

AD-A102 791

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND WS--ETC F/8 4/2
19308A MLRS; MISSILE NUMBER BN-013, BN-009, BN-010, BN-011, BN---ETC(U)

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DR 1193
July 1981

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METEOROLOGICAL DATA REPORT

19305A MLRS,
Missile Numbers BN-013, BN-009, BN-010,
BN-011, BN-012, V02-007,
Round Numbers V-163/MD-29, V-164/MD-30,
V-165/MD-31, V-166/MD-32, V-167/MD-33, V-168/MD-34
11 July 1981,

by

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Program Support Coordinator
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OF-1401/AS1-DR-1110

ATMOSPHERIC SCIENCES LABORATORY
WHITE SANDS MISSILE RANGE, NEW MEXICO

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UNITED STATES ARMY ELECTRONICS COMMAND

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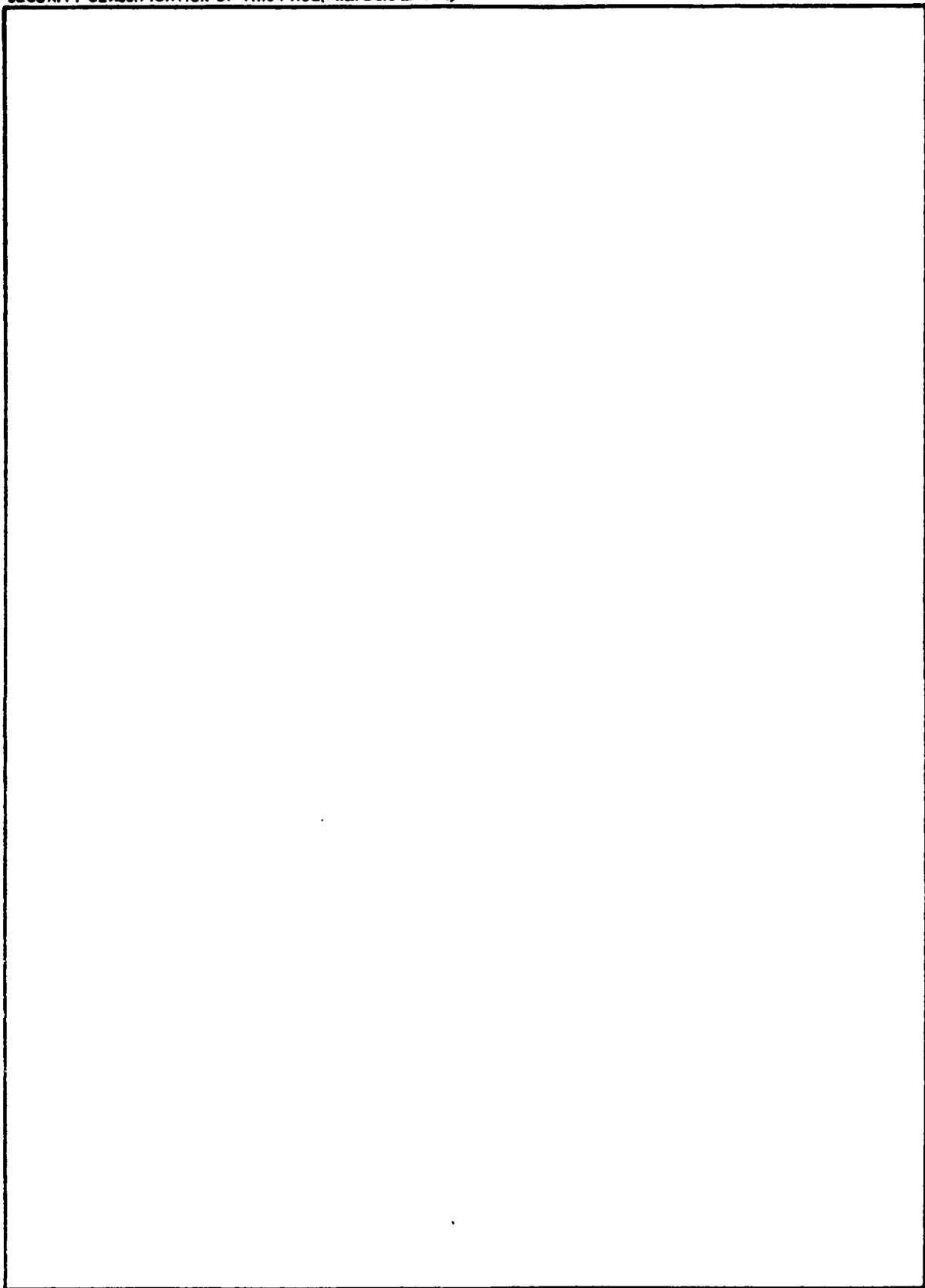
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Meteorological data gathered for the launching of the 19305A MLRS, Missile No. BN013, BN009, BN010, BN011, BN012, V02-007, Round No. V163/MD32, V164/MD30, V165/MD31, V166/MD32, V167/MD33, V168/MD34 presented in tabular form.		

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By _____

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Dist: Avail and/or

Special

INTRODUCTION

19305A MLRS, Missile Numbers BN-013, BN-009, BN-010- BN-011, BN-012, and Vo2-007, Round Numbers V-163/MD-29, V-164/MD-30, V-165/MD-31, V-166/MD-32, V-167/MD-33, and V-168/MD-34, were launched from LC-33, White Sands Missile Range (WSMR), New Mexico, at 1200, 1200:05, 1200:10, 1200:14, 1200:19, and 1200:23 MDT, 06 July 1981. The scheduled times were 1200, 1200:04.5, 1200:09, 1200:13.5, 1200:18 and 1200:22.5 MDT.

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 in the following methods:

1. Observations:

a. Surface

(1) Standard surface observations to include pressure, temperature ($^{\circ}$ C), relative humidity, dew point ($^{\circ}$ C), density (gm/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 Single Theodolite pibal observations at:

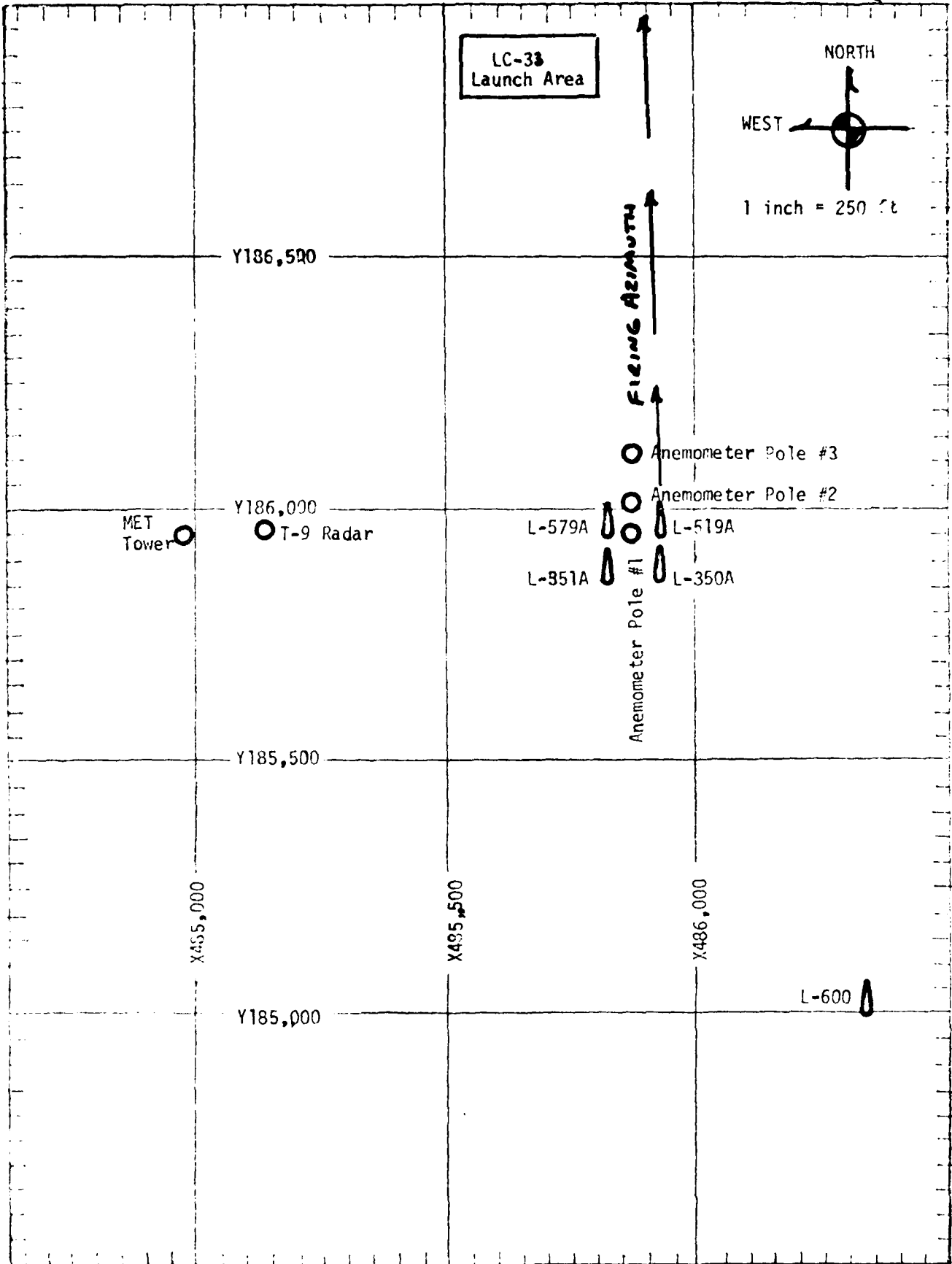
SITE AND ALTITUDE

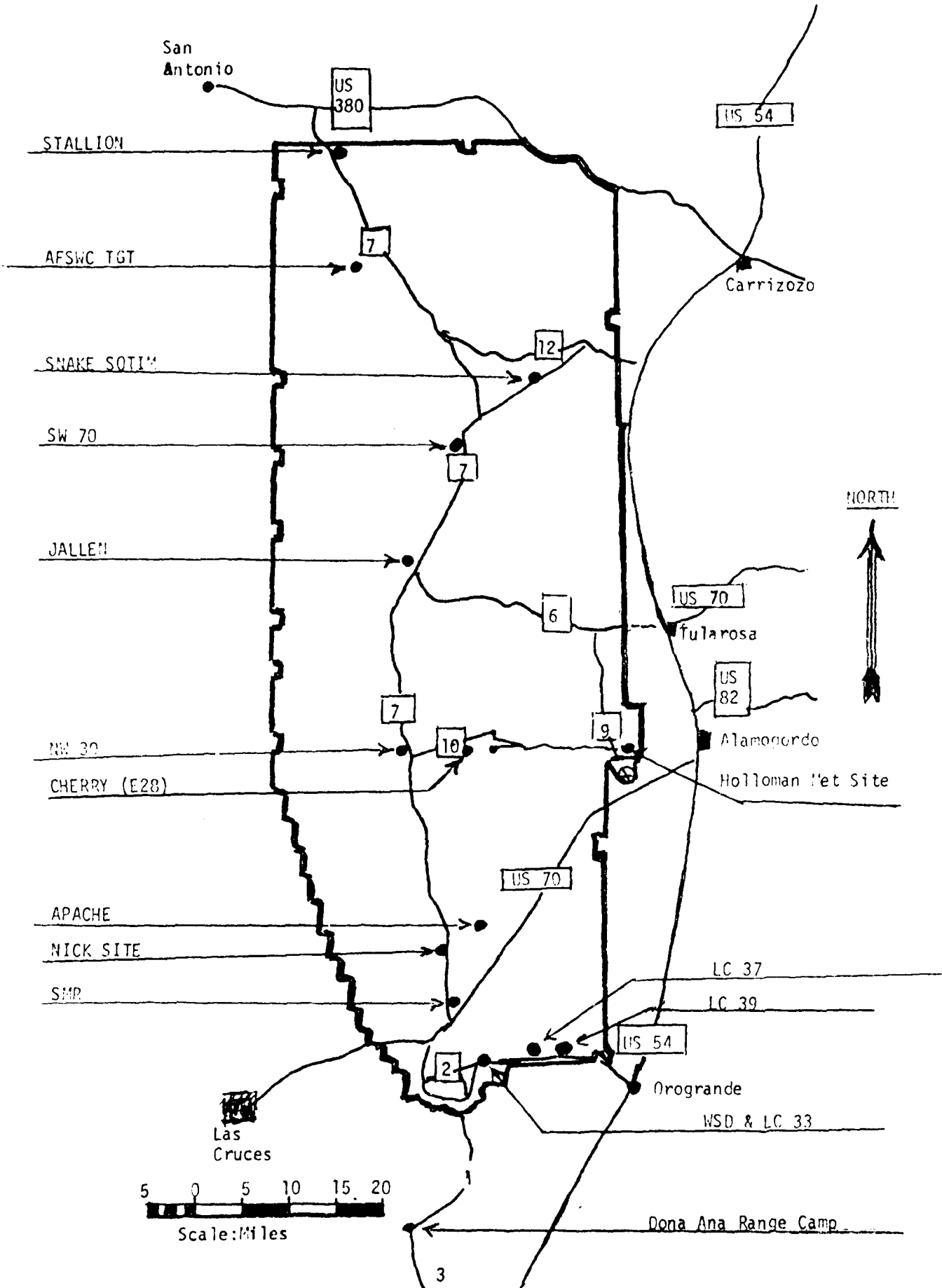
LC-33	2 KM
NICK	2 KM

(2) Air structure data (rawinsonde) were collected at the following Met Sites:

SITE AND TIME

WSD	0900 MDT
LC-37	1000 MDT
WSD	1100 MDT
LC-37	1200 MDT





PROJECT SURFACE OBSERVATION

TABLE 1		STATION LC-33																	
DATE 11 JULY 1981		X = 484,982.64		Y = 185,957.73		H = 3983													
TIME	01	PRESSURE	881.4	TEMPERATURE	32.0	DEW POINT	13.0	RELATIVE	32	DENSITY	998	DIPECTION	165	WIND	05	CHARACTER		VISIBIL-	50+
M	01	mbs		°C		°C		%		gm/m ³		degs		SPEED		kts		ITY	

OBSTRUCTIONS TO VISIBILITY	CLOUDS						REMARKS
	1st LAYER		2nd LAYER		3rd LAYER		
	AMT	HGT	AMT	HGT	AMT	HGT	
	3	CU 6500			0	CI 25,000	

PSYCHROMETRIC COMPUTATION

TIME:	MDT	1200
DRY BULB TEMP.		32.0
WET BULB TEMP.		19.2
WET BULB DEPR.		12.8
DEW POINT		13.0
RELATIVE HUMID.		32

TABLE 2

LC-33 FIXED POLE ANEMOMETER MEASURED WINDS
1200 MOT
11 July 1981

POLE #1 X485,874.29 Y185,958.90 H4018.74 38.7 ft. AGL			POLE #2 Y485,874.93 Y186,012.00 H4033.57 53.0 ft. AGL			POLE #3 X485,877.24 Y185,116.06 H4063.97 83.5 ft. AGL		
T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS
T-30	158	04	T-30	176	04	T-30	162	04
T-20	159	03	T-20	172	03	T-20	183	04
T-10	141	02	T-10	201	01	T-10	174	04
T0.0	128	02	T0.0	209	01	T0.0	181	04
T+10	120	02	T+10	C A L M		T+10	193	04

TABLE 3 LC-33 METEOROLOGICAL TOWER ANEMOMETER MEASURED WINDS (120 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
T-30	141	04	T-30	158	04
T-20	143	04	T-20	164	02
T-10	152	03	T-10	155	04
T0.0	143	03	T0.0	139	04
T+10	123	04	T+10	147	05

LEVEL #3, 102 FEET X484,982.64, Y185,057.73, H3983.00 (base)			LEVEL #4, 202 FEET X484,982.64, Y185,057.73, H3983.00 (base)		
T-TIME SEC	DIR DEG	SPEED KTS	T-TIME SEC	DIR DEG	SPEED KTS
T-30	150	04	T-30	134	06
T-20	158	05	T-20	137	07
T-10	148	06	T-10	143	08
T0.0	146	07	T0.0	132	06
T+10	142	06	T+10	134	07

TABLE 4

T-TIME PILOT-BALLOON MEASURED WIND DATA

DATE 11 July 1981

SITE: LC-33
 TIME: 1200 MDT
 WSTN COORDINATES:
 X= 485,135.76
 Y= 185,919.24
 H= 3,988.57

SITE: NICK
 TIME: 1200 MDT
 WSTN COORDINATES:
 X= 470,734.56
 Y= 255,734.64
 H= 4,126.57

LAYER MIDPOINT METERS AGL	DIRECTION DEGREES	SPEED KNOTS	LAYER MIDPOINT METERS AGL	DIRECTION DEGREES	SPEED KNOTS
SURFACE	165	05	SURFACE	203	06
150	189	08	150	184	06
210	190	09	210	180	06
270	187	09	270	179	06
330	184	09	330	177	06
390	183	09	390	179	06
500	184	09	500	185	06
650	184	08	650	184	06
800	177	06	800	182	07
950	157	05	950	180	08
1150	150	05	1150	177	08
1350	173	05	1350	171	07
1550	179	05	1550	162	06
1750	159	07	1750	158	06
2000	170	07	2000	148	06

All data obtained from Single Theodolite Pilot-Balloon Tracked Observations.

TABLE 5

AIMING AND T-Time COMPUTER MET MESSAGES

WSD 0900 MDT
 METCM1324064
 111500122883
 00373004 29980883
 01300006 29890873
 02306007 29640848
 03307010 29380810
 04309009 29160764
 05348005 28840720
 06294005 28450679
 07307006 28050639
 08283005 27740601
 09309008 27440565
 10305008 27090531
 11252010 26800498
 12246011 26390453

LC-37 1000 MDT
 METCM1324063
 111600124881
 00364007 30360881
 01348011 30100871
 02312005 29750846
 03274009 29400808
 04323011 29140762
 05374005 28810719
 06306005 28390677
 07292006 28020637
 08291005 27690600
 09315005 27410564
 10338005 27040530
 11273009 26720497
 12240011 26300451

WSD 1100 MDT
 METCM1324064
 111700122882
 00320005 30440882
 01326009 30310872
 02317010 30010848
 03317011 29630810
 04351009 29230764
 05355006 28860721
 06274005 28470679
 07306003 28130640
 08339005 27790602
 09310008 27440566
 10327006 27060531
 11290012 26790499
 12248012 26340453

LC-37 1200 MDT
 METCM1324063
 111800124880
 00356008 30680880
 01297011 30490870
 02310010 30170846
 03312014 29810808
 04355008 29320763
 05279006 28900719
 06305008 28510678
 07279006 28170638
 08201004 27840601
 09269006 27550565
 10350008 28210531
 11294008 26860498
 12269013 26450453

STATION ALTITUDE 3989.00 FEET MSL
 11 JULY 61
 ASCENSION NO. 447

SIGNIFICANT LEVEL DATA
 1920020447
 WHITE SANDS

STATION ALTITUDE 3989.00 FEET MSL
 11 JULY 61
 ASCENSION NO. 447

GEODETIC COORDINATES
 32.40043 LAT DEG
 106.37033 LON DEG

TABLE 6

PRESSURE MILLIBARS	GEOMETRIC ALTITUDE MSL FEET	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT
882.8	3989.0	24.3	58.0
850.0	5075.3	21.6	61.0
830.6	5732.8	20.0	56.0
811.2	6402.9	19.3	59.0
772.6	7777.9	17.0	58.0
753.4	8484.0	16.6	51.0
700.0	10527.8	12.0	57.0
642.2	12879.9	6.2	72.0
556.0	16724.7	-2	61.0
522.8	18336.2	-3.9	73.0
509.0	19492.0	-5.3	56.0
481.8	20446.1	-7.5	58.0
461.0	21299.3	-8.0	21.0
420.8	23883.7	-12.8	20.0
400.0	25149.0	-16.1	26.0
377.6	26564.8	-20.3	42.0
357.0	27927.6	-22.2	18.0
300.0	32051.8	-32.4	19.0

STATION: ALTITUDE 3989.00 FEET MSL
 11 JULY 61 0900 HRS NDT
 ASCENSION NO. 447

UPPER AIR DATA
 192002047
 WHITE SANDS

GEODEIC COORDINATES
 32.40043 LAT DEG
 106.37033 LON DEG

TABLE 7

GOME TRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KILOTS	IND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE				DIRECTION DEGREES(TN)	SPEED KILOTS	
3989.0	882.8	24.3	15.5	58.0	1020.1	074.4	210.0	4.1	1.000304
4000.0	862.5	24.3	15.5	58.0	1025.8	074.4	209.4	4.1	1.000304
4500.0	867.2	23.0	14.7	59.4	1012.0	072.9	190.8	5.7	1.000298
5000.0	852.2	21.8	13.9	60.8	999.5	071.4	160.9	7.6	1.000292
5500.0	837.4	20.6	13.6	64.2	986.2	070.0	175.1	9.7	1.000288
6000.0	822.8	19.7	12.5	63.2	972.2	068.9	172.5	11.1	1.000281
6500.0	808.4	19.1	11.1	59.6	957.5	068.1	172.2	10.8	1.000272
7000.0	794.2	18.3	11.1	62.9	943.3	067.2	171.1	10.1	1.000269
7500.0	780.3	17.5	11.1	66.2	929.3	066.3	168.0	8.9	1.000266
8000.0	766.5	16.9	9.7	62.7	915.2	065.4	172.2	8.3	1.000258
8500.0	752.6	16.6	6.4	51.1	901.0	064.7	176.1	7.7	1.000244
9000.0	738.5	15.4	6.5	55.0	888.3	063.5	167.2	6.5	1.000242
9500.0	720.4	14.3	6.4	59.0	875.8	062.2	193.9	5.4	1.000239
10000.0	713.4	13.2	6.3	62.9	863.6	060.9	169.4	4.4	1.000237
10500.0	706.7	12.1	6.1	66.8	851.5	059.6	160.0	4.1	1.000234
11000.0	688.0	10.8	5.2	68.0	839.9	058.1	171.2	4.5	1.000229
11500.0	673.5	9.6	4.2	69.1	828.4	056.6	170.6	5.2	1.000224
12000.0	662.2	8.4	3.3	70.1	817.1	055.1	172.5	6.0	1.000219
12500.0	651.2	7.1	2.3	71.2	806.0	053.6	172.5	6.2	1.000214
13000.0	639.3	6.0	1.3	71.7	794.7	052.2	172.4	6.4	1.000210
13500.0	627.4	5.2	.2	70.2	782.4	051.1	171.1	6.0	1.000205
14000.0	615.8	4.3	-.9	68.8	770.4	050.1	160.7	5.5	1.000200
14500.0	604.4	3.5	-2.0	67.4	758.5	049.1	161.5	4.9	1.000195
15000.0	593.1	2.7	-3.0	65.9	746.8	048.0	157.0	4.7	1.000191
15500.0	582.1	1.8	-4.1	64.5	735.3	047.0	159.3	5.4	1.000186
16000.0	571.3	1.0	-5.2	63.1	724.0	045.9	167.5	6.4	1.000182
16500.0	560.7	.2	-6.3	61.6	712.8	044.9	176.9	8.0	1.000178
17000.0	550.2	-.8	-7.0	63.1	702.1	043.7	179.0	8.6	1.000175
17500.0	539.8	-2.0	-7.3	66.8	691.7	042.3	180.0	8.9	1.000172
18000.0	529.6	-3.1	-7.7	70.5	681.5	041.0	167.7	8.7	1.000170
18500.0	519.5	-4.1	-8.6	70.6	671.1	039.8	156.0	9.0	1.000166
19000.0	509.6	-4.7	-10.0	63.2	660.0	038.9	146.7	9.7	1.000161
19500.0	499.8	-5.3	-12.7	55.8	649.0	036.1	141.5	10.3	1.000157
20000.0	490.2	-6.5	-16.0	46.4	637.5	035.6	140.5	10.4	1.000152
20500.0	480.8	-7.5	-19.7	36.9	624.9	035.2	140.9	10.5	1.000147
21000.0	471.5	-7.8	-23.5	27.0	613.0	034.6	140.9	10.3	1.000143
21500.0	462.3	-8.4	-26.9	20.9	607.9	034.1	140.4	10.4	1.000139
22000.0	453.3	-9.3	-27.7	20.7	593.2	033.0	139.5	10.4	1.000137
22500.0	444.4	-10.2	-24.5	20.5	580.6	031.6	135.9	10.8	1.000134
23000.0	435.7	-11.2	-22.4	20.3	577.1	030.7	132.0	11.4	1.000132

STATION ALTITUDE 3949.00 FEET MSL
 11 JULY 61 0909 HRS MDT
 ASCENSION NO. 447

UPPER AIR DATA
 1920020447
 WHITE SANDS

GEODETIC COORDINATES
 32.40045 LAT DEG
 106.37033 LONG DEG

TABLE 7 CONT

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES DEWPOINT CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CURIC METER	SPEED OF SOUND KNOTS	DIRECTION DEGREES (TN)	WIND DATA		INDEX OF REFRACTION
							SPEED KNOTS	ANGLE DEGREES	
23500.0	427.2	-12.1	20.1	569.8	629.6	150.1	11.6	1.000130	
24000.0	418.8	-13.1	20.6	560.9	620.4	123.4	11.9	1.000127	
24500.0	410.5	-14.4	22.9	552.5	620.8	123.1	11.4	1.000126	
25000.0	402.4	-15.7	25.3	544.3	625.2	117.3	10.9	1.000124	
25500.0	394.3	-17.1	30.0	536.3	623.5	109.5	9.8	1.000122	
26000.0	386.4	-18.6	35.6	528.6	621.7	101.1	9.0	1.000121	
26500.0	378.6	-20.1	41.3	521.0	619.9	99.2	9.2	1.000119	
27000.0	370.9	-20.9	34.3	512.0	618.9	101.0	10.2	1.000116	
27500.0	363.3	-21.6	25.5	503.0	618.0	107.0	12.5	1.000114	
28000.0	355.9	-22.4	18.0	494.3	617.0	106.6	14.5	1.000111	
28500.0	348.5	-23.6	18.1	486.4	615.5	103.7	16.3	1.000109	
29000.0	341.2	-24.9	18.3	478.6	613.9	93.1	17.6	1.000108	
29500.0	334.1	-26.1	18.4	471.0	612.4	94.9	18.9	1.000106	
30000.0	327.1	-27.3	18.5	463.5	610.9	95.7	21.2	1.000104	
30500.0	320.3	-28.6	18.6	456.1	609.3			1.000102	
31000.0	313.6	-29.8	18.7	448.9	607.8			1.000101	
31500.0	307.1	-31.0	18.9	441.8	606.2			1.000099	
32000.0	300.7	-32.3	19.0	434.8	604.7			1.000097	

STATION ALTITUDE 3989.0 FEET MSL
 11 JULY 81 0900 HRS MDT
 ASCENSION NO. 447

MANDATORY LEVELS
 1920021447
 WHITE SANDS

GEODETIC COORDINATES
 32.40043 LAT DEG
 106.37033 LON DEG

TABLE 8

PRESSURE GEOPOTENTIAL MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUMIDITY PERCENT	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS
850.0	21.6	61.	179.9	7.9
800.0	18.6	62.	171.9	10.6
750.0	16.3	52.	179.0	7.5
700.0	12.0	57.	180.2	4.1
650.0	7.0	71.	172.5	6.3
600.0	3.2	67.	158.1	4.6
550.0	-9	63.	179.8	8.6
500.0	-5.3	50.	141.5	10.3
450.0	-9.6	21.	138.8	10.5
400.0	-16.1	20.	115.4	10.6
350.0	-23.4	18.	104.3	15.9
300.0	-32.4	19.		

STATION ALTITUDE 4051.37 FEET MSL
 11 JULY 61
 ASCENSION, MO. 152

SIGNIFICANT LEVEL DATA
 19201M0152
 LC-37

GEODETIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

TABLE 9

PRESSURE MILLIBARS	GEOMETRIC ALTITUDE MSL FEET	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT
880.6	4051.4	28.3	45.0
876.2	4196.9	25.3	48.0
850.0	5070.4	13.5	56.0
828.8	5791.2	22.6	59.0
800.6	6771.4	20.5	67.0
781.8	7441.1	18.0	55.0
715.6	9913.2	18.0	61.0
700.0	10522.4	11.8	68.0
671.2	11673.8	8.7	68.0
644.6	12771.3	6.5	74.0
610.0	14254.5	3.6	68.0
601.8	14616.0	-1.7	71.0
584.8	15378.3	3.0	69.0
559.4	16552.9	1.5	60.0
518.8	18523.5	.1	76.0
500.0	19477.6	-4.6	49.0
479.8	20536.9	-6.0	45.0
464.4	21369.8	-7.7	31.0
449.6	22192.5	-9.1	27.0
400.0	25121.7	-10.3	28.0
377.8	26525.5	-16.2	32.0
357.6	27801.0	-20.2	20.0
344.4	28767.7	-22.0	19.0
312.6	31067.4	-24.3	20.0
300.0	32027.3	-29.7	20.0
		-32.8	20.0

STATION ALTITUDE 4251.37 FEET MSL
 11 JULY 21 1000 HRS DTG
 ASCENSION NO. 152

UPPER AIR DATA
 1920100152
 LC-37

GEODESIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

TABLE 10

GEODESIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CELSIUS	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DIRECTION DEGREES (TH)	WIND SPEED KNOTS	INDEX OF REFRACTION.
4051.4	880.6	28.3	45.0	1010.1	678.9	215.0	7.0	1.000297
4500.0	867.0	24.4	50.8	1001.3	674.3	193.6	6.9	1.000291
5000.0	852.1	22.8	55.4	993.1	672.5	181.1	7.2	1.000289
5500.0	837.3	21.3	57.8	983.9	670.8	170.0	7.8	1.000284
6000.0	822.7	20.0	60.7	971.4	669.2	161.0	8.6	1.000279
6500.0	808.3	18.7	64.8	956.6	667.7	161.5	9.5	1.000276
7000.0	794.1	18.0	62.9	944.3	666.8	163.9	10.0	1.000269
7500.0	780.2	17.9	55.1	928.7	666.4	171.5	9.9	1.000258
8000.0	766.3	17.0	56.4	915.2	665.3	179.5	9.7	1.000253
8500.0	752.7	16.0	57.6	902.0	664.2	187.9	9.6	1.000249
9000.0	739.4	15.1	58.8	889.0	663.1	193.4	8.1	1.000244
9500.0	726.3	14.2	60.0	876.1	662.0	200.3	6.2	1.000240
10000.0	713.4	13.2	62.0	863.6	660.9	201.4	4.3	1.000236
10500.0	700.6	11.9	67.7	851.9	659.4	198.3	2.7	1.000234
11000.0	687.9	10.5	68.0	840.8	657.7	179.2	3.5	1.000228
11500.0	675.5	9.2	68.0	829.8	656.0	171.0	4.8	1.000222
12000.0	663.2	8.0	69.8	818.1	654.7	171.0	6.4	1.000218
12500.0	651.1	7.0	72.5	806.1	653.5	171.5	6.8	1.000215
13000.0	639.1	6.1	73.1	794.2	652.3	171.5	6.6	1.000210
13500.0	627.4	5.1	71.1	782.6	651.0	159.2	6.3	1.000205
14000.0	615.8	4.1	69.0	771.1	649.8	166.3	6.0	1.000200
14500.0	604.4	3.2	70.0	759.4	648.7	161.8	5.9	1.000196
15000.0	593.2	2.2	70.0	747.9	647.5	158.0	5.8	1.000192
15500.0	582.1	1.4	68.1	736.5	646.4	157.0	5.5	1.000187
16000.0	571.2	.3	64.2	724.5	645.6	164.7	5.0	1.000182
16500.0	560.5	.2	60.4	712.6	644.9	163.7	4.8	1.000178
17000.0	549.9	-1.0	63.6	702.1	643.5	155.0	4.9	1.000175
17500.0	539.5	-2.2	67.7	691.8	642.1	203.2	5.0	1.000172
18000.0	529.3	-3.4	71.7	681.7	640.7	169.7	4.5	1.000170
18500.0	519.3	-4.5	75.8	671.8	639.3	172.4	4.8	1.000167
19000.0	509.3	-5.3	62.5	661.2	638.7	153.3	6.4	1.000161
19500.0	499.6	-6.0	48.9	650.6	637.2	153.7	8.9	1.000155
20000.0	489.9	-6.8	47.0	640.0	636.2	152.7	11.8	1.000152
20500.0	480.5	-7.6	45.1	629.7	635.2	149.3	12.3	1.000149
21000.0	471.2	-8.5	37.2	619.6	634.1	145.0	12.2	1.000144
21500.0	462.0	-9.3	30.4	609.3	633.1	137.1	10.8	1.000141
22000.0	453.0	-10.0	27.9	599.4	632.2	131.0	10.0	1.000138
22500.0	444.1	-10.9	27.1	589.6	631.1	127.5	9.6	1.000135
23000.0	435.3	-11.9	27.3	580.2	629.8	125.3	9.6	1.000133
23500.0	426.7	-12.9	27.4	571.6	628.6	123.7	10.3	1.000131

STATION ALTITUDE 4051.37 FEET MSL
 11 JULY 61
 ASCENSION NO. 132

UPPER AIR DATA
 1920100126
 LC-37

GEODETTIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

TABLE 10 CONT.

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CU CM METER	SPEED OF SOUND M/SEC	WIND DATA		INDEX OF REFRACTION
						DIRECTION DEGREES (T)	SPEED KNOTS	
4000.0	410.3	-13.9	27.6	561.4	627.4	119.7	10.8	1.000128
4500.0	410.0	-14.9	27.0	553.0	626.2	115.0	11.3	1.000126
5000.0	401.9	-16.0	28.0	544.2	624.9	110.2	11.1	1.000124
5500.0	393.9	-17.3	29.1	536.0	623.3	104.5	10.9	1.000122
6000.0	385.0	-18.7	30.5	528.2	621.6	98.9	10.6	1.000120
6500.0	376.2	-20.1	31.9	520.5	619.6	97.3	10.6	1.000118
7000.0	370.5	-20.8	27.7	511.4	618.9	98.1	10.8	1.000116
7500.0	363.0	-21.5	23.2	502.3	618.1	100.5	12.3	1.000115
8000.0	355.5	-22.4	19.8	493.8	617.0	100.6	13.9	1.000111
8500.0	348.2	-23.6	19.3	486.1	615.5	97.6	15.8	1.000109
9000.0	341.0	-24.8	19.1	478.4	613.4	97.2	17.3	1.000108
9500.0	333.9	-26.0	19.3	470.7	612.5	97.7	18.5	1.000106
10000.0	327.0	-27.2	19.5	463.1	611.0	95.2	21.3	1.000104
10500.0	320.2	-28.4	19.8	455.6	609.6			1.000102
11000.0	313.5	-29.5	20.0	448.2	608.1			1.000101
11500.0	306.9	-31.1	20.0	441.6	606.1			1.000099
12000.0	300.4	-32.7	20.0	435.1	604.1			1.000097

STATION ALTITUDE 4651.37 FEET MSL
 11 JULY 61
 ASCENSION NO. 152

MANDATORY LEVELS
 19201R0152
 LC-37

GEODETIC COORDINATES
 32.40175 LAT DEG
 106.31232 LON DEG

TABLE 11

PRESSURE GEOPOTENTIAL MILLIBARS	AIR TEMPERATURE DEGREES CENTIGRADE	REL. HUMID. PERCENT	WIND DATA	
			DIRECTION DEGREES (TN)	SPEED KNOTS
850.0	22.6	50.	179.5	7.2
800.0	18.0	67.	161.5	10.0
750.0	15.8	58.	189.7	9.6
700.0	11.8	58.	197.4	2.7
650.0	7.0	73.	171.5	0.8
600.0	2.8	71.	160.1	3.9
550.0	-1.0	64.	195.4	4.9
500.0	-6.0	49.	153.6	6.7
450.0	-10.3	27.	129.9	9.9
400.0	-16.2	23.	108.9	11.1
350.0	-23.3	19.	98.5	15.3
300.0	-32.8	20.		

STATION ALTITUDE 3989.00 FEET MSL
 11 JULY 61 1200 HRS MDT
 ASCENSION NO. 448

SIGNIFICANT LEVEL DATA
 19200.0046
 WHITE SAHUS

GEODLTIC COORDINATES
 32.40343 LAT DEG
 106.37033 LONG DEG

TABLE 12

PRESSURE MILLIBARS	GEOMETRIC ALTITUDE MSL FEET	TEMPERATURE		REL. HUMID. PERCENT
		AIR DEGREES CENTIGRADE	DEWPOINT CENTIGRADE	
882.2	3382.0	29.3	14.7	41.0
850.0	5070.4	25.0	12.0	46.0
795.8	6355.2	19.6	11.1	58.0
730.3	9348.3	14.7	9.0	52.0
700.0	10540.6	11.8	8.2	54.0
649.4	12592.5	7.6	1.9	67.0
631.8	13336.3	6.4	0.0	61.0
564.4	16348.3	.2	-0.0	63.0
555.8	16753.2	-1.1	-0.3	54.0
523.4	18323.9	-4.4	-0.1	75.0
500.0	19507.9	-5.4	-14.6	48.0
460.0	21206.2	-8.4	-24.4	26.0
400.0	25154.6	-16.2	-32.9	22.0
372.8	26884.7	-20.5	-37.0	21.0
353.8	27014.9	-21.7	-30.5	20.0
300.0	32064.5	-32.2	-47.1	21.0

STATION ALTITUDE 3989.00 FEET MSL
 11 JULY 61
 ASCENSION, MO. 448

UPPER AIR DATA
 1920Z040
 WHITE BALLOON

GEOMETRIC COORDINATES
 32.40043 LAT DEG
 106.37033 LONG DEG

TABLE 13

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND M/SEC	WIND DIRECTION DEGREES (TR)	WIND SPEED KNOTS	INDEX OF REFRACTION
		AIR DEGREES CENTIGRADE	DEW-POINT DEGREES CENTIGRADE						
3989.0	882.2	29.3	14.7	41.0	1000.8	680.0	170.0	5.1	1.000294
4000.0	861.9	29.3	14.7	41.1	1000.6	679.9	170.1	5.1	1.000294
4500.0	860.8	27.3	13.7	43.4	996.3	677.6	172.5	6.3	1.000269
5000.0	852.1	25.3	12.7	45.7	986.1	675.2	174.1	7.6	1.000263
5500.0	837.3	23.8	12.3	48.7	970.0	673.5	175.2	8.9	1.000279
6000.0	822.8	22.3	12.0	51.9	963.8	671.8	175.5	10.0	1.000276
6500.0	803.6	20.9	11.6	55.1	951.8	670.2	178.9	10.5	1.000272
7000.0	794.5	19.5	11.0	57.9	934.9	668.6	184.2	10.6	1.000268
7500.0	780.5	18.5	9.7	56.6	920.9	667.2	169.7	9.9	1.000260
8000.0	760.7	17.5	8.4	55.4	914.1	665.9	196.5	8.7	1.000253
8500.0	753.2	16.4	7.1	54.1	901.5	664.0	200.7	7.9	1.000247
9000.0	739.9	15.4	5.9	52.9	889.0	663.4	203.3	7.1	1.000240
9500.0	720.8	14.3	5.0	53.5	870.7	662.0	201.6	6.0	1.000235
10000.0	713.8	13.1	5.2	58.6	864.6	660.7	191.1	4.7	1.000234
10500.0	701.0	11.9	5.2	63.6	852.6	659.3	174.1	4.3	1.000231
11000.0	688.3	10.9	4.5	64.7	840.4	658.1	150.2	4.8	1.000227
11500.0	675.9	9.8	3.7	65.4	823.3	656.8	135.5	5.3	1.000222
12000.0	663.6	8.8	2.8	66.1	816.4	655.6	137.2	5.6	1.000218
12500.0	651.6	7.8	2.0	66.9	804.7	654.3	162.7	4.6	1.000213
13000.0	639.7	6.9	1.6	63.7	792.6	653.2	173.6	3.5	1.000207
13500.0	627.9	6.1	-0.9	61.1	780.7	652.1	179.6	3.3	1.000202
14000.0	616.3	5.0	-1.8	61.4	769.2	650.8	185.2	3.3	1.000198
14500.0	604.9	4.0	-2.7	61.8	757.9	649.6	180.5	4.8	1.000194
15000.0	593.6	3.0	-3.6	62.1	746.7	648.3	178.7	6.2	1.000190
15500.0	582.6	1.9	-4.5	62.4	735.7	647.1	180.1	7.2	1.000186
16000.0	571.8	.9	-5.4	62.8	724.9	645.8	181.2	7.8	1.000182
16500.0	561.2	.1	-6.8	59.6	713.7	644.6	182.4	7.6	1.000178
17000.0	550.6	-0.8	-8.1	57.3	702.6	643.7	182.1	7.1	1.000173
17500.0	540.2	-2.1	-8.0	64.0	692.7	642.1	179.2	6.4	1.000172
18000.0	529.9	-3.5	-9.1	70.7	683.0	640.5	174.3	6.1	1.000170
18500.0	519.9	-4.5	-9.9	71.0	672.7	639.2	168.5	6.2	1.000166
19000.0	509.9	-5.0	-11.6	59.6	661.1	638.0	167.1	8.8	1.000161
19500.0	500.2	-5.4	-14.6	48.2	649.6	636.8	160.5	12.0	1.000155
20000.0	490.5	-6.2	-17.1	41.6	639.5	635.6	160.5	14.0	1.000151
20500.0	481.6	-7.2	-17.4	35.1	629.4	633.7	165.5	15.6	1.000147
21000.0	471.8	-8.0	-23.0	28.7	619.4	634.6	157.6	13.9	1.000143
21500.0	462.6	-9.0	-25.0	25.7	609.6	633.4	140.7	12.5	1.000140
22000.0	453.5	-10.0	-26.1	25.2	599.9	632.2	135.6	11.9	1.000138
22500.0	444.5	-11.0	-27.2	24.7	590.3	631.0	120.2	11.6	1.000135
23000.0	435.8	-11.9	-29.3	24.2	580.6	629.8	121.5	11.5	1.000133

UPPER AIR DATA
 19200Z0446
 WHITE SANDS

STATION ALTITUDE 3999.00 FEET MSL
 11 JULY 51
 ASCENDING 1.0. 448

GEODETIC COORDINATES
 32.40043 LAT DEG
 106.57033 LONG DEG

TABLE 13 CONT

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES CENTIGRADE	REL. HUM. PERCENT	WIND DIRECTION DEGREES (TRUE)	WIND DATA SPEED KNOTS	INCL X OF REFRACTION
23500.0	427.2	-12.9	23.7	115.7	11.5	1.000130
24000.0	413.8	-13.9	23.2	100.0	11.6	1.000128
24500.0	419.5	-14.9	22.7	93.8	12.2	1.000126
25000.0	402.5	-15.9	22.2	90.9	12.9	1.000124
25500.0	394.4	-17.1	21.8	90.0	13.4	1.000121
26000.0	380.5	-18.3	21.5	102.6	13.8	1.000119
26500.0	378.7	-19.5	21.2	107.7	14.0	1.000117
27000.0	371.0	-20.6	20.9	113.0	14.3	1.000115
27500.0	363.5	-21.3	20.3	115.6	15.0	1.000113
28000.0	356.0	-22.2	20.0	117.7	15.8	1.000111
28500.0	348.6	-23.4	20.2	113.0	16.9	1.000109
29000.0	341.3	-24.6	20.3	108.7	16.1	1.000108
29500.0	334.2	-25.9	20.4	103.9	19.4	1.000106
30000.0	327.3	-27.1	20.5	100.2	20.9	1.000104
30500.0	320.4	-28.3	20.6	90.0	22.5	1.000102
31000.0	313.8	-29.6	20.7			1.000101
31500.0	307.2	-30.8	20.9			1.000099
32000.0	300.8	-32.0	21.0			1.000097

STATION ALTITUDE 3999.00 FEET AMSL
 11 JULY 81 1200 HRS MDT
 ASCENSION NO. 448

MANDATORY LEVELS
 192002 448
 WHITE BANDS

GEOLATITIC COORDINATES
 32.40043 LAT DEG
 106.37033 LONG DEG

TABLE 14

PRESSURE MILLIBARS	GEOPOTENTIAL FEET	TEMPERATURE		REL. HUMIDITY PERCENT	WIND DATA	
		AIR DEGREES CENTIGRADE	DEWPOINT CENTIGRADE		DIRECTION DEGREES(TN)	SPEED KNOTS
950.0	5067.	25.0	12.0	40.	174.5	7.8
900.0	6060.	20.0	11.3	57.	182.1	10.6
750.0	8517.	16.2	6.6	54.	201.2	7.7
700.0	10530.	11.8	5.2	64.	172.9	4.3
650.0	12554.	7.7	1.4	67.	163.7	4.5
600.0	14706.	3.6	-3.0	62.	179.3	5.5
550.0	17007.	-0.9	-8.1	50.	182.0	7.1
500.0	19490.	-5.4	-14.0	40.	160.9	12.0
450.0	22169.	-10.3	-26.5	25.	131.3	11.7
400.0	25112.	-16.2	-32.9	22.	96.1	13.1
350.0	28363.	-23.2	-39.7	20.	113.9	10.7
300.0	31999.	-32.2	-47.1	21.		

STATION ALTITUDE 4351.37 FEET MSL
 11 JULY 61
 ASCENDING 10. 153

SIGNIFICANT LEVEL DATA
 1920140153
 LC-37

GEODETIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

TABLE 15

PRESSURE GEOMETRIC ALTITUDE MILLIBARS MSL FEET	TEMPERATURE		REL. HUM. PERCENT
	AIR DEGREES CENTIGRADE	DEWPOINT PERCENT	
879.6	31.5	15.0	57.0
871.0	29.3	15.1	42.0
850.0	26.9	14.3	46.0
830.4	24.6	12.9	48.0
800.4	21.9	12.2	54.0
751.6	16.6	10.2	66.0
722.8	14.6	9.7	59.0
700.0	12.6	9.0	52.0
657.4	8.5	9.1	69.0
629.8	6.1	9.0	65.0
611.8	4.8	-1.2	65.0
583.2	2.5	-2.9	69.0
548.6	.0	-7.5	57.0
540.0	-1.1	-7.6	61.0
514.4	-4.3	-9.2	74.0
500.0	-5.4	-12.1	59.0
496.0	-5.4	-14.6	48.0
480.2	-6.1	-17.7	33.0
464.4	-8.4	-19.3	41.0
448.6	-9.5	-25.4	26.0
417.8	-12.4	-30.7	20.0
400.0	-15.6	-31.1	25.0
388.2	-17.0	-33.1	23.0
359.6	-21.0	-37.9	20.0
312.6	-29.0	-44.6	20.0
300.0	-31.7	-48.2	22.0

GEODETIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

UPPER AIR DATA
 192010155
 LC-37

STATION ALTITUDE 4051.37 FEET MSL
 11 JULY 61
 ASCENSION NO. 153

TABLE 16

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		REL. HUM. PERCENT	DENSITY GM/CM ³ METER	SPEED OF SOUND KIOTS	DIRECTION DEGREES (TH)	SPEED KIOTS	INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT DEGREES						
4051.4	879.6	31.5	15.0	37.0	991.4	682.5	210.0	8.0	1.000292
4500.0	863.3	28.8	14.9	42.9	992.1	679.6	191.4	9.2	1.000292
5000.0	851.5	27.1	14.4	45.7	980.9	677.5	184.2	10.7	1.000268
5500.0	837.0	25.4	13.4	47.3	969.9	675.5	179.0	12.4	1.000261
6000.0	822.6	23.9	12.7	49.5	958.1	673.7	175.0	14.1	1.000277
6500.0	805.4	22.6	12.4	52.4	945.7	672.3	174.9	13.3	1.000273
7000.0	794.3	21.3	12.0	55.5	933.6	670.7	173.0	12.3	1.000269
7500.0	780.4	19.8	11.5	58.8	922.0	669.0	177.9	10.5	1.000265
8000.0	768.8	18.3	10.9	62.2	910.7	667.2	183.0	8.6	1.000261
8500.0	755.4	16.8	10.3	65.6	899.4	665.5	183.3	7.3	1.000257
9000.0	740.9	15.8	8.8	63.2	887.0	664.2	178.4	6.5	1.000244
9500.0	725.9	14.9	7.2	60.0	874.5	662.9	174.1	6.0	1.000241
10000.0	712.2	13.8	5.3	56.3	862.6	661.5	173.5	6.2	1.000233
10500.0	701.2	12.7	3.2	52.4	851.0	660.0	172.6	6.4	1.000225
11000.0	688.5	11.5	3.2	56.5	839.0	658.7	169.3	6.5	1.000223
11500.0	675.1	10.3	3.2	61.4	827.2	657.3	165.9	6.7	1.000221
12000.0	663.7	9.1	3.2	66.3	815.7	656.0	160.0	6.5	1.000210
12500.0	651.8	8.0	2.5	68.2	804.1	654.6	155.0	6.3	1.000214
13000.0	639.9	7.0	1.2	66.5	792.6	653.3	149.3	5.7	1.000209
13500.0	628.2	6.0	-0.1	65.0	781.1	652.1	139.5	4.9	1.000204
14000.0	616.6	5.2	-0.9	65.0	769.2	651.1	132.0	4.2	1.000199
14500.0	605.2	4.3	-1.5	65.9	757.4	650.0	130.3	3.5	1.000196
15000.0	594.0	3.4	-2.1	67.5	745.8	648.9	122.2	3.1	1.000192
15500.0	583.0	2.5	-2.0	68.9	734.4	647.9	116.1	4.4	1.000169
16000.0	572.1	1.7	-4.1	65.2	722.9	646.9	113.0	5.8	1.000184
16500.0	561.4	.9	-5.6	61.5	711.6	645.9	102.4	9.5	1.000179
17000.0	550.9	.2	-7.1	57.8	700.5	644.9	109.1	7.4	1.000174
17500.0	540.6	-1.0	-7.0	60.7	689.4	643.4	109.9	7.1	1.000171
18000.0	530.3	-2.3	-7.8	65.8	680.4	641.9	100.2	6.9	1.000169
18500.0	520.3	-3.6	-8.0	71.0	670.7	640.4	100.2	7.1	1.000167
19000.0	510.4	-4.6	-9.3	69.8	660.6	639.1	174.5	7.5	1.000163
19500.0	500.6	-5.4	-11.9	53.7	650.0	638.1	159.5	9.1	1.000158
20000.0	491.0	-5.6	-10.2	42.8	638.6	637.0	102.4	11.6	1.000151
20500.0	481.6	-6.0	-10.2	34.3	627.4	637.0	130.0	12.9	1.000147
21000.0	472.3	-7.2	-10.4	37.0	616.1	635.6	130.0	13.1	1.000145
21500.0	463.2	-8.5	-10.7	39.8	604.0	634.1	135.7	12.7	1.000143
22000.0	454.2	-9.1	-23.0	31.3	593.7	633.3	146.0	11.0	1.000139
22500.0	445.3	-9.3	-23.9	25.4	583.7	632.4	137.4	9.8	1.000135
23000.0	436.6	-10.6	-27.3	23.7	573.0	631.4	129.6	10.2	1.000133
23500.0	428.0	-11.4	-23.3	22.0	563.4	630.4	116.3	11.1	1.000130

GEODETIC COORDINATES
52.40175 LAT DEG
106.31232 LONG DEG

UPPER AIR DATA
1920130155
LC-37

STATION ALTITUDE 4051.37 FEET MSL
11 JULY 61 1207 HRS MDT
ASLATION, NO. 153

TABLE 16 CONT

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	DIRECTION DEGREES (TN)	"ING DATA SPEED KNOTS	INDEX OF REFRACTION.
24000.0	419.7	-12.2	20.4	560.0	029.4	111.0	12.3	1.000127
24500.0	411.4	-13.5	21.8	551.8	027.8	107.4	13.3	1.000126
25000.0	403.2	-15.0	24.1	543.9	026.1	103.5	13.5	1.000124
25500.0	395.2	-16.2	24.2	535.5	024.6	105.0	13.6	1.000122
26000.0	387.3	-17.1	22.9	526.8	023.5	109.0	13.3	1.000119
26500.0	379.5	-18.2	22.1	518.3	022.2	112.0	13.0	1.000117
27000.0	371.8	-19.3	21.3	510.0	020.8	116.0	12.6	1.000115
27500.0	364.3	-20.3	20.5	501.6	019.5	119.0	12.3	1.000113
28000.0	356.9	-21.4	20.0	493.8	018.2	119.4	12.1	1.000111
28500.0	349.5	-22.6	20.0	485.9	016.7	117.0	12.1	1.000109
29000.0	342.3	-23.8	20.0	478.1	015.2	113.0	13.2	1.000108
29500.0	335.2	-25.0	20.0	470.5	013.7	110.1	14.7	1.000106
30000.0	328.2	-26.2	20.0	463.0	012.2	108.0	16.1	1.000104
30500.0	321.5	-27.4	20.0	455.6	010.6	102.1	17.5	1.000102
31000.0	314.8	-28.6	20.0	448.4	009.3			1.000101
31500.0	308.2	-29.9	20.7	441.4	007.6			1.000099
32000.0	301.7	-31.3	21.7	434.6	005.9			1.000097

STATION ALTITUDE 4051.37 FEET MSL
 11 JULY 61 1200 HRS PDT
 ASCENSION NO. 153

INDICATOR LEVELS
 1920100153
 LC-37

GEODETIC COORDINATES
 32.40175 LAT DEG
 106.31232 LONG DEG

TABLE 17

PRESSURE GEOPOTENTIAL		TEMPERATURE		REL. HUMID. PERCENT	WIND DATA	
MILLIBARS	FEET	AIR DEGREES CENTIGRADE	DEWPOINT CENTIGRADE		DIRECTION DEGREES(TN)	SPEED KNOTS
650.0	5049.	26.9	14.3	40.	183.0	10.9
600.0	6793.	21.9	12.2	54.	174.9	12.7
750.0	8618.	16.5	10.0	60.	162.2	7.1
700.0	10536.	12.6	3.0	52.	172.5	6.4
650.0	12563.	7.9	2.3	60.	154.1	6.3
600.0	14716.	3.0	-1.0	67.	149.4	3.2
550.0	17023.	.1	-7.3	50.	169.0	7.5
500.0	19304.	-5.4	-12.1	59.	169.4	9.3
450.0	22200.	-9.4	-24.7	27.	143.1	10.3
400.0	25157.	-15.6	-31.1	25.	106.1	13.5
350.0	28420.	-22.5	-39.2	20.	117.7	12.1
300.0	32067.	-31.7	-46.2	22.		

