DR-965
MARCH 1978

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METEOROLOGICAL DATA REPORT

19301A GSRS
MISSILE NO. V-2, ROUND NO. V-2
(9 DECEMBER 1977)*

BY

WSMR METEOROLOGICAL TEAM

* THIS SUPERSEDES DR-956

ATMOSPHERIC SCIENCES LABORATORY
WHITE SANDS MISSILE RANGE, NEW MEXICO

ECOM
UNITED STATES ARMY ELECTRONICS COMMAND

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REPORT DOCUMENTATION PAGE

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1. Ballistics
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3. Wind

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Meteorological data gathered for the launching of 19301A GSRS, Missile No. V-2, Round No. V-2, are presented in tabular form.

ABSTRACT

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CONTENTS

INTRODUCTION

19301A GSRS, Missile Number V-2, Round Number V-2, was launched from launcher 519 at LC-33, White Sands Missile Range (WSMR), New Mexico at 0931 HRS MST, 9 December 1977. The scheduled launch time was 0930 HRS 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 (°C), relative humidity, dew point (°C), density (gm/m^3), wind direction, wind velocity and cloud cover were made at the LC-33 Met Site at T-0 mins.

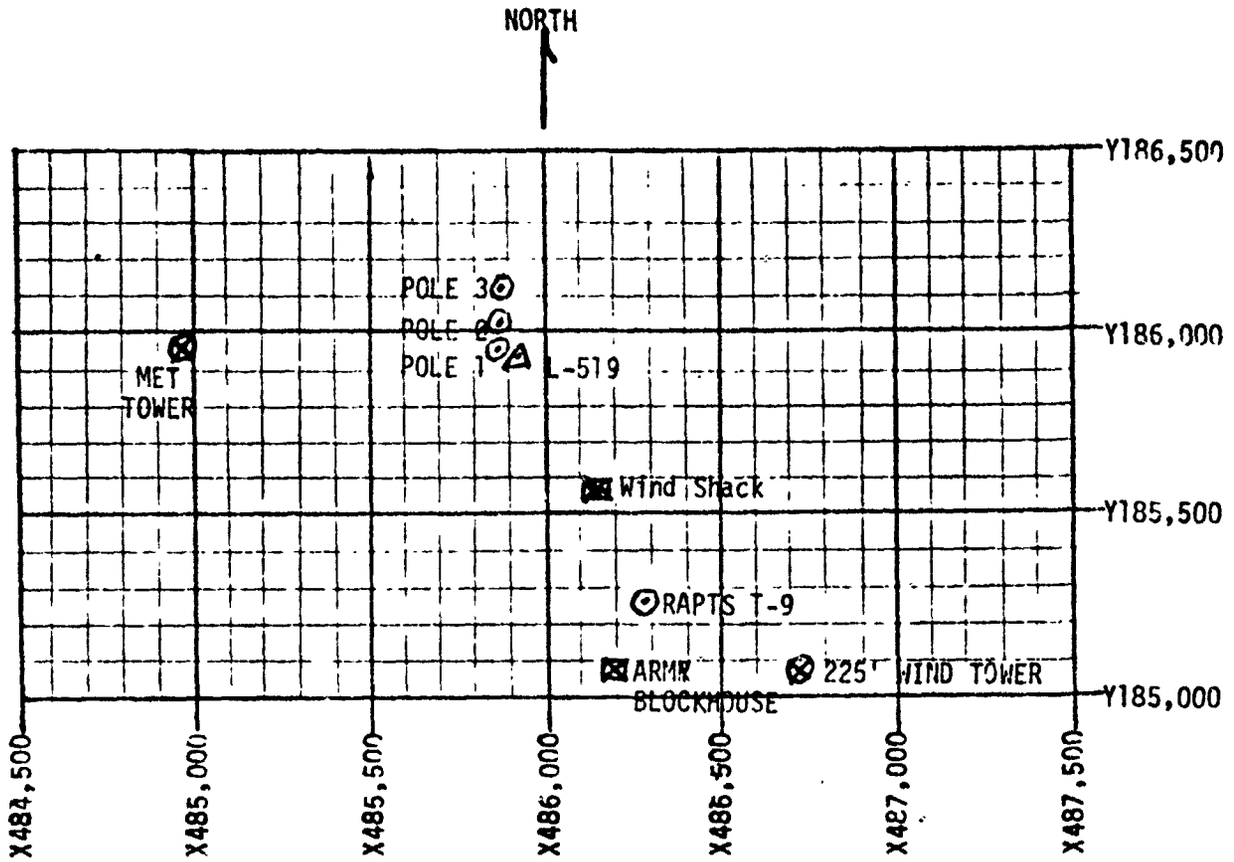
      (2) Anemometer data were provided from existing pole mounted and tower mounted anemometers at LC-33. Monitor of wind speed and direction from one anemomoeter was also provided in the launch control room.

   b. Upper Air

      (1) Low level wind data were obtained from RAPTS-T-9 pibals observations at T-0 mins as follows:

SITE & ALT.
LC-33 900 meters (15 meter incs)
APA 900 meters (30 meter incs)
SMR 900 meters (30 meter incs)

      (2) Air structure data (rawinsonde) were collected at the SMR Met Site at T-0 mins. Data were collected from surface to 125% of apogee in 100 meter incs.



1. MET TOWER - 4 Bendix Model T-120 Anemometers at 12 ft, 62 ft, 102 ft and 202 ft with E/A recorders in Wind Shack.

2. POLE ANEMOMETER - Bendix Model T-120 with E/A recorders in Wind Shack

   (a) Pole #1 - 38.7 ft

   (b) Pole #2 - 53.0 ft

   (c) Pole #3 - 83.6 ft

3. 225 FT WIND TOWER - 5 Bendix Model T-120 Anemometers at 35 ft, 88 ft, 128 ft, 168 ft and 200 ft with 5 X-Y visual indicators in Blockhouse.

4. RAPTS T-9 - Radar Automatic Pilot-Balloon Tracking System T-9 Radar

The data are presented in the following tabulations:

ELEVATION	3,990	FEET/MSL
PRESSURE	876.2	MBS
TEMPERATURE	17.9	°C
RELATIVE HUMIDITY	22	%
DEW POINT	-4.1	°C
DENSITY	1,049	GM/M^3
WIND SPEED/DIR	CALM	
CLOUD COVER	CLEAR	

TABLE I. SURFACE OBSERVATIONS TAKEN AT WSD,
1004 HRS MST/9 DECEMBER 1977

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	155	10
50	132	08
100	140	08
150	145	07
200	151	07
250	165	06
300	180	06
350	180	06
400	180	06
450	171	07
500	163	07
550	164	07
600	164	08
650	153	09
700	145	10
750	142	12
800	140	13
850	142	13
900	144	12
950	147	12
1000	151	11

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
1050	158	11
1100	165	11
1150	172	11
1200	176	11
1250	177	11
1300	178	11
1350	179	11
1400	179	11
1450	184	11
1500	187	12
1550	191	12
1600	193	13
1650	195	13
1700	196	13
1750	191	14
1800	186	16
1850	183	17
1900	181	16
1950	182	15
2000	183	15
2050	188	17

TABLE II. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 486,296.83 Y = 185,251.85 Z = 3,986.67

APPROXIMATELY: 815 FEET SSE OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
2100	191	20
2150	193	21
2200	194	21
2250	190	20
2300	184	19
2350	185	20
2400	186	20
2450	185	19
2500	182	19
2550	182	19

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
2600	183	18
2650	188	18
2700	192	18
2750	196	17
2800	201	16
2850	195	12
2900	184	08
2950	178	08
3000	171	07

TABLE II. (CONT)

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	200	06
100	041	01
200	052	03
300	150	10
400	167	10
500	163	10
600	164	08
700	168	07
800	175	10
900	175	10
1000	183	09
1100	188	09
1200	175	06
1300	166	10
1400	161	10
1500	182	13
1600	197	14
1700	177	16
1800	175	13
1900	182	18
2000	173	20

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
2100	182	19
2200	190	17
2300	183	17
2400	186	21
2500	184	23
2600	177	24
2700	195	20
2800	193	13
2900	196	12
3000	202	12
3100	205	05
3200	207	05
3300	184	05
3400	186	06
3500	188	10
3600	199	08
3700	188	05
3800	188	09
3900	195	06
4000	203	05
4100	264	03

TABLE III. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA
RELEASED FROM SMR, AT 0938 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 472,441.28 Y = 214,137.54 Z = 3,999.00

APPROXIMATELY: 7 MILES NNW OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
4200	333	01
4300	357	06
4400	347	06
4500	337	12
4600	330	08
4700	312	09
4800	292	06
4900	276	10
5000	291	07
5100	315	09
5200	310	08
5300	274	11
5400	272	07
5500	265	08
5600	279	11

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
5700	290	07
5800	271	11
5900	258	11
6000.	219	07
6100	224	10
6200	247	09
6300	237	10
6400	248	08
6500	244	08
6600	277	08
6700	250	10
6800	241	09
6900	271	10
7000	275	10

TABLE III. (CONT)

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	180	12
100	205	11
200	210	19
300	190	25
400	175	24
500	160	25
600	165	24
700	160	26
800	160	24
900	190	15
1000	190	17
1100	160	25
1200	155	28
1300	160	31
1400	165	26
1500	175	24

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
1600	175	25
1700	180	29
1800	175	31
1900	165	35
2000	165	35
2100	165	37
2200	165	38
2300	160	33
2400	165	28
2500	165	29
2600	165	28
2700	175	23
2800	175	16
2900	160	09
3000	155	08

TABLE IV. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA
RELEASED FROM APACHE, AT 0945 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 481,338.60 Y = 267,644.40 Z = 3,962.07

APPROXIMATELY: 16 MILES NORTH OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	7	145
-20.0	10	162
-10.0	11	152
-00.00	8	158
+10.00	8	144
+20.00	12	139
+30.00	12	148

TABLE V. **ANEMOMETER-MEASURED WIND SPEED AND DIRECTION,** POLE 38.7 FT
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 485,874.29 Y = 185,958.90 Z = 4,018.74

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	9	142
-20.0	13	169
-10.0	13	163
-00.00	15	147
+10.00	11	142
+20.00	17	143
+30.00	15	157

TABLE VI. **ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, POLE** 53.0 FT
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 485,874.93 Y = 186,012.00 Z = 4,033.57

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	8	M
-20.0	8	M
-10.0	10	M
-00.00	10	M
+10.00	8	M
+20.00	12	M
+30.00	12	M

TABLE VII. **ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 12 FT**
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	12	133
-20.0	13	136
-10.0	12	132
-00.00	13	132
+10.00	11	135
+20.00	11	141
+30.00	13	136

TABLE VIII. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 62 FT
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	14	132
-20.0	12	135
-10.0	11	147
-00.00	11	144
+10.00	15	133
+20.00	13	129
+30.00	13	137

TABLE IX. **ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 102 FT**
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	11	148
-20.0	12	140
-10.0	10	143
-00.00	11	120
+10.00	14	133
+20.00	15	135
+30.00	14	128

TABLE X. **ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL** 202 FT
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

STATION ALTITUDE 3997.30 FEET MSL
9 DEC. 77 0930 HRS MST
ASCENSION NO. 170

SIGNIFICANT LEVEL DATA
3430060170
S M R
TABLE XI.

GEODETIC COORDINATES
32.48034 LAT DEG
106.42307 LON DEG

PRESSURE MILLIBARS	GEOMETRIC ALTITUDE MSL FEET	TEMPERATURE AIR DEGREES CENTIGRADE	TEMPERATURE DEWPOINT CENTIGRADE	REL.HUM. PERCENT
887.3	3997.3	8.5	-1.6	49.0
884.8	4077.2	5.1	-10.6	31.0
865.3	4671.8	3.1	-9.2	40.0
850.0	5146.5	3.7	-6.9	39.0
814.8	6274.9	4.5	-9.6	35.0
793.3	6994.9	9.0	-14.7	17.0
747.3	8615.5	8.9	-12.8	20.0
700.0	10375.1	4.5	-15.9	21.0
682.3	11058.6	4.4	-16.6	20.0
637.8	12841.8	-.5	-21.2	19.0
621.3	13528.4	-.5	-23.9	15.0
522.8	17964.1	-10.7	-29.2	26.0
503.0	19085.1	-11.9	-31.3	18.0
463.3	20981.4	-16.1	-34.3	19.0

UPPER AIR DATA

STATION ALTITUDE 3997.30 FEET MSL
9 DEC. 77 0930 HRS MST
ASCENSION NO. 170

3430660170
S M R
TABLE XII.

GEODETIC COORDINATES
32.46034 LAT DEG
106.42307 LON DEG

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	TEMPERATURE DEWPOINT CENTIGRADE	REL.HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	WIND DATA SPEED KNOTS	INDEX OF REFRACTION
3997.3	887.3	8.5	-1.6	49.0	1094.9	654.6	180.0	6.0	1.000270
4000.0	887.2	8.4	-1.9	48.4	1095.3	654.4	180.0	6.0	1.000270
4500.0	870.9	3.7	-9.5	37.4	1094.5	648.6	184.3	7.4	1.000259
5000.0	854.7	3.5	-9.0	39.3	1074.7	648.4	187.2	8.7	1.000255
5500.0	838.8	4.0	-9.1	37.7	1053.1	649.0	189.4	10.1	1.000250
6000.0	823.2	4.3	-9.4	36.0	1032.2	649.4	190.3	11.0	1.000245
6500.0	808.0	5.9	-10.6	29.4	1007.4	651.2	186.5	8.9	1.000236
7000.0	793.2	9.0	-14.7	17.0	976.4	654.7	184.5	6.3	1.000227
7500.0	778.7	9.0	-14.1	17.9	960.6	654.7	208.5	2.2	1.000224
8000.0	764.4	8.9	-13.5	18.4	943.1	654.7	296.9	2.6	1.000220
8500.0	750.5	8.9	-12.9	19.8	925.9	654.7	303.8	5.2	1.000217
9000.0	736.7	7.9	-13.5	20.2	912.0	653.5	293.1	6.5	1.000214
9500.0	723.1	6.7	-14.3	20.5	899.3	652.0	277.4	7.4	1.000210
10000.0	709.6	5.4	-15.2	20.8	886.7	650.6	267.7	8.7	1.000207
10500.0	696.7	4.5	-16.0	20.8	873.4	649.4	261.4	10.2	1.000203
11000.0	683.8	4.4	-16.5	20.1	857.4	649.3	260.9	11.0	1.000199
11500.0	671.0	3.2	-17.7	19.8	845.2	647.9	263.0	11.2	1.000196
12000.0	658.4	1.8	-19.0	19.5	833.6	646.2	266.6	10.8	1.000192
12500.0	646.1	.4	-20.3	19.2	822.1	644.6	271.9	10.1	1.000189
13000.0	634.0	-.5	-21.8	18.1	809.5	643.5	272.5	10.8	1.000186
13500.0	622.0	-.5	-23.8	15.2	794.3	643.4	270.6	12.3	1.000181
14000.0	610.0	-1.6	-24.4	15.5	782.1	642.2	269.8	13.8	1.000179
14500.0	598.2	-2.7	-24.9	16.1	770.3	640.6	269.3	15.3	1.000176
15000.0	586.7	-3.9	-25.5	16.7	758.7	639.4	268.5	16.4	1.000173
15500.0	575.4	-5.0	-26.1	17.2	747.3	638.1	267.6	17.2	1.000170
16000.0	564.3	-6.2	-26.7	17.8	736.1	636.7	267.5	18.2	1.000168
16500.0	553.5	-7.3	-27.3	18.3	725.0	635.3	267.5	19.1	1.000165
17000.0	542.8	-8.5	-27.9	18.9	714.1	633.9	270.8	19.6	1.000162
17500.0	532.3	-9.6	-28.6	19.5	703.4	632.5	274.9	20.0	1.000160
18000.0	522.1	-10.7	-29.3	19.9	692.8	631.2	278.9	20.6	1.000157

STATION ALTITUDE 3997.30 FEET MSL
9 DEC. 77 0930 HRS MST
ASCENSION NO. 170

UPPER AIR DATA
3430060170
S M R
TABLE XII. (CONT)

GEODETIC COORDINATES
32.48034 LAT DEG
106.42307 LON DEG

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	TEMPERATURE DEWPOINT CENTIGRADE	REL.HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	WIND DATA SPEED KNOTS	INDEX OF REFRACTION
18500.0	511.8	-11.3	-30.2	19.0	660.5	630.6	282.7	21.3	1.000154
19000.0	501.7	-11.8	-31.2	18.2	668.3	629.9	284.0	21.4	1.000151
19500.0	491.7	-12.6	-32.0	18.2	657.8	628.7			1.000149
20000.0	481.9	-13.9	-32.8	18.5	647.5	627.3			1.000146
20500.0	472.4	-15.0	-33.5	18.7	637.3	626.0			1.000144

STATION ALTITUDE 3997.30 FEET MSL
9 DEC. 77 0930 HRS MST
ASCENSION NO. 170

MANDATORY LEVELS
34500601?0
S M R
TABLE XIII.

GEODETIC COORDINATES
32.48034 LAT DEG
106.42307 LON DEG

PRESSURE	GEOPOTENTIAL	TEMPERATURE		REL.HUM.	WIND DATA	
		AIR	DEWPOINT	PERCENT	DIRECTION	SPEED
MILLIBARS	FEET	DEGREES CENTIGRADE			DEGREES(TN)	KNOTS
850.0	5145.	3.7	-8.9	39.	187.9	9.1
800.0	6766.	7.6	-12.4	23.	183.7	7.9
750.0	8517.	8.9	-12.9	20.	303.9	5.4
700.0	10375.	4.5	-15.9	21.	262.7	9.9
650.0	12345.	.9	-19.9	19.	270.3	10.3
600.0	14442.	-2.6	-24.9	16.	269.3	15.2
550.0	16684.	-7.7	-27.5	19.	268.2	19.4
500.0	19093.	-11.9	-31.3	18.	284.3	21.4