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ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND WS--ETC F/6 4/2  
19305A MLRS, MISSILE NUMBERS 1083, 1132, 1141, 1142, 1143, ROUN--ETC(U)  
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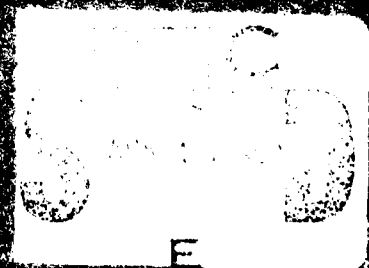


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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Meteorological data gathered for the launching of 19305A MLRS, Missile Numbers 1083, 1132, 1141, 1142, 1143, Round Numbers V-104, V-105, V-106, V-107 and V-108 are presented in tabular form.		

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## INTRODUCTION

19305A MLRS , Missile Numbers 1083, 1132, 1141, 1142 and 1143 ,  
Round Numbers V-104, V-105, V-106, V-107 and V-108 , were launched from LC-33 ,  
White Sands Missile Range (WSMR), New Mexico, at 1000 MST  
on 23 January 1980 . The schedule launch times were 0900 MST .

## 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) Anemometer data were provided from existing pole-mounted and tower-mounted anemometers at LC-33. Monitor of wind speed and direction from one anemometer was also provided in the launch control room.

#### b. Upper Air

(1) Low level wind data were obtained from RAPT'S T-9 pibal observation at:

#### SITE AND ALTITUDE

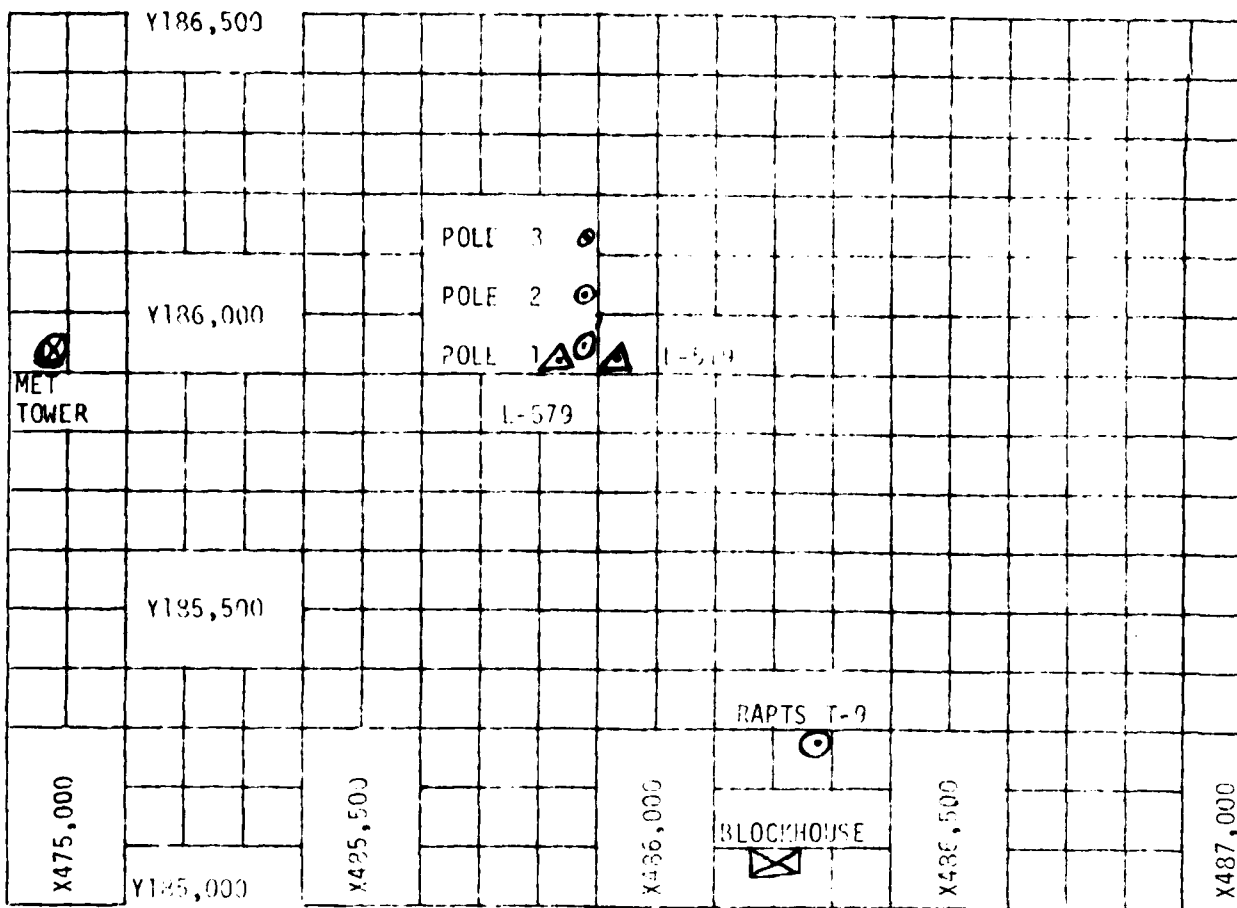
LC-33	2Km
Nick	2Km

(2) Air structure data (rawinsonde) were collected at the following Met Sites. Data were collected from surface to 78,000 feet in 500-foot increments.

#### SITE AND TIME

SMR 1000 MST

NORTH



1. MET TOWER - 4 Bendix Model T-20 Anemometers at 12 ft, 62 ft, 102 ft, and 202 ft with E/A recorders.
2. POLE ANEMOMETER - Bendix Model T-120 with E/A recorders.
  - (a) Pole #1 - 38.7 ft.
  - (b) Pole #2 - 53.0 ft.
  - (c) Pole #3 - 83.6 ft.
3. RAPTS T-9 Radar Automatic Pilot-Balloon Tracking System T-9 Radar.



TABLE 1. Surface Observations taken at 1000 MST,  
 23 January 1980, at LC-33, 19305A MLRS,  
 Missile Numbers 1083, 1132, 1141, 1142  
 and 1143, Round Numbers V-104, V-105,  
 V-106, V-107 and V-108.

ELEVATION	3977.30	FT/MSL
PRESSURE	892.0	MBS
TEMPERATURE	-0.3	°C
RELATIVE HUMIDITY	80	
DEW POINT	-3.2	°C
DENSITY	1139.13	GM/M <sup>3</sup>
WIND SPEED	06	KTS
WIND DIRECTION	360	DEGREES
CLOUD COVER	CLEAR	

TABLE 2

## LC-33 FIXED POLE ANEMOMETER MEASURED WINDS

POLE #1 X485,874.29 Y185,958.90 H4018.74 38.7 ft. AGL			POLE #2 X485,874.93 Y186,012.00 H4033.57 53.0 ft. AGL			POLE #3 X485,877.29 Y186,116.06 H4063.92 83.6 ft. AGL		
T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS
-30	346	08	-30	360	02	-30	345	05
-20	341	08	-20	352	03	-20	345	05
-10	340	07	-10	342	04	-10	342	04
0.0	345	07	0.0	345	04	0.0	344	05
+10	342	07	+10	342	04	+10	342	05

TABLE 3

## LC-33 METEOROLOGICAL TOWER ANEMOMETER MEASURED WINDS (202 FT TOWER)

LEVEL #1, 12 FEET X484,982.64, Y185,057.73, H3983.00 (base)			LEVEL #2, 62 FEET X484,982.64, Y185,057.73, H3983.00 (base)		
T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS
-30	004	06	-30	007	05
-20	005	05	-20	006	05
-10	001	05	-10	007	05
0.0	359	04	0.0	348	05
+10	358	05	+10	345	05

LEVEL #3, 102 FEET X484,982.64, Y185,057.73, H3983.00 (base)			LEVEL #4, 202 FEET X484,982, Y185,057.73, H3983.00 (base)		
T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS
-30	360	07	-30	357	06
-20	360	06	-20	356	07
-10	360	06	-10	355	07
0.0	358	05	0.0	357	07
+10	360	06	+10	358	06





STATION ALTITUDE 3997.30 FEET MSL  
 23 JAN. 80  
 ASCENSION NO. 16

SIGNIFICANT LEVEL DATA  
 0230060016  
 S M R

GEODETIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

TABLE 6

PRESSURE GEOMETRIC ALTITUDE MILLIBARS MSL FEET	TEMPERATURE AIR DEGREE CENTIGRADE	REL. HUM. PERCENT
890.0	1.8	80.0
887.0	.3	73.0
872.9	-1.4	89.0
856.8	.3	69.0
850.0	-2.2	66.0
798.4	-2.1	59.0
779.0	-1.8	31.0
769.4	-1.2	15.0
722.4	-2.5	16.0
709.2	-.4	17.0
700.0	-.8	16.0
641.6	-4.6	17.0
581.4	-10.1	17.0
500.0	-19.7	17.0
431.0	-29.0	18.0
400.0	-32.4	18.0
388.4	-33.7	18.0
368.0	-36.1	18.0
328.6	-42.6	
300.0	-44.9	
292.0	-45.5	
268.6	-49.9	
250.0	-51.0	
215.4	-57.7	
205.6	-58.5	
200.0	-54.0	
196.0	-52.7	
182.2	-54.2	
172.1	-52.1	
150.0	-56.4	
144.6	-57.7	
133.2	-57.2	
112.0	-61.4	
105.4	-60.8	
100.0	-63.2	
81.0	-64.7	
70.0	-64.0	
54.4	-64.9	
50.0	-62.5	
32.4	-60.5	

STATION ALTITUDE 9997.30 FEET MSL  
23 JAN. 60 1000 HRS MST  
ASCENSION NO. 16

SIGNIFICANT LEVEL DATA  
0230060016  
S M R  
TABLE 6 (CONT)

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

PRESSURE GEOMETRIC ALTITUDE MILLIBARS MSL FEET	TEMPERATURE AIR DEWPOINT DEGREES CENTIGRADE	REL. HUM. PERCENT
30.0 78203.4	-62.3	

UPPER AIR DATA  
0230060016  
S M R  
TABLE 7

STATION ALTITUDE 3997.30 FEET MSL  
23 JAN. 80 1000 HRS MST  
ASCENSION NO. 16

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARs	AIR TEMPERATURE DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DIRECTION DEGREES(TN)	WIND SPEED KNOTS	INDEX OF REFRACTION
3997.3	890.0	1.8	-1.3	80.0	1125.0	646.7	45.0	2.9	1.000279
4000.0	889.9	1.8	-1.4	79.8	1125.1	646.7			1.000278
4500.0	873.2	-1.4	-3.0	88.7	1116.8	642.9			1.000274
5000.0	856.7	.3	-4.7	69.0	1089.4	644.8			1.000264
5500.0	840.5	-0.5	-6.3	64.7	1072.3	643.8			1.000258
6000.0	824.7	-1.1	-7.3	62.6	1054.3	643.1			1.000253
6500.0	809.1	-1.7	-8.3	60.5	1036.7	642.4			1.000248
7000.0	793.8	-2.0	-10.5	52.4	1018.6	641.9			1.000241
7500.0	778.7	-1.8	-16.8	30.5	998.9	642.0			1.000231
8000.0	764.0	-1.5	-24.3	15.3	978.7	642.4			1.000222
8500.0	749.5	-1.7	-24.0	16.2	961.6	642.0			1.000219
9000.0	735.3	-2.1	-23.7	17.2	944.7	641.5			1.000215
9500.0	721.5	-2.3	-23.4	17.9	927.4	641.5			1.000211
10000.0	707.7	-0.5	-22.6	16.8	903.6	643.5			1.000206
10500.0	694.3	-1.2	-23.6	16.1	886.8	642.7			1.000203
11000.0	681.1	-2.0	-24.2	16.3	874.6	641.7			1.000199
11500.0	668.1	-2.8	-24.7	16.5	860.8	640.7			1.000196
12000.0	655.4	-3.7	-25.3	16.8	846.9	639.7			1.000193
12500.0	643.0	-4.5	-25.8	17.0	833.4	638.7			1.000190
13000.0	630.5	-5.6	-26.7	17.0	820.6	637.4			1.000186
13500.0	618.5	-6.7	-27.6	17.0	808.0	636.1			1.000183
14000.0	606.4	-7.8	-28.5	17.0	795.7	634.8			1.000180
14500.0	594.7	-8.8	-29.4	17.0	783.5	633.5			1.000177
15000.0	583.2	-9.9	-30.3	17.0	771.6	632.2			1.000175
15500.0	571.6	-11.2	-31.3	17.0	759.9	630.6			1.000172
16000.0	560.2	-12.5	-32.4	17.0	748.4	629.1			1.000169
16500.0	549.1	-13.7	-33.4	17.0	737.2	627.5			1.000166
17000.0	538.1	-15.0	-34.5	17.0	726.1	626.0			1.000164
17500.0	527.4	-16.3	-35.6	17.0	715.2	624.4			1.000161
18000.0	516.9	-17.6	-36.6	17.0	704.5	622.9			1.000158
18500.0	506.7	-18.9	-37.7	17.0	694.0	621.5			1.000156
19000.0	496.4	-20.1	-38.8	17.0	683.5	619.7			1.000153
19500.0	486.2	-21.5	-39.8	17.2	672.8	618.1			1.000151
20000.0	476.2	-22.8	-40.8	17.3	662.4	616.5			1.000149
20500.0	466.5	-24.1	-41.8	17.5	652.1	614.9			1.000146
21000.0	456.7	-25.4	-42.8	17.6	642.0	613.5			1.000144
21500.0	447.5	-26.7	-43.9	17.8	632.1	611.8			1.000142
22000.0	438.0	-28.0	-44.9	17.9	622.4	610.0			1.000139
22500.0	429.0	-29.2	-45.9	18.0	612.5	608.5			1.000137
23000.0	419.9	-30.2	-46.7	18.0	602.0	607.5			1.000135

XX WIND DATA INVALID DUE TO MISSING RAW AZIMUTH AND ELEVATION ANGLES.

STATION ALTITUDE 9997.30 FEET MSL  
 23 JAN. 80 1000 HRS MST  
 ASCENSION NO. 16

UPPER AIR DATA  
 0230060016  
 S M R  
 TABLE 7 (CONT)

GEODETIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	REL HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
23500.0	411.0	-31.2	18.0	591.6	600.0	352.3	14.7	1.000132
24000.0	402.3	-32.1	18.0	581.4	604.8	345.4	15.8	1.000130
24500.0	393.7	-33.1	18.0	571.3	603.6	339.5	17.0	1.000128
25000.0	385.3	-34.1	15.3**	561.3	602.4	335.6	17.9	1.000125
25500.0	377.0	-35.0	8.0**	551.5	601.2	331.2	18.8	1.000123
26000.0	368.8	-36.0	.8**	541.8	599.9	324.8	19.7	1.000121
26500.0	360.8	-37.2		532.7	598.4	317.4	20.6	1.000119
27000.0	352.9	-38.5		523.9	596.8	308.0	21.6	1.000117
27500.0	345.1	-39.8		515.2	595.1	300.5	23.3	1.000115
28000.0	337.5	-41.1		506.6	593.5	295.2	25.6	1.000113
28500.0	330.1	-42.5		498.3	591.9	291.5	29.0	1.000111
29000.0	322.8	-43.1		488.7	591.0	289.2	33.4	1.000109
29500.0	315.6	-43.6		479.0	590.2	285.8	37.7	1.000107
30000.0	308.5	-44.2		469.4	589.5	281.8	42.1	1.000105
30500.0	301.6	-44.8		460.1	588.7	277.9	46.0	1.000102
31000.0	294.8	-45.3		450.8	588.1	274.2	49.8	1.000100
31500.0	288.2	-46.2		442.3	586.9	271.1	52.7	1.000099
32000.0	281.6	-47.4		434.6	585.3	268.4	55.3	1.000097
32500.0	275.2	-48.6		427.0	583.8	265.9	59.9	1.000095
33000.0	269.0	-49.8		419.6	582.2	263.9	65.0	1.000093
33500.0	262.8	-50.2		410.7	581.7	262.9	70.0	1.000091
34000.0	256.7	-50.6		401.9	581.2	262.2	75.0	1.000090
34500.0	250.8	-50.9		393.2	580.7	262.5	76.3	1.000088
35000.0	245.0	-51.9		385.7	579.5	263.0	76.8	1.000086
35500.0	239.2	-53.0		378.5	578.1	265.0	75.0	1.000084
36000.0	233.6	-54.0		371.5	576.7	267.4	72.8	1.000083
36500.0	228.2	-55.1		364.5	575.3	268.7	68.5	1.000081
37000.0	222.8	-56.2		357.8	573.9	269.7	63.4	1.000080
37500.0	217.6	-57.2		351.1	572.4	269.3	58.8	1.000078
38000.0	212.5	-57.9		343.9	571.5	266.9	54.9	1.000077
38500.0	207.4	-58.3		336.4	571.0	264.4	51.4	1.000075
39000.0	202.5	-56.0		324.9	574.1	262.8	49.1	1.000072
39500.0	197.7	-53.3		313.3	577.7	262.3	46.8	1.000070
40000.0	193.1	-53.0		305.6	578.0	265.8	44.6	1.000068
40500.0	188.6	-53.5		299.2	577.4	269.4	42.7	1.000067
41000.0	184.2	-54.0		292.8	576.8	272.4	41.0	1.000065
41500.0	180.0	-53.7		285.7	577.1	275.1	38.9	1.000064
42000.0	175.8	-52.9		278.0	578.2	274.1	33.7	1.000062
42500.0	171.7	-52.2		270.6	579.1	272.9	29.1	1.000060
43000.0	167.7	-52.9		265.2	578.1	273.2	29.6	1.000059

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

STATION ALTITUDE 3997.30 FEET MSL  
 23 JAN. 60 1000 HRS MST  
 ASCENSION NO. 16

'UPPER AIR DATA  
 0230060016  
 S M R

GEODETIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

TABLE 7 (CONT)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	DEWPOINT DEGREES	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
43500.0	163.7	-53.7			259.9	577.2	273.6	30.3	1.000058
44000.0	159.9	-54.4			254.7	576.2	275.1	34.6	1.000057
44500.0	156.2	-55.1			249.6	575.2	276.3	38.9	1.000056
45000.0	152.5	-55.9			244.5	574.2	277.7	39.4	1.000054
45500.0	148.9	-56.7			239.7	573.2	279.3	39.1	1.000053
46000.0	145.4	-57.5			234.9	572.1	280.9	36.8	1.000052
46500.0	142.0	-57.6			229.4	572.0	283.0	33.3	1.000051
47000.0	138.0	-57.4			223.8	572.2	285.4	30.3	1.000050
47500.0	135.3	-57.3			218.4	572.4	288.3	27.9	1.000049
48000.0	132.1	-57.4			213.3	572.2	291.0	26.3	1.000048
48500.0	128.9	-58.0			208.8	571.5	292.8	26.1	1.000046
49000.0	125.9	-58.6			204.3	570.7	293.8	25.8	1.000046
49500.0	122.8	-59.2			200.0	569.9	292.3	25.2	1.000045
50000.0	119.9	-59.7			195.7	569.1	290.7	24.6	1.000044
50500.0	117.0	-60.3			191.6	568.3	287.0	24.4	1.000043
51000.0	114.2	-60.9			187.5	567.5	283.2	24.3	1.000042
51500.0	111.5	-61.4			183.4	567.0	281.4	24.0	1.000041
52000.0	108.8	-61.1			178.8	567.3	280.2	23.7	1.000040
52500.0	106.2	-60.9			174.3	567.6	279.3	23.2	1.000039
53000.0	103.6	-61.6			170.6	568.7	278.8	22.4	1.000038
53500.0	101.1	-62.7			167.4	565.2	277.9	21.6	1.000037
54000.0	98.7	-63.3			163.8	564.4	276.1	20.7	1.000036
54500.0	96.3	-63.5			159.9	564.1	274.1	20.0	1.000035
55000.0	93.9	-63.6			156.1	563.9	270.8	21.0	1.000035
55500.0	91.6	-63.8			152.5	563.6	267.7	22.1	1.000034
56000.0	89.4	-64.0			148.9	563.4	265.7	23.9	1.000033
56500.0	87.2	-64.2			145.3	563.2	264.1	25.9	1.000032
57000.0	85.1	-64.4			141.9	562.9	267.5	27.0	1.000032
57500.0	83.0	-64.5			138.6	562.7	275.2	27.6	1.000031
58000.0	81.0	-64.7			135.3	562.5	283.3	28.7	1.000030
58500.0	79.0	-64.6			131.9	562.6	293.7	30.3	1.000029
59000.0	77.0	-64.5			128.6	562.8	302.7	32.7	1.000029
59500.0	75.2	-64.3			125.4	563.0	310.0	33.0	1.000028
60000.0	73.3	-64.2			122.3	563.1	317.0	33.5	1.000027
60500.0	71.5	-64.1			119.2	563.3	321.9	31.4	1.000027
61000.0	69.8	-64.0			116.2	563.4	326.4	27.1	1.000026
61500.0	68.1	-64.1			113.4	563.3	331.5	23.3	1.000025
62000.0	66.4	-64.2			110.7	563.2	334.0	20.5	1.000025
62500.0	64.8	-64.3			108.0	563.0	337.4	17.8	1.000024
63000.0	63.2	-64.4			105.4	562.9	339.7	17.1	1.000023

STATION ALTITUDE 3997.30 FEET MSL  
 23 JAN. 60 1000 HRS MST  
 ASCENSION NO. 10

UPPER AIR DATA  
 0230060016  
 S M R

GEODETIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

TABLE 7 (CONT)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION (TIN) DEGREES	SPEED KNOTS	INDEX OF REFRACTION
63500.0	61.6	-64.5		102.9	562.8	342.0	16.7	1.000023
64000.0	60.1	-64.5		100.4	562.7	342.4	16.8	1.000022
64500.0	58.7	-64.6		98.0	562.6	340.5	17.4	1.000022
65000.0	57.2	-64.7		95.7	562.4	338.7	18.2	1.000021
65500.0	55.8	-64.8		93.4	562.3	335.8	20.5	1.000021
66000.0	54.3	-64.9		91.1	562.2	333.5	22.8	1.000020
66500.0	53.1	-64.2		88.6	563.1	338.6	22.4	1.000020
67000.0	51.8	-63.5		86.2	564.0	350.3	20.9	1.000019
67500.0	50.6	-62.8		83.8	565.0	2.8	20.0	1.000019
68000.0	49.4	-62.4		81.6	565.5	14.3	17.9	1.000018
68500.0	48.2	-62.5		79.6	565.7	28.3	16.6	1.000018
69000.0	47.0	-62.2		77.6	565.8	34.1	14.5	1.000017
69500.0	45.9	-62.1		75.7	566.0	32.1	11.3	1.000017
70000.0	44.8	-62.0		73.9	568.1	28.3	8.2	1.000016
70500.0	43.7	-61.9		72.0	568.3	17.2	8.7	1.000016
71000.0	42.6	-61.8		70.3	566.4	7.7	9.6	1.000016
71500.0	41.6	-61.7		68.5	566.8	4.4	10.4	1.000015
72000.0	40.6	-61.5		66.8	566.7	6.4	11.0	1.000015
72500.0	39.6	-61.4		65.2	566.9	8.3	11.6	1.000015
73000.0	38.7	-61.3		63.6	567.0	8.3	11.6	1.000014
73500.0	37.7	-61.2		62.0	567.2	8.1	11.6	1.000014
74000.0	36.8	-61.1		60.5	567.3	6.6	11.5	1.000013
74500.0	35.9	-61.0		59.0	567.5	3.1	11.5	1.000013
75000.0	35.1	-60.9		57.6	567.6	359.5	11.5	1.000013
75500.0	34.2	-60.8		56.1	567.8	5.0	11.4	1.000013
76000.0	33.4	-60.6		54.8	567.9	11.5	11.5	1.000012
76500.0	32.6	-60.5		53.4	568.1			1.000012
77000.0	31.8	-60.9		52.2	567.5			1.000012
77500.0	31.0	-61.5		51.1	566.8			1.000011
78000.0	30.3	-62.1		50.0	566.0			1.000011

STATION ALTITUDE 3997.30 FEET MSL  
 23 JAN. 80  
 ASCENSION NO. 16

MANDATORY LEVELS  
 0230060016  
 S M R

GEODETTIC COORDINATES  
 32.48034 LAT DEG  
 106.42307 LON DEG

TABLE 8

PRESSURE MILLIBARS	GEOPOTENTIAL FEET	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT	WIND DATA	
				DIRECTION DEGREES(TM)	SPEED KNOTS
850.0	5203.	-2	66.	9999.0	9999.0XX
800.0	6790.	-2.0	59.	331.9	5.2
750.0	8475.	-1.7	16.	254.5	2.9
700.0	10276.	-1.8	16.	25.4	9.4
650.0	12205.	-4.0	17.	25.9	13.8
600.0	14260.	-8.3	17.	10.4	14.4
550.0	16453.	-13.6	17.	11.7	12.5
500.0	18803.	-19.7	17.	35.4	15.4
450.0	21336.	-26.3	18.	35.6	10.7
400.0	24073.	-32.4	16.	343.8	16.1
350.0	27143.	-39.0		304.8	22.1
300.0	30559.	-44.9		277.1	46.8
250.0	34497.	-51.0		262.6	76.3
200.0	39167.	-54.0		262.0	47.9
175.0	41986.	-52.7		273.9	33.0
150.0	45232.	-56.4		278.7	39.2
125.0	49009.	-58.7		293.4	25.7
100.0	53563.	-63.2		277.2	21.2
80.0	58048.	-64.6		287.8	29.2
70.0	60728.	-64.0		325.5	27.9
60.0	63822.	-64.6		342.3	16.8
50.0	67482.	-62.5		7.1	19.1
40.0	72010.	-61.5		7.4	11.3
30.0	77673.	-62.3			