

FLIGHT SUMMARY REPORT

Flight Number: 97-005-04
Calendar/Julian Date: 17 June 1997 • 168
Sensor Package: Thermal Infrared Multispectral
Scanner (TIMS)
DoE Multispectral Scanner (MSS)
Area(s) Covered: Death Valley, CA/Railroad Valley, NV

Investigator(s): Kahle and Hook, JPL

Aircraft #: 799
Department of Energy
Cessna Citation

SENSOR DATA

Accession #:	----	----
Sensor ID #:	086	1268
Sensor Type:	TIMS	MSS
Focal Length:	----	----
Film Type:	----	----
Filtration:	----	----
Spectral Band:	----	----
f Stop:	----	----
Shutter Speed:	----	----
# of Frames:	----	----
% Overlap:	----	----
Quality:	Fair	Good
Remarks:		

Airborne Science and Applications Program

The Airborne Science Branch at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Department of Energy Remote Sensing Laboratory

The NASA Airborne Science and Applications Program at Ames Research Center contracted with the Department of Energy Remote Sensing Laboratory (RSL) in Las Vegas, Nevada to fly the RSL Multispectral Scanner (MSS) and the NASA Thermal Infrared Multispectral Scanner (TIMS) over the desert southwest. The scanners were flown on the DOE Cessna Citation.

The Cessna Citation is a low and medium altitude, moderate speed aircraft. It can operate from 4,000 to 35,000 feet above sea level at speeds between 135 and 225 knots. There are two instrument ports in the aircraft. The RSL 1268 Multispectral Scanner was mounted over the aft port and the NASA Thermal Infrared Multispectral Scanner was mounted over the forward port.

RSL Daedalus 1268 MSS

The DOE Multispectral Scanner simulates the spectral characteristics the Thematic Mapper (TM) multispectral scanners orbiting on Landsat 4 and Landsat 5. The seven TM bands are replicated with the MSS and four additional bands of discrete wavelengths are acquired. THE MSS acquires TM band six (thermal data) as two bands in low and high gain settings. The scanner is configured as follows:

<u>Daedalus Channel</u>	<u>TM Band</u>	<u>Wavelength, mm</u>
1	A	0.42 - 0.45
2	1	0.45 - 0.52
3	2	0.52 - 0.60
4	B	0.60 - 0.62
5	3	0.63 - 0.69
6	C	0.69 - 0.75
7	4	0.75 - 0.90

8	D	0.91 - 1.05
9	5	1.55 - 1.75
10	7	2.08 - 2.35
11	6	8.5 - 12.5 low gain
12	6	8.5 - 12.5 high gain

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Total Scan Angle:	86°
Pixels/Scan Line:	716
Scan Rate:	12.5/25/50/100 scans/second

Thermal Infrared Multispectral Scanner

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2 *mm* to 12.2 *mm* region.

<u>Channel</u>	<u>Wavelength, <i>mm</i></u>	<u>NET</u>
1	8.2 - 8.6	< 0.3° C
2	8.6 - 9.0	< 0.3° C
3	9.0 - 9.4	< 0.3° C
4	9.4 - 10.2	< 0.3° C
5	10.2 - 11.2	< 0.3° C
6	11.2 - 12.2	< 0.3° C

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56°
Swath Width:	16.9 nmi (31.3 km) at 65,000 feet
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

Information on data tape format, logical record format, and scanner calibration data may be obtained from the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 650-604-6252).

TIMS FLIGHT DATA
 FLIGHT NUMBER: 97-005-04

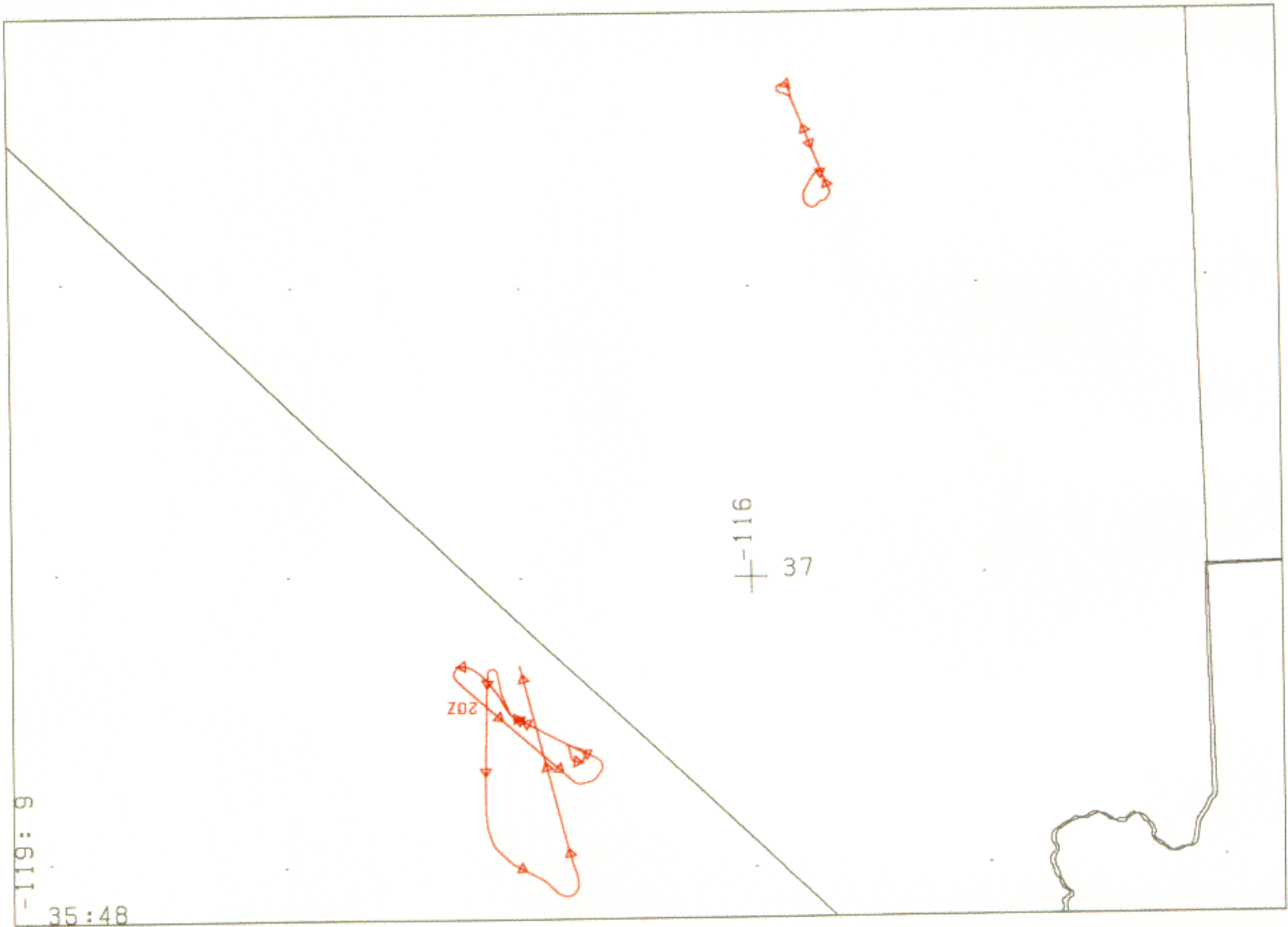
Site	Line	Run	Actual time (GMT)		Actual scanline		Altitude	Scan Speed	total Good	total Interpolated	total Repeated
			begin	end	begin	end	feet/meter	(rps)	scanlines	scanlines	scanlines
1.	726	1 2	17:13:28.0	17:20:24.0	115146	125483	5200/ 1585	25.00	10326	0	12
2.	726	1 3	17:25:22.0	17:32:12.0	132912	143105	5200/ 1585	25.00	10194	0	0
3.	726	1 4	17:43:53.0	17:49:26.0	160547	168838	20200/ 6157	25.00	8292	0	0
4.	731	2 1	19:18:21.0	19:22:23.0	11238	17249	12000/ 3658	25.00	6012	0	0
5.	731	2 2	19:26:03.0	19:29:43.0	22719	28190	12000/ 3658	25.00	5472	0	0
6.	731	3 1a	19:36:15.0	19:43:29.0	37961	48754	12000/ 3658	25.00	10734	0	60
7.	731	3 1b	19:43:53.0	19:44:18.0	49355	49978	12000/ 3658	25.00	624	0	0
8.	731	1 1a	19:50:01.0	19:52:09.0	58495	61686	6000/ 1829	25.00	2952	0	240
9.	731	1 1b	19:53:12.0	19:54:02.0	63247	64494	6000/ 1829	25.00	1184	0	64
10.	731	4 1a	20:12:58.0	20:13:55.0	92762	94171	25000/ 7620	25.00	1350	0	60
11.	731	4 1b	20:14:34.0	20:14:57.0	95132	95707	25000/ 7620	25.00	276	0	300
12.	731	4 1c	20:15:23.0	20:18:06.0	96368	100429	25000/ 7620	25.00	1959	0	2103
13.	731	4 1d	20:18:43.0	20:18:47.0	101330	101449	25000/ 7620	25.00	120	0	0
14.	731	4 1e	20:19:21.0	20:20:09.0	102290	103465	25000/ 7620	25.00	396	0	780
15.	731	4 1f	20:21:21.0	20:21:27.0	105266	105409	25000/ 7620	25.00	144	0	0
16.	731	4 1g	20:22:25.0	20:23:33.0	106850	108541	25000/ 7620	25.00	672	0	1020
17.	731	4 1h	20:23:57.0	20:24:03.0	109142	109309	25000/ 7620	25.00	168	0	0

Notes: Site 726 Railroad Valley
 Site 731 Death Valley
 Severe Line drops, data archived per investigator's request

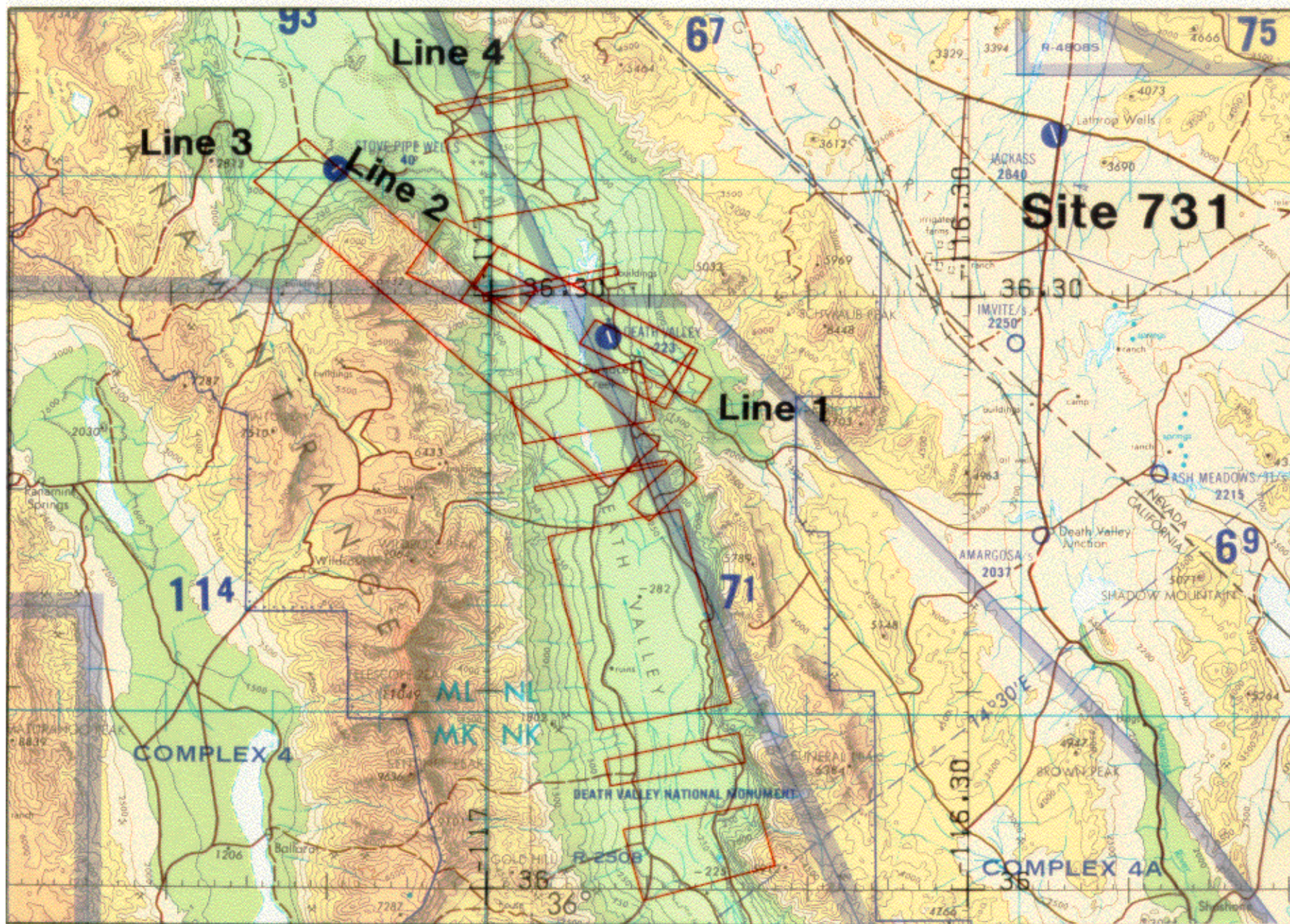
DoE DAEDALUS TMS FLIGHT DATA
 FLIGHT NUMBER: 97-005-04

Site	Line	Run	Actual time (GMT) begin end		Actual scanline begin end		Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines	
1.	726	1	2	17:13:42.0	17:20:24.7	115834	125902	5200/ 1585	25.00	10069	0	0
2.	726	1	3	17:25:05.3	17:32:11.8	132916	143580	5200/ 1585	25.00	10665	0	0
3.	726	1	4	17:43:46.8	17:49:32.9	153464	157791	20200/ 6157	12.50	4328	0	0
4.	731	2	1	19:17:26.0	19:22:12.3	40796	44375	12000/ 3658	12.50	3579	1	0
5.	731	2	2	19:26:06.4	19:29:55.4	47301	50163	12000/ 3658	12.50	2863	0	0
6.	731	3	1	19:35:49.2	19:44:19.9	54586	60970	12000/ 3658	12.50	6385	0	0
7.	731	1	1	19:49:44.0	19:54:04.6	68718	75232	6000/ 1829	25.00	6515	0	0
8.	731	4	1	20:12:59.2	20:24:31.7	89664	98320	25000/ 7620	12.50	8657	0	0

Notes: Site 726 Railroad Valley
 Site 731 Death Valley



FLIGHT 97-005-04 17 JUNE 1997 A/C 799 TIMS / TMS
 LAMBERT CONFORMAL PROJECTION: SP1 = 35.4 SP2 = 38.2 CM = -116.5 ROTATED BY 0.0
 17:08:50 TO 20:24:31 UT SCALE 1:2.02E+06 TIME TICK EVERY 5.00 MINUTES



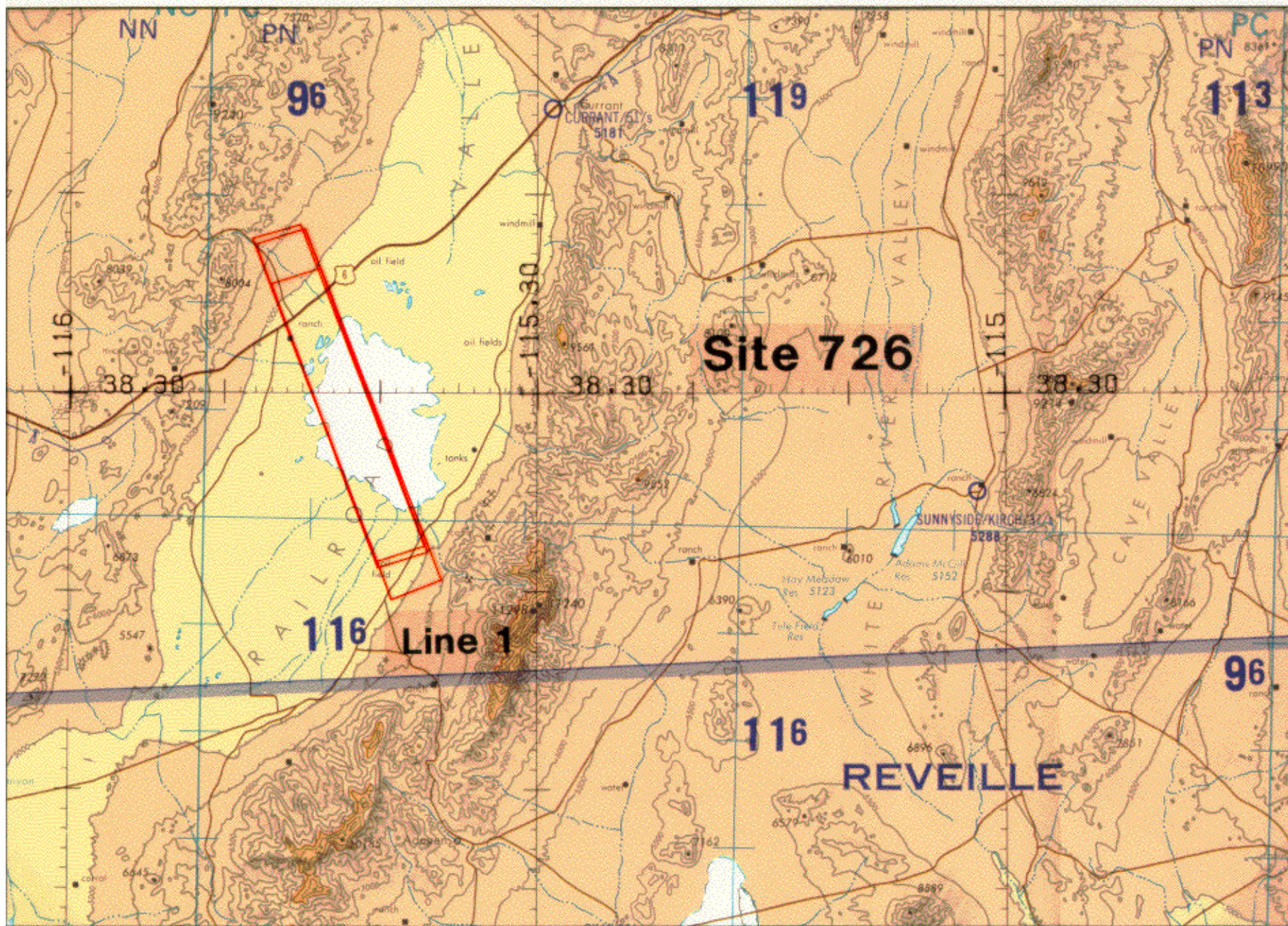
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A/C 799

TIMS

TPC 018-B



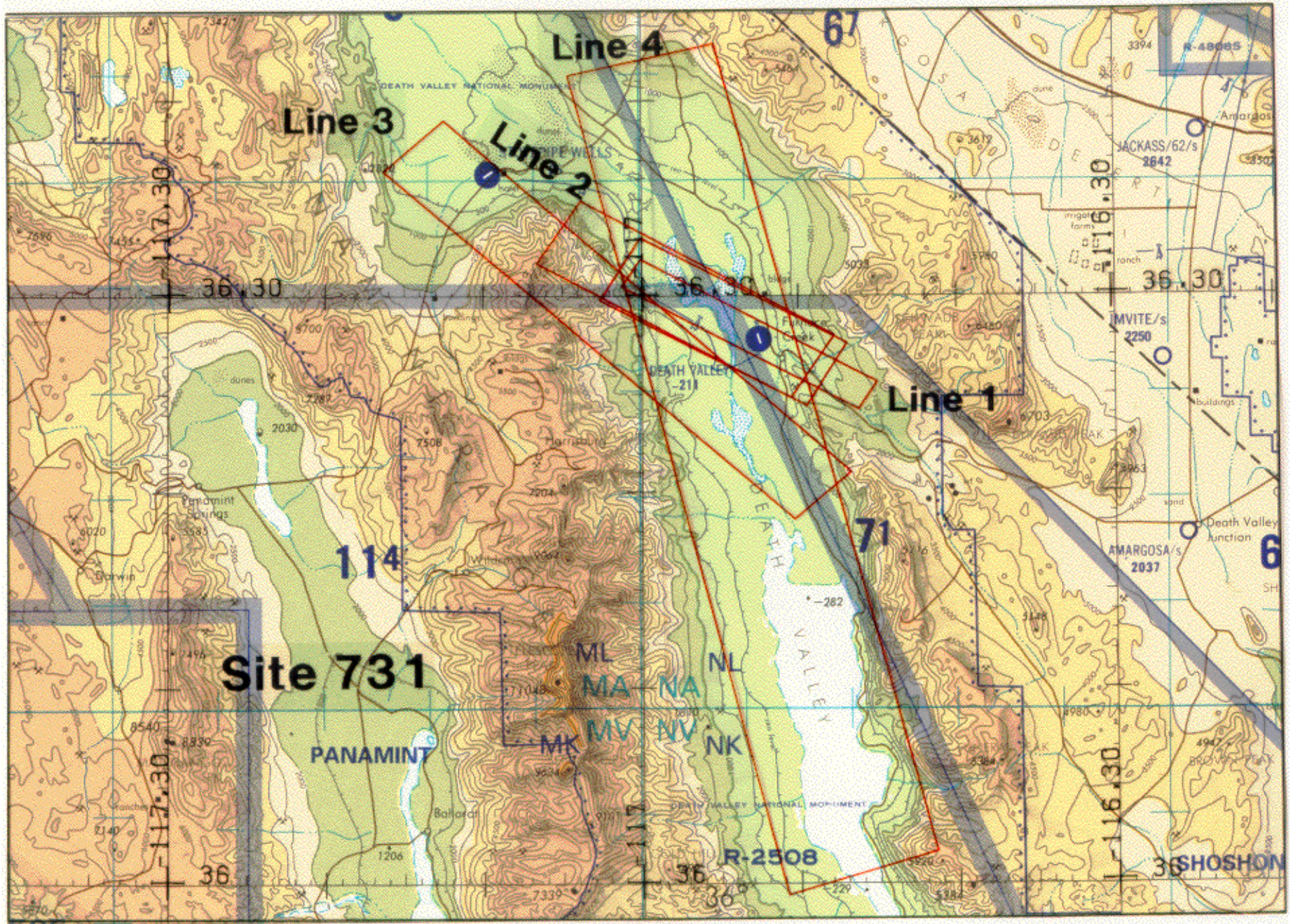
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R/C 799

TIMS

TPC 018-B



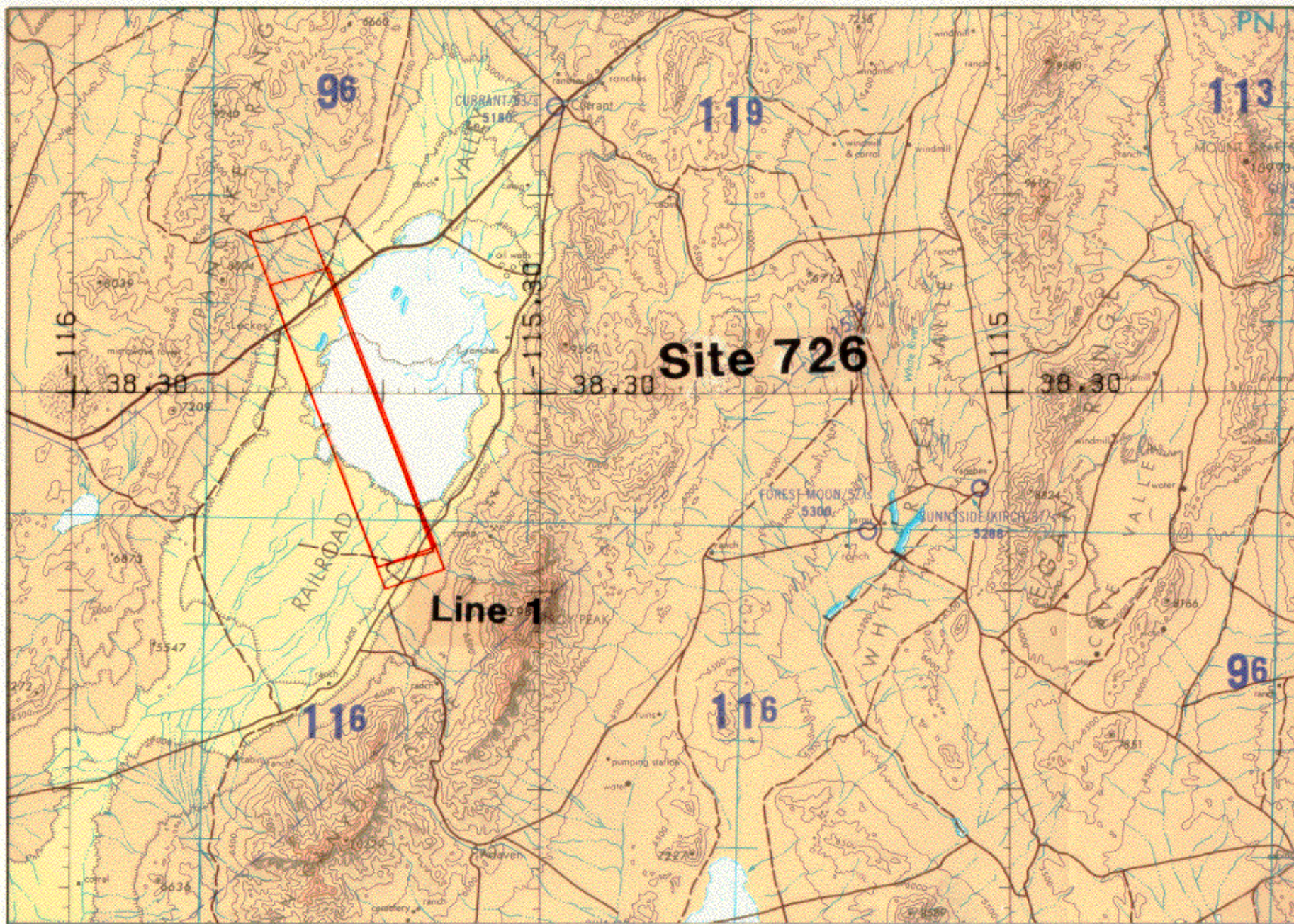
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R/C 799

DOE MSS

TPC G18-B



FLIGHT 97-005-04

17 JUNE 1997

A/C 799

DOE MSS

TPC G18-B