    |
| 150            | 267       | 32    |
| 210            | 279       | 35    |
| 270            | 270       | 36    |
| 330            | 269       | 35    |
| 390            | 271       | 37    |
| 500            | 273       | 33    |
| 650            | 272       | 37    |
| 800            | 272       | 39    |
| 950            | 270       | 39    |
| 1150           | 274       | 39    |
| 1350           | 277       | 43    |
| 1550           | 272       | 44    |
| 1750           | 265       | 48    |
| 2000           | 260       | 55    |

| LAYER MIDPOINT | DIRECTION | SPEED |
|----------------|-----------|-------|
| METERS AGL     | DEGREES   | KNOTS |
| SURFACE        | 240       | 14    |
| 150            | 263       | 20    |
| 210            | 266       | 34    |
| 270            | 266       | 36    |
| 330            | 265       | 33    |
| 390            | 271       | 27    |
| 500            | 264       | 23    |
| 650            | 257       | 25    |
| 800            | 264       | 32    |
| 950            | 263       | 36    |
| 1150           | 268       | 34    |
| 1350           | 271       | 41    |
| 1550           | 265       | 40    |
| 1750           | 262       | 46    |
| 2000           | 263       | 57    |

AIMING COMPUTER MET MESSAGE DATA

18 November 1983

WSD 1415 MST

METCM1324064

182130122866

00462030 29250864

01478047 29110854

02482045 28860829

03491045 28510791

04473052 28040744

05471051 27550700

06461058 27130658

07461051 26700617

08469050 26230579

09480056 25930542

LC-37 1415 MST

METCM1324063

182130124864

00480030 29350866

01477033 29200856

02459043 28900831

03476047 28510793

04473047 28020746

05464057 27590702

06463049 27010659

07470054 26790619

08478057 26390581

09477051 25960544

STATION ALTITUDE 3989.00 FT. I MSL  
 18 NOV. 83  
 ASCENSION NO. 375

SIGNIFICANT LEVEL DATA  
 3220020575  
 WHITE SANDS  
 TABLE 4

| PRESSURE  | GEOGRAPHIC | TEMPERATURE  | REL. HUM.  |
|-----------|------------|--------------|------------|
| ALTITUDE  | ALTITUDE   | AIR DEWPOINT | PERCENT    |
| MILLIBARS | MSL FLEI   | DEGREES      | CENTIGRADE |
| 866.0     | 3989.0     | 19.3         | 35.0       |
| 863.9     | 4057.5     | 19.6         | 27.0       |
| 857.0     | 4513.3     | 16.8         | 32.0       |
| 807.5     | 5037.9     | 12.8         | 30.0       |
| 758.1     | 7663.4     | 7.6          | 32.0       |
| 719.0     | 9057.4     | 3.5          | 63.0       |
| 700.0     | 9799.6     | 1.9          | 53.0       |
| 641.1     | 10130.7    | 1.5          | 53.0       |
| 635.5     | 12137.9    | -3.9         | 54.0       |
| 632.8     | 12488.2    | -4.6         | 52.0       |
| 626.5     | 12700.9    | -5.4         | 63.0       |
| 610.7     | 13363.4    | -6.0         | 49.0       |
| 600.9     | 13481.4    | -6.5         | 45.0       |
| 582.5     | 14574.5    | -9.3         | 55.0       |
| 540.4     | 16090.4    | -13.4        | 34.0       |
| 531.7     | 16860.2    | -14.9        | 39.0       |
| 507.0     | 18045.5    | -17.7        | 50.0       |
|           |            | -25.6        |            |

STATION ALTITUDE 3989.00 FEET MSL  
10 NOV. 63  
ASCENSION NO. 375

UPPER AIR DATA  
3220020075  
WHITE SANDS

TABLE 5

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR DEGREES<br>CENTIGRADE | WIND DIRECTION<br>DEGREES (IN) | WIND SPEED<br>KNOTS | DENSITY<br>GM/CM <sup>3</sup><br>METER | SPLF <sup>1</sup><br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|------------------------------------------|--------------------------------|---------------------|----------------------------------------|----------------------------|---------------------------|
| 3989.0                         | 865.0                 | 19.3                                     | 3.0                            | 35.0                | 1028.0                                 | 667.4                      | 1.000264                  |
| 4000.0                         | 865.7                 | 19.3                                     | 3.0                            | 33.7                | 1027.6                                 | 667.4                      | 1.000263                  |
| 4500.0                         | 850.4                 | 18.9                                     | 0                              | 31.9                | 1018.7                                 | 664.4                      | 1.000255                  |
| 5000.0                         | 835.2                 | 15.4                                     | -3                             | 34.0                | 1005.5                                 | 662.7                      | 1.000251                  |
| 5500.0                         | 820.3                 | 14.0                                     | -7                             | 36.2                | 992.5                                  | 661.1                      | 1.000248                  |
| 6000.0                         | 805.7                 | 12.6                                     | -1.1                           | 38.5                | 979.6                                  | 659.4                      | 1.000244                  |
| 6500.0                         | 791.1                 | 11.1                                     | -1.1                           | 42.6                | 966.9                                  | 657.7                      | 1.000242                  |
| 7000.0                         | 776.7                 | 9.6                                      | -1.3                           | 46.6                | 954.4                                  | 656.0                      | 1.000239                  |
| 7500.0                         | 762.6                 | 8.1                                      | -1.3                           | 50.7                | 942.1                                  | 654.2                      | 1.000236                  |
| 8000.0                         | 748.7                 | 6.6                                      | -1.9                           | 54.7                | 929.8                                  | 652.5                      | 1.000233                  |
| 8500.0                         | 734.9                 | 5.1                                      | -2.3                           | 58.6                | 917.5                                  | 650.8                      | 1.000230                  |
| 9000.0                         | 721.3                 | 3.7                                      | -2.8                           | 62.5                | 905.4                                  | 649.0                      | 1.000226                  |
| 9500.0                         | 707.9                 | 2.3                                      | -5.1                           | 57.0                | 892.5                                  | 647.6                      | 1.000220                  |
| 10000.0                        | 694.7                 | 1.7                                      | -6.9                           | 53.0                | 878.9                                  | 646.5                      | 1.000214                  |
| 10500.0                        | 681.6                 | 0.6                                      | -7.8                           | 53.2                | 865.8                                  | 645.2                      | 1.000210                  |
| 11000.0                        | 668.8                 | -0.6                                     | -8.9                           | 53.4                | 853.3                                  | 643.7                      | 1.000206                  |
| 11500.0                        | 656.1                 | -1.8                                     | -10.0                          | 53.6                | 841.1                                  | 642.2                      | 1.000202                  |
| 12000.0                        | 643.7                 | -3.1                                     | -11.1                          | 53.8                | 829.1                                  | 640.7                      | 1.000198                  |
| 12500.0                        | 631.3                 | -4.8                                     | -12.6                          | 54.2                | 816.6                                  | 638.7                      | 1.000195                  |
| 13000.0                        | 619.4                 | -5.7                                     | -12.9                          | 56.8                | 805.8                                  | 637.8                      | 1.000191                  |
| 13500.0                        | 607.3                 | -6.6                                     | -16.4                          | 45.5                | 793.3                                  | 636.3                      | 1.000186                  |
| 14000.0                        | 595.7                 | -7.9                                     | -16.5                          | 49.9                | 781.5                                  | 634.8                      | 1.000183                  |
| 14500.0                        | 584.2                 | -9.1                                     | -16.8                          | 54.3                | 770.0                                  | 633.4                      | 1.000181                  |
| 15000.0                        | 572.8                 | -10.4                                    | -18.7                          | 50.5                | 758.8                                  | 631.7                      | 1.000177                  |
| 15500.0                        | 561.3                 | -11.8                                    | -21.2                          | 45.3                | 747.9                                  | 630.0                      | 1.000173                  |
| 16000.0                        | 550.3                 | -13.1                                    | -23.8                          | 40.0                | 737.1                                  | 628.4                      | 1.000169                  |
| 16500.0                        | 539.6                 | -14.2                                    | -25.1                          | 39.0                | 725.5                                  | 627.1                      | 1.000166                  |
| 17000.0                        | 528.9                 | -15.2                                    | -25.7                          | 40.2                | 713.9                                  | 625.8                      | 1.000163                  |
| 17500.0                        | 518.3                 | -16.4                                    | -25.5                          | 44.9                | 702.9                                  | 624.4                      | 1.000161                  |
| 18000.0                        | 507.9                 | -17.6                                    | -25.0                          | 47.6                | 692.0                                  | 623.0                      | 1.000159                  |

LABORATORY LEVELS  
32200205/5  
WHITE SANDS  
TABLE 6

GEONETIC COORDINATES  
32.40043 LAT DEG  
106.37033 LONG DEG

TABLE 6

| MILLIBARS | PRESSURE<br>LUPUTNITAL<br>FEET | TEMPERATURE    |                        | REL. HUMID.<br>PERCENT | DIRECTION<br>JFGREES(TN) | SPEED<br>KNOTS |
|-----------|--------------------------------|----------------|------------------------|------------------------|--------------------------|----------------|
|           |                                | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                        |                          |                |
| 850.0     | 4510.                          | 16.8           | .0                     | 32.                    | 269.0                    | 39.6           |
| 800.0     | 6100.                          | 12.0           | -1.1                   | 40.                    | 260.4                    | 45.0           |
| 750.0     | 7947.                          | 6.8            | -1.8                   | 54.                    | 268.8                    | 47.2           |
| 700.0     | 9700.                          | 1.9            | -6.6                   | 53.                    | 260.0                    | 51.2           |
| 650.0     | 11738.                         | -2.4           | -10.5                  | 54.                    | 261.1                    | 55.5           |
| 600.0     | 13803.                         | -7.4           | -16.4                  | 48.                    | 267.7                    | 52.9           |
| 550.0     | 16003.                         | -13.2          | -24.0                  | 40.                    | 268.5                    | 52.2           |

STATION ALTITUDE 4051.37 FEET MSL  
IN NOV. 63 1415 HRS MST  
ASCENSION NO. 174

SIGNIFICANT LEVEL DATA  
3220160174  
LC-37

GEOMETRIC COORDINATES  
32.40175 LAT DEG  
106.31232 LONG DEG

TABLE 7

| PRESSURE GEOMETRIC<br>MILLIBARS MSL FEET | TEMPERATURE<br>AIR DEWPOINT<br>DEGREES CENTIGRADE | REL. HUM.<br>PERCENT |
|------------------------------------------|---------------------------------------------------|----------------------|
| 864.1                                    | 18.5                                              | 55.0                 |
| 850.0                                    | 16.5                                              | 30.0                 |
| 420.5                                    | 14.5                                              | 34.0                 |
| 780.6                                    | 10.8                                              | 41.0                 |
| 767.3                                    | 8.9                                               | 45.0                 |
| 748.1                                    | 6.9                                               | 47.0                 |
| 720.5                                    | 5.1                                               | 53.0                 |
| 700.0                                    | 1.3                                               | 63.0                 |
| 687.3                                    | .3                                                | 65.0                 |
| 654.5                                    | -2.8                                              | 74.0                 |
| 637.7                                    | -4.7                                              | 73.0                 |
| 620.1                                    | -6.3                                              | 68.0                 |
| 611.9                                    | -7.1                                              | 71.0                 |
| 594.5                                    | -9.2                                              | 69.0                 |
| 571.0                                    | -12.2                                             | 98.0                 |
| 550.5                                    | -13.7                                             | 98.0                 |
| 544.1                                    | -13.6                                             | 98.0                 |
| 527.5                                    | -15.5                                             | 98.0                 |
| 524.4                                    | -16.7                                             | 98.0                 |
| 516.5                                    | -17.4                                             | 64.0                 |
| 511.7                                    | -18.3                                             | 35.0                 |
| 500.0                                    | -18.9                                             | 30.0                 |



STATION ALTITUDE 4051.77 FEET MSL  
 IN NOV. 83 1415 HRS MST  
 ASCENSION NO. 174

UPPER AIR DATA  
 3200100174  
 LC-37  
 TABLE 8

GEODETIC COORDINATES  
 32°40'17.5" LAT DEG  
 196°31'23.2" LONG DEG

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR DEGREE C | REL. HUM.<br>PERCENT | DENSITY<br>GM/CM <sup>3</sup><br>METER | SPEED OF<br>SOUND<br>KI/MS | WIND DATA<br>DIRECTION (TH)<br>DEGREES | SPEED<br>KI/MS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|-----------------------------|----------------------|----------------------------------------|----------------------------|----------------------------------------|----------------|---------------------------|
| 4051.4                         | 860.1                 | 18.5                        | 35.0                 | 1020.8                                 | 060.4                      | 200.0                                  | 20.9           | 1.000262                  |
| 4500.0                         | 850.4                 | 16.6                        | 30.1                 | 1020.0                                 | 66.3.9                     | 204.1                                  | 32.1           | 1.000253                  |
| 5000.0                         | 835.0                 | 15.3                        | 32.4                 | 1006.2                                 | 66.2.5                     | 204.0                                  | 34.8           | 1.000250                  |
| 5500.0                         | 820.3                 | 14.0                        | 34.9                 | 992.6                                  | 66.1.0                     | 211.3                                  | 37.6           | 1.000247                  |
| 6000.0                         | 805.6                 | 12.6                        | 37.5                 | 979.5                                  | 65.9.4                     | 214.2                                  | 40.5           | 1.000244                  |
| 6500.0                         | 791.1                 | 11.2                        | 40.2                 | 966.0                                  | 65.7.8                     | 213.6                                  | 43.5           | 1.000240                  |
| 7000.0                         | 776.8                 | 9.8                         | 43.0                 | 953.8                                  | 65.6.2                     | 211.0                                  | 46.7           | 1.000237                  |
| 7500.0                         | 762.7                 | 8.4                         | 45.5                 | 941.2                                  | 65.4.5                     | 208.6                                  | 49.5           | 1.000234                  |
| 8000.0                         | 748.7                 | 7.0                         | 46.9                 | 928.9                                  | 65.2.8                     | 205.1                                  | 49.7           | 1.000230                  |
| 8500.0                         | 734.9                 | 5.6                         | 51.2                 | 916.2                                  | 65.1.3                     | 203.8                                  | 40.6           | 1.000227                  |
| 9000.0                         | 721.3                 | 4.1                         | 55.7                 | 904.3                                  | 64.9.4                     | 202.0                                  | 48.7           | 1.000224                  |
| 9500.0                         | 707.9                 | 2.5                         | 60.3                 | 893.1                                  | 64.7.4                     | 202.2                                  | 51.0           | 1.000221                  |
| 10000.0                        | 694.7                 | 1.0                         | 63.6                 | 880.8                                  | 64.5.8                     | 201.6                                  | 53.4           | 1.000217                  |
| 10500.0                        | 681.7                 | .1                          | 65.5                 | 867.1                                  | 64.4.7                     | 201.2                                  | 55.8           | 1.000214                  |
| 11000.0                        | 668.8                 | -1.3                        | 69.6                 | 855.2                                  | 64.3.0                     | 200.8                                  | 58.2           | 1.000210                  |
| 11500.0                        | 656.2                 | -2.7                        | 73.8                 | 843.5                                  | 64.1.3                     | 200.5                                  | 60.0           | 1.000207                  |
| 12000.0                        | 643.7                 | -4.1                        | 73.3                 | 831.7                                  | 63.9.7                     | 200.2                                  | 60.0           | 1.000203                  |
| 12500.0                        | 631.4                 | -5.3                        | 71.2                 | 819.6                                  | 63.8.2                     | 200.0                                  | 60.0           | 1.000198                  |
| 13000.0                        | 619.3                 | -6.4                        | 68.3                 | 807.4                                  | 63.6.8                     | 200.0                                  | 55.8           | 1.000194                  |
| 13500.0                        | 607.3                 | -7.6                        | 75.7                 | 795.6                                  | 63.5.3                     | 200.0                                  | 50.7           | 1.000191                  |
| 14000.0                        | 595.5                 | -9.1                        | 87.9                 | 784.3                                  | 63.3.6                     | 200.0                                  | 45.0           | 1.000189                  |
| 14500.0                        | 583.9                 | -10.7                       | 93.6                 | 773.9                                  | 63.1.0                     | 200.0                                  | 40.0           | 1.000186                  |
| 15000.0                        | 572.5                 | -12.3                       | 98.0                 | 763.3                                  | 62.9.7                     | 200.0                                  | 44.5           | 1.000183                  |
| 15500.0                        | 561.2                 | -13.5                       | 98.0                 | 750.4                                  | 62.8.8                     | 200.0                                  | 50.3           | 1.000179                  |
| 16000.0                        | 550.1                 | -13.7                       | 98.0                 | 737.6                                  | 62.8.0                     | 200.0                                  | 65.0           | 1.000176                  |
| 16500.0                        | 539.2                 | -14.2                       | 98.0                 | 724.2                                  | 62.7.4                     | 200.0                                  | 66.6           | 1.000173                  |
| 17000.0                        | 528.3                 | -15.4                       | 98.0                 | 713.3                                  | 62.5.9                     | 211.4                                  | 57.7           | 1.000169                  |
| 17500.0                        | 517.9                 | -17.6                       | 70.2                 | 705.5                                  | 62.3.0                     | 210.4                                  | 62.0           | 1.000163                  |
| 18000.0                        | 507.5                 | -18.5                       | 33.2                 | 694.0                                  | 62.1.0                     |                                        |                | 1.000157                  |

STATION ALTITUDE 4051.37 FEET MSL  
 18 NOV. 83  
 ASCENSION NO. 174

MANDATORY LEVELS  
 320180174  
 LC-37

GEODETIC COORDINATES  
 39.40175 LAT DEG  
 106.31234 LONG DEG

TABLE 9

| PRESSURE GEOPOTENTIAL |        | TEMPERATURE    |                        | REL. HUM. |         | WIND DATA                 |                |
|-----------------------|--------|----------------|------------------------|-----------|---------|---------------------------|----------------|
| MILLIBARS             | FEET   | ATP<br>DEGREES | DEWPOINT<br>CENTIGRADE | PERCENT   | PERCENT | DIRECTION<br>DEGREES (TN) | SPEED<br>KNOTS |
| 250.0                 | 4500.  | 16.5           | -1.1                   | 30.       |         | 264.2                     | 32.2           |
| 300.0                 | 6189.  | 12.1           | -1.6                   | 39.       |         | 275.2                     | 41.6           |
| 350.0                 | 7947.  | 7.1            | -3.5                   | 47.       |         | 280.9                     | 49.7           |
| 400.0                 | 9701.  | 1.3            | -5.0                   | 63.       |         | 282.4                     | 50.1           |
| 450.0                 | 11725. | -3.4           | -7.4                   | 74.       |         | 280.7                     | 59.4           |
| 500.0                 | 13774. | -8.5           | -10.8                  | 83.       |         | 259.5                     | 47.3           |
| 550.0                 | 15985. | -13.7          | -13.9                  | 98.       |         | 268.3                     | 64.9           |
| 600.0                 | 18319. | -18.9          | -32.1                  | 30.       |         |                           |                |

GEOLYTIC COORDINATES  
 52-40045 LAT DEG  
 106-37033 LONG DEG

SIGNIFICANT LEVEL DATA  
 1220020576  
 WHITE SANDS  
 TABLE 10

STATION ALTITUDE 3049.00 FEET MSL  
 IN NOV. 63 1547 HRC MST  
 ASCENSION NO. 576

| PRESSURE<br>MILLIBARS | GEO. TIR. C<br>ALTITUDE<br>MCL FEET | TEMPERATURE    |                        | REL. HUM.<br>PERCENT |
|-----------------------|-------------------------------------|----------------|------------------------|----------------------|
|                       |                                     | AIR<br>DEGREES | DEWPOINT<br>CENTIGRADE |                      |
| 860.3                 | 3989.0                              | 17.4           | 2.2                    | 36.0                 |
| 854.6                 | 4383.7                              | 15.7           | 1.4                    | 38.0                 |
| 850.7                 | 4519.5                              | 15.5           | 1.3                    | 30.0                 |
| 857.7                 | 4024.4                              | 14.1           | .7                     | 40.0                 |
| 774.2                 | 7015.8                              | 8.2            | -1.1                   | 52.0                 |
| 749.1                 | 7075.2                              | 5.2            | -1.9                   | 50.0                 |
| 734.3                 | 8030.7                              | 3.5            | -2.4                   | 65.0                 |
| 720.7                 | 8670.9                              | 3.3            | -2.6                   | 55.0                 |
| 700.0                 | 9779.3                              | .3             | -2.6                   | 81.0                 |
| 680.2                 | 10534.1                             | -1.3           | -5.9                   | 71.0                 |
| 671.1                 | 10003.8                             | -2.2           | -4.7                   | 83.0                 |
| 655.4                 | 11503.0                             | -3.4           | -6.7                   | 78.0                 |
| 653.6                 | 11575.3                             | -3.7           | -7.6                   | 74.0                 |
| 628.2                 | 12683.1                             | -6.3           | -8.6                   | 98.0                 |
| 608.3                 | 13427.2                             | -8.1           | -8.2                   | 99.0                 |
| 574.1                 | 14002.5                             | -9.6           | -9.7                   | 99.0                 |
| 571.5                 | 15017.8                             | -9.9           | -10.2                  | 98.0                 |
| 561.7                 | 15465.2                             | -12.3          | -12.5                  | 98.0                 |
| 555.5                 | 15687.4                             | -13.9          | -22.3                  | 49.0                 |
| 547.9                 | 16075.0                             | -15.8          | -30.1                  | 28.0                 |
| 531.5                 | 16820.9                             | -16.8          | -30.0                  | 29.0                 |
| 500.0                 | 18328.7                             | -19.2          | -31.0                  | 34.0                 |

STATION ALTITUDE 3989.00 FEET SL  
18 NOV. 83  
ASCENSION NO. 5/6

UPPER AIR DATA  
3220020576  
WHITE SANDS  
TABLE 11

GEODETIC COORDINATES  
32-40043 LAT DEG  
106-37033 LONG DEG

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | AIR TEMPERATURE<br>DEGREES CENTIGRADE | REL. HUM. PERCENT | DENSITY<br>GM/CUBIC METER | SPEED OF SOUND<br>KNOTS | WIND DIRECTION<br>DEGREES (TN) | WIND SPEED<br>KNOTS | INDEX OF REFRACTION |
|--------------------------------|-----------------------|---------------------------------------|-------------------|---------------------------|-------------------------|--------------------------------|---------------------|---------------------|
| 3989.0                         | 860.5                 | 17.4                                  | 36.0              | 1035.4                    | 665.1                   | 270.0                          | 20.0                | 1.000263            |
| 4000.0                         | 860.0                 | 17.4                                  | 36.1              | 1035.2                    | 665.0                   | 269.9                          | 20.1                | 1.000263            |
| 4500.0                         | 850.5                 | 15.5                                  | 38.0              | 1023.4                    | 662.9                   | 268.0                          | 26.4                | 1.000259            |
| 5000.0                         | 835.4                 | 13.9                                  | 40.4              | 1010.9                    | 661.0                   | 268.6                          | 32.6                | 1.000255            |
| 5500.0                         | 820.5                 | 12.5                                  | 43.3              | 997.6                     | 659.4                   | 266.0                          | 38.8                | 1.000251            |
| 6000.0                         | 805.5                 | 11.1                                  | 46.2              | 984.5                     | 657.7                   | 264.6                          | 39.9                | 1.000248            |
| 6500.0                         | 790.9                 | 9.7                                   | 49.0              | 971.5                     | 656.1                   | 264.6                          | 41.8                | 1.000244            |
| 7000.0                         | 776.6                 | 8.2                                   | 51.9              | 958.8                     | 654.4                   | 266.6                          | 44.5                | 1.000241            |
| 7500.0                         | 762.4                 | 6.7                                   | 56.0              | 946.5                     | 652.6                   | 270.9                          | 45.0                | 1.000237            |
| 8000.0                         | 748.4                 | 5.1                                   | 60.3              | 934.5                     | 650.7                   | 274.9                          | 44.7                | 1.000234            |
| 8500.0                         | 734.6                 | 3.4                                   | 65.0              | 922.7                     | 648.8                   | 276.9                          | 42.0                | 1.000231            |
| 9000.0                         | 720.9                 | 2.4                                   | 69.7              | 908.9                     | 647.0                   | 278.1                          | 39.4                | 1.000228            |
| 9500.0                         | 707.4                 | 1.1                                   | 76.9              | 896.3                     | 646.0                   | 275.7                          | 37.2                | 1.000225            |
| 10000.0                        | 694.2                 | -0.2                                  | 78.1              | 883.6                     | 644.5                   | 272.4                          | 38.8                | 1.000221            |
| 10500.0                        | 681.1                 | -1.2                                  | 71.5              | 870.6                     | 643.1                   | 269.5                          | 42.6                | 1.000214            |
| 11000.0                        | 668.2                 | -2.5                                  | 81.6              | 858.1                     | 641.6                   | 267.6                          | 45.0                | 1.000213            |
| 11500.0                        | 655.5                 | -3.4                                  | 78.0              | 844.7                     | 640.5                   | 266.2                          | 43.2                | 1.000208            |
| 12000.0                        | 643.0                 | -4.7                                  | 83.2              | 832.6                     | 639.0                   | 264.5                          | 41.6                | 1.000204            |
| 12500.0                        | 630.6                 | -5.9                                  | 94.0              | 820.1                     | 637.6                   | 261.2                          | 44.8                | 1.000202            |
| 13000.0                        | 618.5                 | -7.1                                  | 98.4              | 808.0                     | 636.2                   | 258.7                          | 47.4                | 1.000199            |
| 13500.0                        | 606.6                 | -8.2                                  | 99.0              | 795.8                     | 634.8                   | 258.3                          | 46.4                | 1.000195            |
| 14000.0                        | 594.8                 | -8.7                                  | 99.0              | 781.9                     | 634.2                   | 257.8                          | 45.4                | 1.000191            |
| 14500.0                        | 583.2                 | -9.2                                  | 98.0              | 768.2                     | 633.6                   | 259.3                          | 46.1                | 1.000188            |
| 15000.0                        | 571.9                 | -9.9                                  | 98.2              | 755.3                     | 632.7                   | 263.6                          | 49.8                | 1.000184            |
| 15500.0                        | 560.7                 | -13.0                                 | 77.5              | 749.8                     | 628.8                   | 266.6                          | 58.2                | 1.000177            |
| 16000.0                        | 549.6                 | -15.4                                 | 32.1              | 742.6                     | 625.5                   | 267.7                          | 74.6                | 1.000169            |
| 16500.0                        | 538.6                 | -16.4                                 | 28.6              | 730.4                     | 624.4                   | 268.3                          | 74.6                | 1.000165            |
| 17000.0                        | 527.8                 | -17.1                                 | 29.6              | 717.7                     | 623.5                   |                                |                     | 1.000163            |
| 17500.0                        | 517.1                 | -17.9                                 | 31.2              | 705.5                     | 622.5                   |                                |                     | 1.000160            |
| 18000.0                        | 506.7                 | -18.7                                 | 32.9              | 693.5                     | 621.6                   |                                |                     | 1.000157            |

STATION ALTITUDE 3989.00 FEET MSL

18 NOV. 83

ASCENSION NO. 576

MANDATORY LEVELS

3220020570

WHITE SANDS

GEODETIC COORDINATES

12.40043 LAT DEG

106.37033 LONG DEG

TABLE 12

| PRESSURE<br>MILLIBARS | GEOPOTENTIAL<br>FEET | TEMPERATURE                  |                        | REL. HUMIDITY<br>PERCENT | WIND DATA                 |                |
|-----------------------|----------------------|------------------------------|------------------------|--------------------------|---------------------------|----------------|
|                       |                      | AIR<br>DEGREES<br>CENTIGRADE | DEWPOINT<br>CENTIGRADE |                          | DIRECTION<br>DEGREES (TN) | SPEED<br>KNOTS |
| 850.0                 | 4516.                | 15.5                         | 1.3                    | 38.                      | 267.9                     | 20.6           |
| 800.0                 | 6188.                | 10.5                         | -2                     | 47.                      | 264.1                     | 40.3           |
| 750.0                 | 7936.                | 5.3                          | -1.9                   | 60.                      | 274.7                     | 45.0           |
| 700.0                 | 9770.                | .3                           | -2.6                   | 81.                      | 274.1                     | 30.9           |
| 650.0                 | 11706.               | -4.0                         | -7.4                   | 77.                      | 265.6                     | 42.3           |
| 600.0                 | 13762.               | -8.5                         | -8.6                   | 99.                      | 250.0                     | 45.8           |
| 550.0                 | 15960.               | -15.3                        | -27.9                  | 33.                      | 267.7                     | 73.7           |
| 500.0                 | 18304.               | -19.2                        | -31.0                  | 34.                      |                           |                |

**DATE**  
**ILME**