

FLIGHT SUMMARY REPORT

Flight #: 91-002
Date: 04 October 1990
Sensor Package: Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)
Thermal Infrared Multispectral Scanner (TIMS)
Thematic Mapper Simulator (TMS)
Wild-Heerbrug RC-10
Area(s) Covered: Colorado, Arizona, and California

Investigator(s): Kruse, University of Colorado
Kahle, JPL
Aircraft #: 706
Flight Request: 90D206C and 90L220C
Julian Date: 277

SENSOR DATA

Accession #:	----	----	----	04137
Sensor ID #:	099	086	074	076
Sensor Type:	AVIRIS	TIMS	TMS	RC-10
Focal Length:	----	----	----	12" 304.87 mm
Film Type:	----	----	----	High Definition Aerochrome IR SO-131
Filtration:	----	----	----	cc.10B
Spectral Band:	----	----	----	510-900 nm
f Stop:	----	----	----	4
Shutter Speed:	----	----	----	1/125
# of Frames:	----	----	----	92
% Overlap:	----	----	----	60
Quality:	----	----	Excellent	Excellent
Remarks:				

Airborne Science and Applications Program

The Airborne Science and Applications Program (ASAP) is supported by three ER-2 high altitude Earth Resources Survey aircraft. These aircraft are operated by the High Altitude Missions Branch at NASA-Ames Research Center, Moffett Field, California. 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 used for data collection during this flight.

Airborne Visible and Infrared Imaging Spectrometer

The Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) is the second in the series of imaging spectrometer instruments developed at the Jet Propulsion Laboratory (JPL) for earth remote sensing. This instrument uses scanning optics and four spectrometers to image a 614 pixel swath simultaneously in 224 contiguous spectral bands (0.4-2.4 μm).

AVIRIS parameters are as follows:

IFOV:	1 mrad
Ground Resolution:	66 feet (20 meters) at 65,000 feet
Total Scan Angle:	30°
Swath Width:	5.7 nmi (10.6 km) at 65,000 feet
Spectral Coverage:	0.41-2.45 μm
Pixels/Scan Line:	614
Number of Spectral Bands:	224
Digitization:	10-bits
Data Rate:	17 MBPS

<u>Spectrometer</u>	<u>Wavelength Range</u>	<u>Number of Bands</u>	<u>Sampling Interval</u>
1	0.41 - 0.70 μm	31	9.4 nm
2	0.68 - 1.27 μm	63	9.4 nm
3	1.25 - 1.86 μm	63	9.7 nm
4	1.84 - 2.45 μm	63	9.7 nm

All AVIRIS data is decommutated and archived at JPL and not currently available for public distribution. For further information contact Rob Green at Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, California 91109-8099.

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 μm to 12.2 μm region.

<u>Channel</u>	<u>Wavelength, μm</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)

Thematic Mapper Simulator

The Daedalus Thematic Mapper Simulator (TMS) is a multispectral scanner flown aboard the ER-2 aircraft which simulates spatial and spectral characteristics of the seven Landsat-D Thematic Mapper bands. The specific bands are as follows:

<u>Daedalus Channel</u>	<u>TM Band</u>	<u>Wavelength, μm</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	0.76 - 0.90
8	D	0.91 - 1.05
9	5	1.55 - 1.75
10	7	2.08 - 2.35
11	6	8.5 - 14.0 low gain
12	6	8.5 - 14.0 high gain

Sensor/aircraft parameters are as follows:

IFOV:	1.25 mrad
Ground Resolution:	81 feet (25 meters) at 65,000 feet
Total Scan Angle:	43°
Swath Width:	8.4 nmi (15.6 km) at 65,000 feet
Pixels/Scan Line:	716
Scan Rate:	12.5 scans/second
Ground Speed:	400 kts (206 m/second)

NOTE: Information on data tape format, logical record format, and scanner calibration data may be obtained from the NASA-Ames Aircraft Data Facility at (415) 604-6252 or FTS 464-6252.

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 91-002**

Accession # 04137

Sensor # 076

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3875-3884	18:17:42	18:21:26	65000/19800	Clear
C - D	3885-3892	19:20:24	19:23:37	"	Clear
D - E	3893-3899	19:30:44	19:33:30	"	Clear
F - G	3900-3909	19:44:14	19:48:23	"	Clear
H - I	3910-3914	19:56:04	19:56:59	"	Clear; No TMS, TIMS, AVIRIS data
J - K	3915-3920	20:08:00	20:10:18	"	Clear
L - M	3921-3932	20:40:10	20:45:13	"	Clear
N - O	3933-3944	21:23:27	21:28:29	"	Clear
P - Q	3945-3954	21:35:39	21:39:46	"	Clear
R - S	3955-3966	21:47:32	21:52:35	"	Clear

SCANNER FLIGHT LINE DATA

FLIGHT NO. 91-002

DAEDALUS FLIGHT DATA
 FLIGHT NUMBER: 91-002

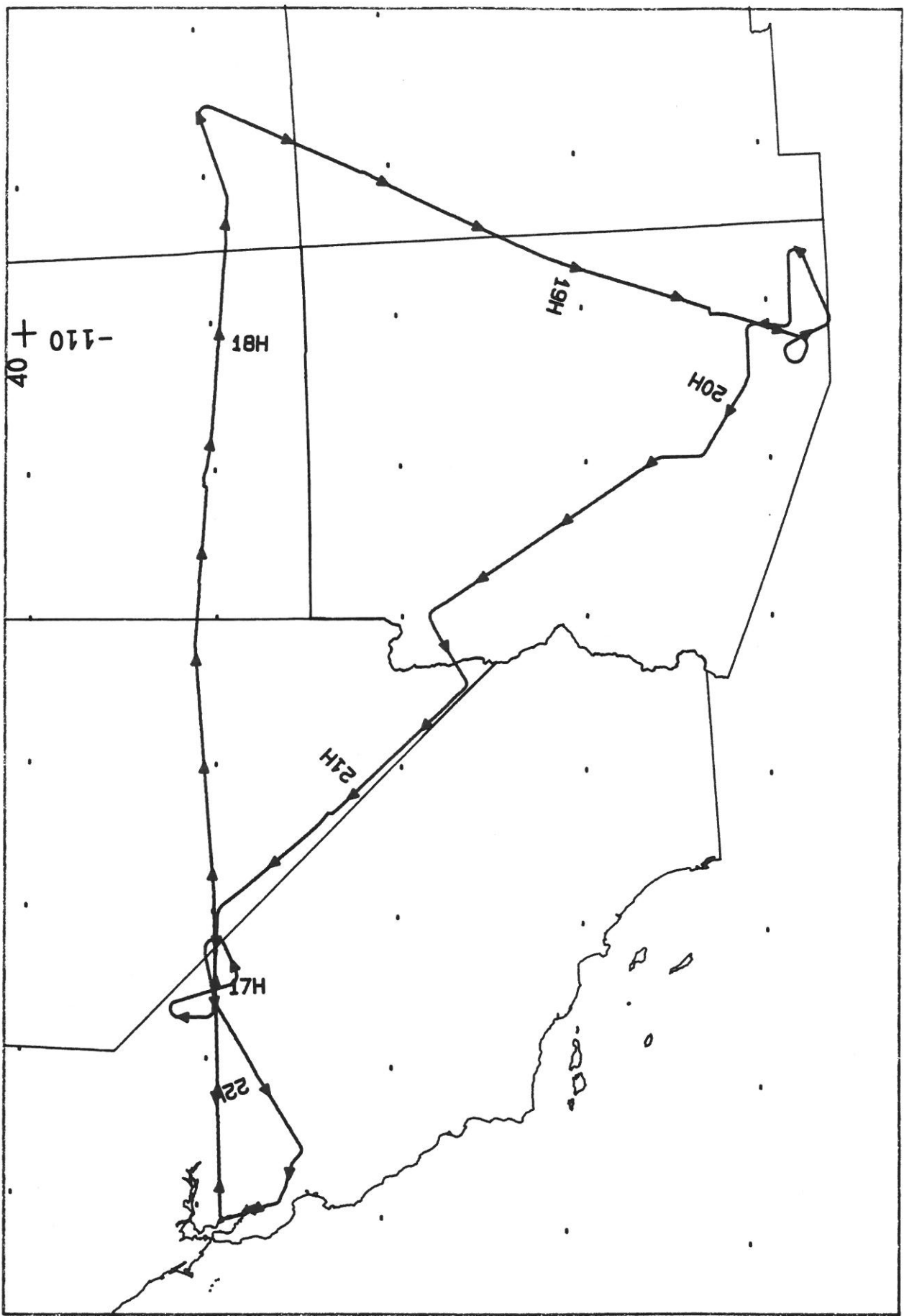
Check Points	Actual Time (GMT)		Actual Scanline		End	Altitude feet/meter	Scan Speed (rps)	Total Good Scanlines	Total Interpolated Scanlines	Total Repeated Scanlines
	Begin	End	Begin	End						
A-B	18:17:31.0	18:21:07.0	86966	89671	65000/19812	12.50	2652	0	54	
C-D	19:20:13.0	19:23:55.0	133993	136760	65000/19812	12.50	2762	0	6	
E-F	19:30:34.0	19:33:24.0	141748	143882	65000/19812	12.50	2130	0	5	
G-H	19:44:03.0	19:48:44.0	151868	155373	65000/19812	12.50	3496	0	10	
I-J	20:07:49.0	20:10:18.0	169690	171552	65000/19812	12.50	1857	0	6	
K-L	20:39:59.0	20:45:27.0	193806	197908	65000/19812	12.50	2933	0	1170	
M-N	21:23:16.0	21:28:32.0	226279	230223	65000/19812	12.50	3933	0	12	
O-P	21:35:27.0	21:39:45.0	235417	238642	65000/19812	12.50	3203	0	23	
Q-R	21:48:05.0	21:51:26.0	244883	247403	65000/19812	12.50	2517	0	4	

SCANNER FLIGHT LINE DATA

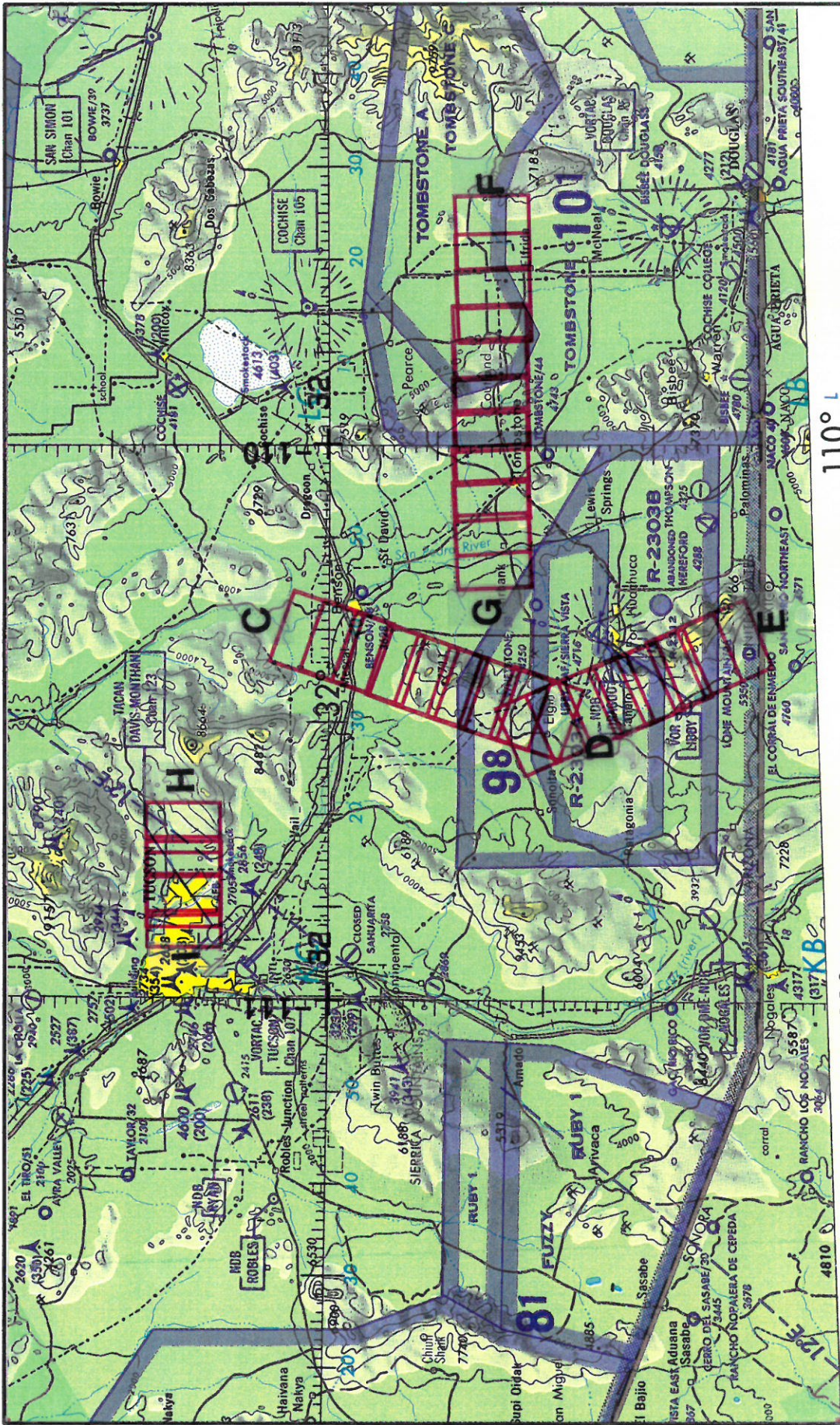
FLIGHT NO. 91-002

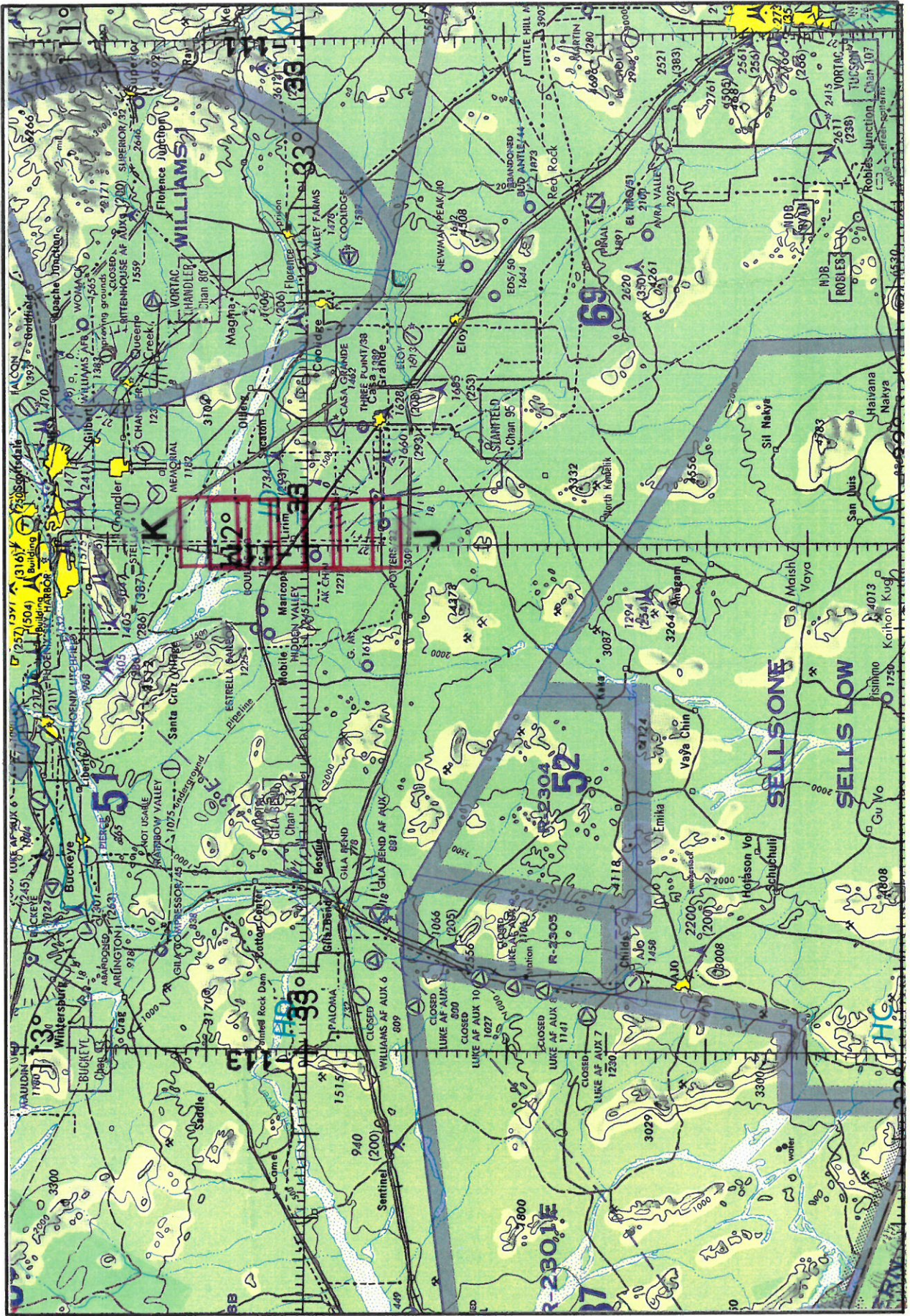
TIMS FLIGHT DATA
 FLIGHT NUMBER: 91-002

Check Points	Actual Time (GMT)		Actual Scanline		Altitude feet/meter	Scan Speed (rps)	Total Good Scanlines	Total Interpolated Scanlines	Total Repeated Scanlines
	Begin	End	Begin	End					
A-B	18:17:33.0	18:21:08.0	50833	52405	65000/19812	7.30	1571	0	2
C-D	19:20:24.0	19:23:55.0	78395	79936	65000/19812	7.30	1540	0	2
E-F	19:30:36.0	19:33:25.0	82864	84103	65000/19812	7.30	1234	0	6
G-H	19:44:15.0	19:48:44.0	88854	90820	65000/19812	7.30	1965	0	2
I-J	20:07:51.0	20:10:19.0	99206	100283	65000/19812	7.30	1076	0	2
K-L	20:40:02.0	20:45:27.0	113317	115696	65000/19812	7.30	2376	0	1
M-N	21:23:27.0	21:28:33.0	132362	134595	65000/19812	7.30	2228	0	6
O-P	21:35:30.0	21:39:46.0	137649	139517	65000/19812	7.30	1865	0	1
Q-R	21:48:16.0	21:51:19.0	143244	144585	65000/19812	7.30	1340	0	2

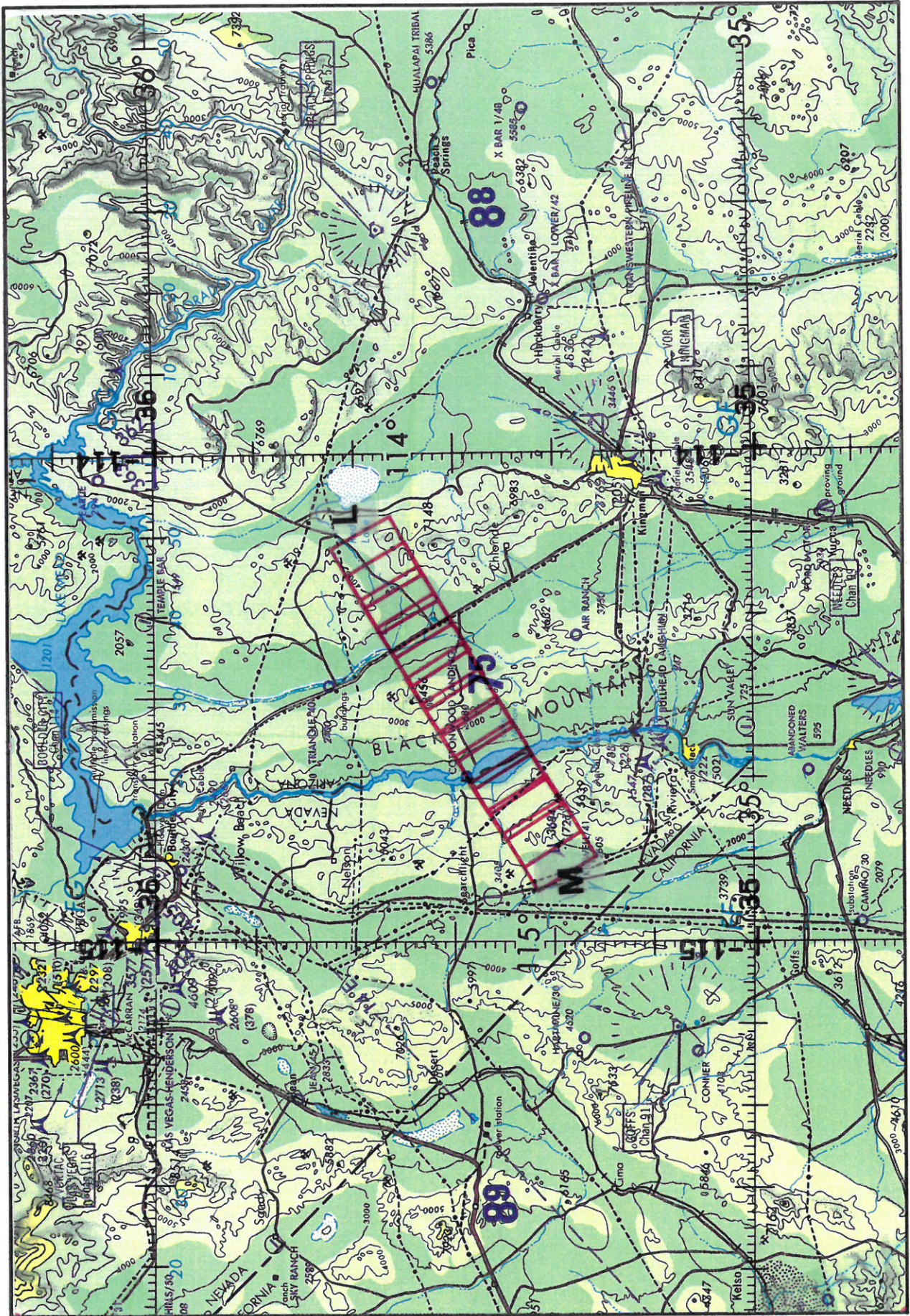


FLIGHT 91-002 4 October 1990 A/C 706 AVIRIS/ TMS / TMS / RC-10





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FLIGHT 91-002 4 October 1990 A/C 706 AVIRIS / RC-10 / TMS / TMS Accession # 04137 ONC 6-16

