

FLIGHT SUMMARY REPORT

Flight Number: 99-139
Calendar/Julian Date: 29 September 1999 • 272
Sensor Package: Wild Heerbrugg RC-10 (12" and 6")
 Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)
 Thematic Mapper Simulator (TMS)
Area(s) Covered: Sevillita/Jornada, NM; Rio Grande, TX

Investigator(s): Nolen, NM State U.; Keller, U. of TX **Aircraft #:** 806

SENSOR DATA

Accession #:	05404	05405	----	----
Sensor ID #:	034	035	099	074
Sensor Type:	RC-10	RC-10	AVIRIS	TMS
Focal Length:	12" 304.66 mm	6" 153.46 mm	----	----
Film Type:	Aerochrome IR SO-134	Aerochrome IR SO-134	----	----
Filtration:	Wratten 12	Wratten 12 + 2.2 AV	----	----
Spectral Band:	510-900nm	510-900 nm	----	----
f Stop:	11	8	----	----
Shutter Speed:	1/275	1/275	----	----
# of Frames:	59	27	----	----
% Overlap:	60	60	----	----
Quality:	Good	Good	----	Excellent
Remarks:	Add 10 seconds for correct UTC	Data block unreadable		

Airborne Science Program

The Airborne Science Program 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.

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 ^o
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.

Camera Systems

Various camera systems and films are used for photographic data collection. Film types include high definition color infrared, natural color, and black and white emulsions. Available photographic systems are as follows:

- Wild-Heerbrugg RC-10 metric mapping camera
 - 9 x 9 inch film format
 - 6 inch focal length lens provides area coverage of 16 x 16 nautical miles from 65,000 feet
 - 12 inch focal length lens provides area coverage of 8 x 8 nautical miles from 65,000 feet
- Hycon HR-732 large scale mapping camera
 - 9 x 18 inch film format
 - 24 inch focal length lens provides area coverage of 4 x 8 nautical miles from 65,000 feet
- IRIS II Panoramic camera
 - 4.5 x 34.7 inch film format
 - 24 inch focal length lens
 - 90 degree field of view provides area coverage of 2 x 21.4 nautical miles from 65,000 feet

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)

Data Availability

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for Airborne Science Program aircraft acquired photographic and digital imagery. The photographic archive consists of photography acquired by the program from 1971 to April 1996. For information regarding photography and digital data (including areas of coverage, products, and product costs) contact EROS Data Center, Customer Services, Sioux Falls, South Dakota 57198 (Telephone: 605.594.6151).

As of April 1996 the EROS Data Center no longer receives an archive copy of newly acquired Airborne Science Program photography. Original photography is archived with the Airborne Sensor Facility at Ames Research Center. A user copy of the photography is provided to the principal investigators for each flight. Principal investigators are cited on the first page of their respective flight summary reports. For information regarding photography acquired from April 1996 to the present contact the Airborne Sensor Facility as follows:

Flight Documentation and Data Archive Searches

The following is the web site for flight documentation as published by the Airborne Sensor Facility at NASA Ames Research Center: <http://asapdata.arc.nasa.gov/er-2fsr.html>

Additional information regarding flight documentation to include data archive searches, data availability, sensor parameters, and areas of coverage may be obtained from the following: Airborne Sensor Facility, MS 240-6, NASA Ames Research Center, Moffett Field, CA 94035-1000, Telephone: 650.604.6252 (FAX 650.604.4987).

CAMERA FLIGHT LINE DATA
FLIGHT NO. 99-139

Accession # 05404

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
C - D	3472-3478	17:32:03	17:34:48	67600/20605	Clear
E - F	3479-3487	17:39:30	17:42:49	67100/20450	Clear; static discharge (frame 3487)
G - H	3488-3495	17:47:59	17:51:12	67600/20605	Clear; static discharge (frame 3495)
I - J	3496-3504	17:57:41	18:05:59	67200/20483	Clear; static discharge (frame 3504)
K - L	3505-3513	18:05:21	18:08:39	67700/20635	Clear; oblique (frames 3505-3506); static discharge (frame 3513)
N - O	3514-3529	18:17:51	18:24:45	68600/20910	Clear; emulsion discoloration (frames 3521-3528)
P	3530	18:30:39	—	68100/20760	Clear

CAMERA FLIGHT LINE DATA
FLIGHT NO. 99-139

Accession # 05405

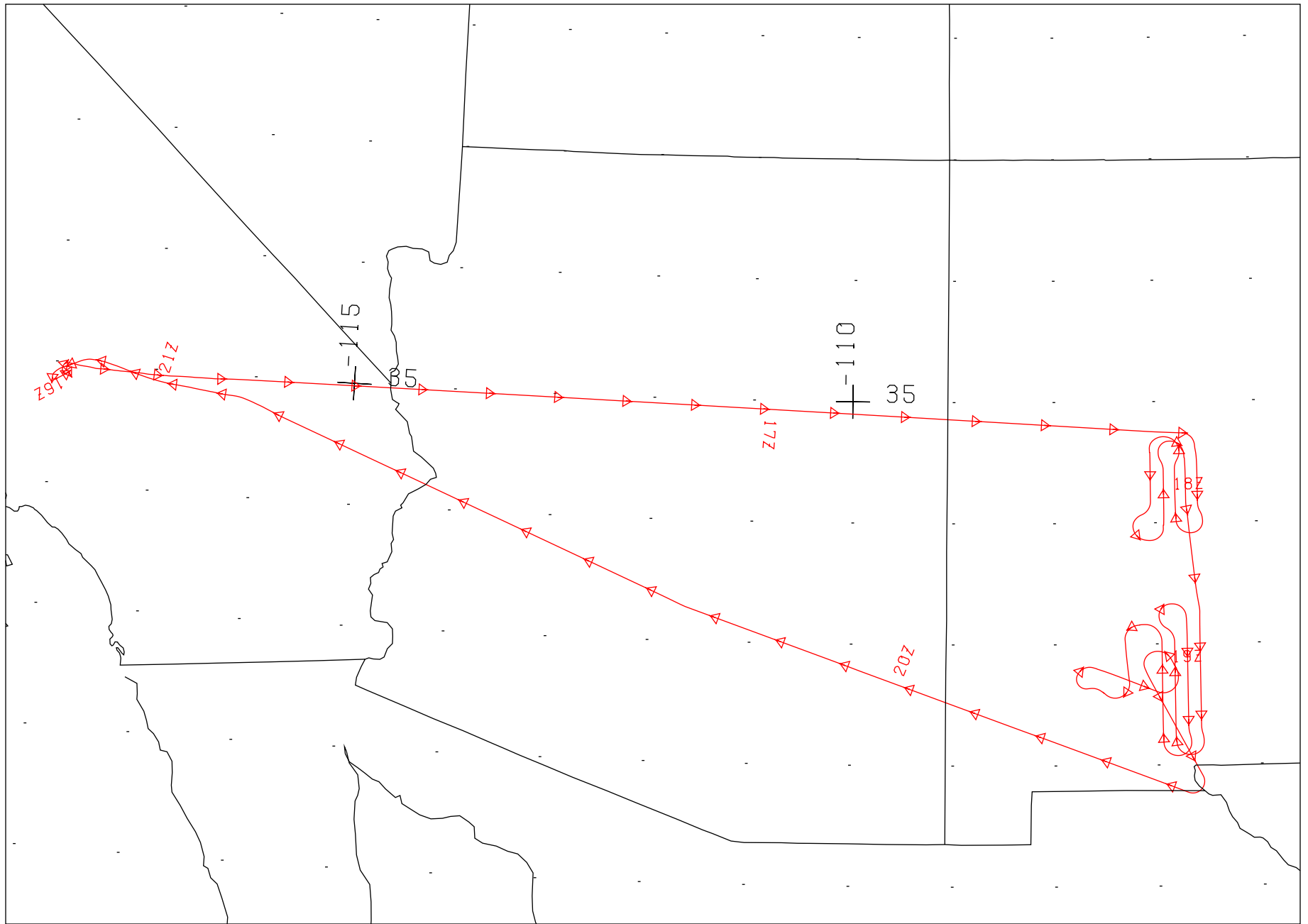
Sensor # 035

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
T - U	9964-9971	18:55:00	19:01:46	69000/21030	Clear
V - W	9972-9976	19:05:00	19:07:57	69000/21030	Clear
X - Y	9977-9980	19:16:00	19:18:54	68700/20940	Clear
Y - Z	9981-9990	19:27:00	19:35:42	69300/21120	10-30% cumulus (frames 9986-9990)
NOTE: LIGHT LEAK; AFFECTS AREA ABOVE RIGHT CENTER FIDUCIAL OF EACH FRAME					

DAEDALUS FLIGHT DATA
 FLIGHT NUMBER: 99-139

Check Points	Actual time (GMT)		Actual scanline		Altitude feet/meter	ground speed knots/mps	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
	begin	end	begin	end						
A-B	16:43:50.0	17:29:29.0	39042	73272	67332/20523	424/213	12.50	34201	0	30
C-D	17:32:17.0	17:35:10.0	75371	77541	67632/20614	420/211	12.50	2171	0	0
E-F	17:39:33.0	17:43:15.0	80821	83601	67186/20478	420/211	12.50	2781	0	0
G-H	17:48:01.0	17:51:32.0	87171	89811	67501/20574	425/213	12.50	2641	0	0
I-J	17:57:54.0	18:01:21.0	94591	97171	67231/20492	423/212	12.50	2581	0	0
K-L	18:06:13.0	18:08:58.0	100821	102891	67702/20636	420/211	12.50	2071	0	0
L-M	18:09:54.0	18:15:34.0	103591	107831	68101/20757	423/212	12.50	4241	0	0
N-O	18:17:12.0	18:25:18.0	109061	115141	68596/20908	419/210	12.50	6081	0	0
P-Q	18:30:08.0	18:36:38.0	118761	123641	68376/20841	425/213	12.50	4881	0	0
R-S	18:42:23.0	18:49:51.0	127951	133551	68627/20918	416/209	12.50	5601	0	0
T-U	18:54:14.0	19:01:25.0	136841	142221	68855/20987	426/214	12.50	5381	0	0
V-W	19:05:42.0	19:08:32.0	145431	147561	68856/20987	417/209	12.50	2131	0	0
X-Y	19:15:46.0	19:20:22.0	152981	156441	68648/20924	418/210	12.50	3461	0	0
Y-Z	19:28:00.0	19:35:52.0	162161	168061	69224/21099	418/210	12.50	5901	0	0
1-2	19:38:33.0	20:16:09.0	170072	198272	69701/21245	427/214	12.50	28201	0	0
2-3	20:17:13.0	20:48:25.0	199072	222472	69313/21127	421/211	12.50	23401	0	0

Channel 8 geographically offset 1 sample from other channels

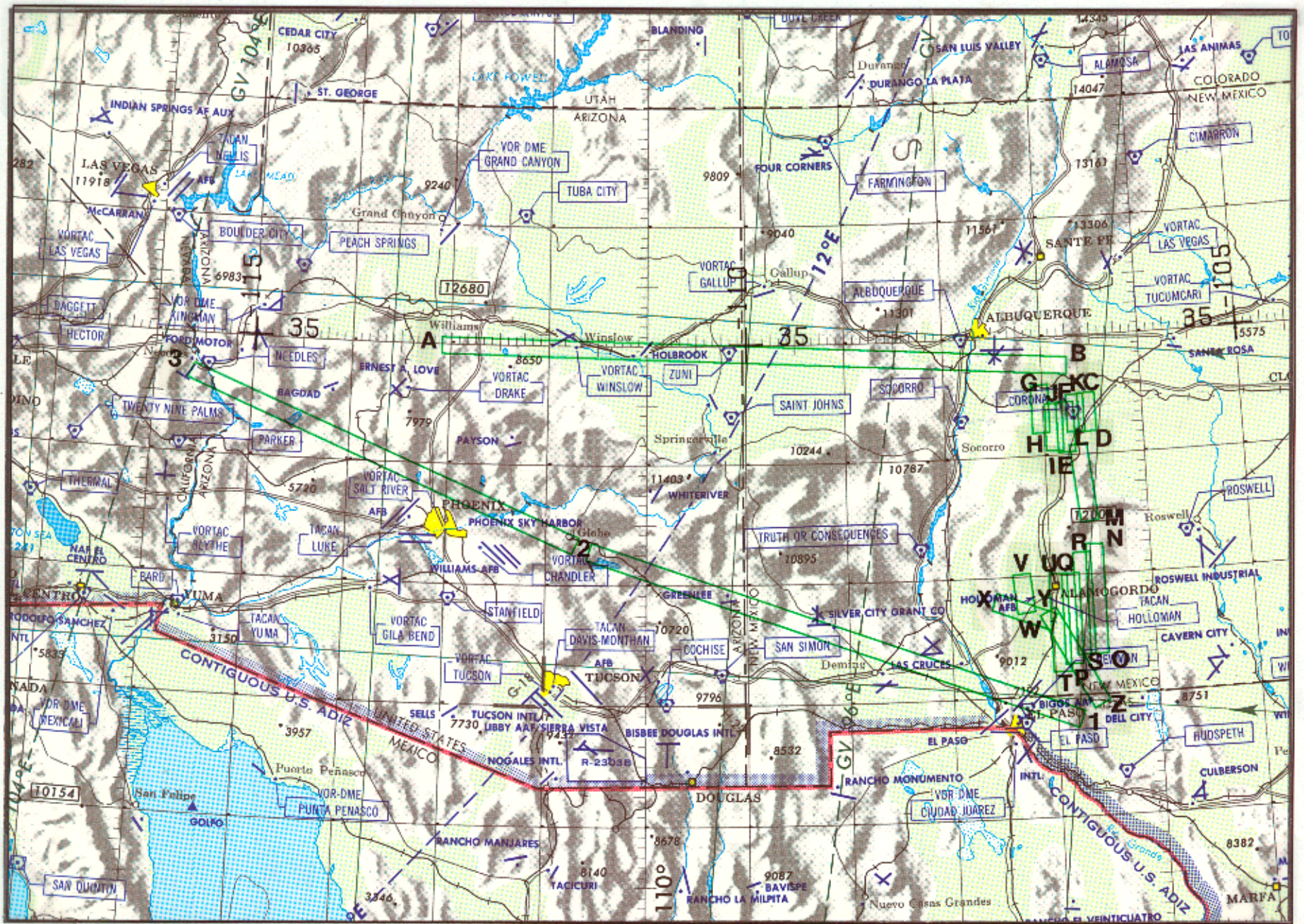


FLIGHT 99-139

29 SEPTEMBER 1999

A/C 806

RC-10 / AVIRIS / TMS

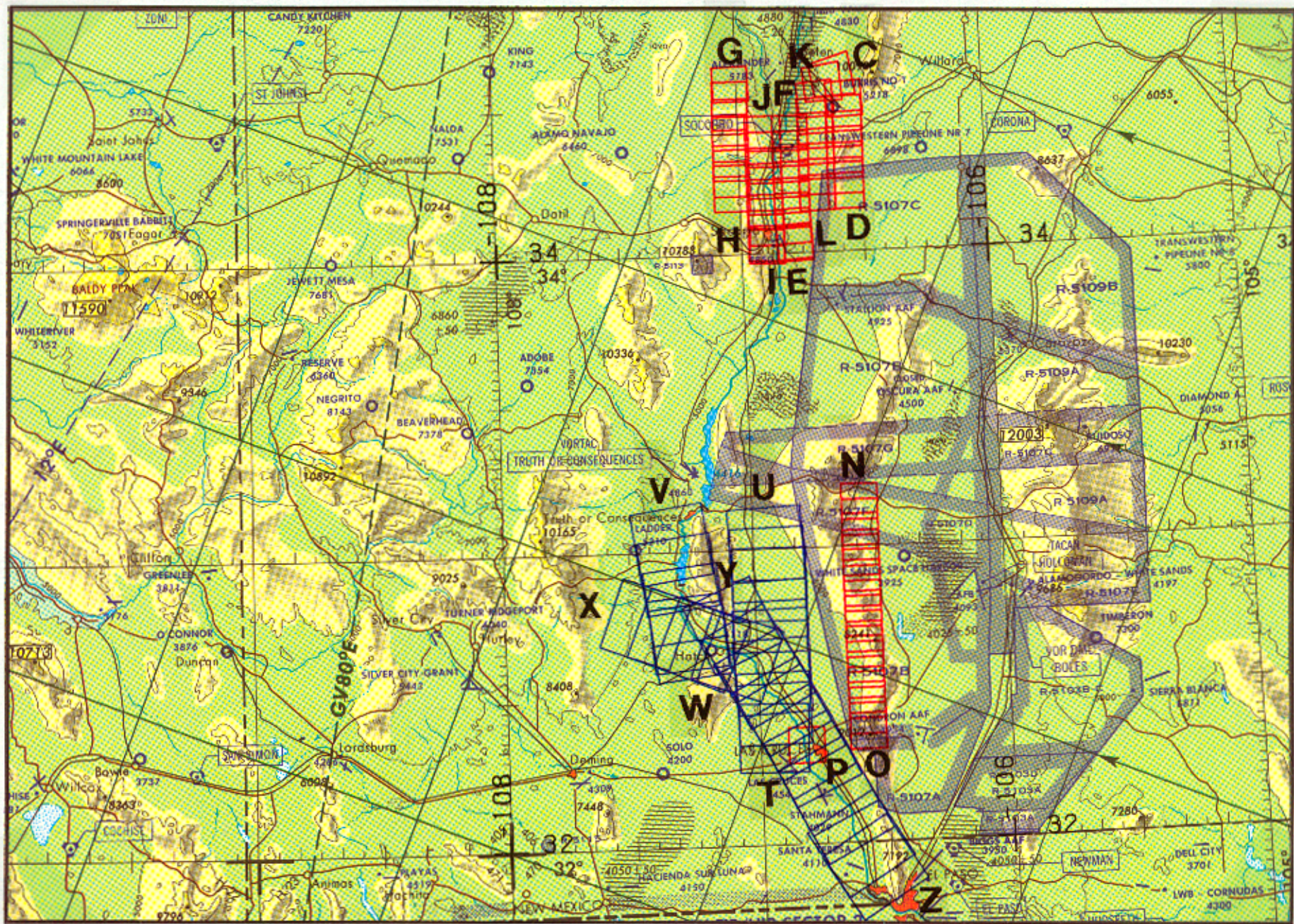


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A/R C 806

TMS

GNC 2



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R/C 806

RC-10

JNC 43