

# FLIGHT SUMMARY REPORT

**Flight #:** 91-088  
**Date:** 14 May 1991  
**Sensor Package:** Wild-Heerbrug RC-10  
 Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)  
 Thematic Mapper Simulator (TMS)  
 Thermal Infrared Multispectral Scanner (TIMS)  
**Area(s) Covered:** Walnut Gulch, Arizona  
 Japer Ridge, California

**Investigator(s):** Huete, University of Arizona;  
 Green, JPL; and Ustin, University of California  
**Aircraft #:** 706  
**Flight Request:** 91L237C, 91L230, 91U248  
**Julian Date:** 134

## SENSOR DATA

<b>Accession #:</b>	04219	-----	-----	-----
<b>Sensor ID #:</b>	033	099	101	086
<b>Sensor Type:</b>	RC-10	AVIRIS	TMS	TIMS
<b>Focal Length:</b>	6" 153.17 mm	-----	-----	-----
<b>Film Type:</b>	High Definition Aerochrome IR SO131	-----	-----	-----
<b>Filtration:</b>	cc.10B	-----	-----	-----
<b>Spectral Band:</b>	510-900 nm	-----	-----	-----
<b>f Stop:</b>	4	-----	-----	-----
<b>Shutter Speed:</b>	1/100	-----	-----	-----
<b># of Frames:</b>	19	-----	-----	-----
<b>% Overlap:</b>	60	-----	-----	-----
<b>Quality:</b>	Excellent	-----	Excellent	-----
<b>Remarks:</b>	Data annotation very faint -- unreadable			Did not acquire data

## 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  $\mu\text{m}$ ).

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 $\mu\text{m}$
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 $\mu\text{m}$	31	9.4 nm
2	0.68 - 1.27 $\mu\text{m}$	63	9.4 nm
3	1.25 - 1.86 $\mu\text{m}$	63	9.7 nm
4	1.84 - 2.45 $\mu\text{m}$	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  $\mu\text{m}$  to 12.2  $\mu\text{m}$  region.

<u>Channel</u>	<u>Wavelength, <math>\mu\text{m}</math></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, <math>\mu\text{m}</math></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. 91-088**

Accession # 04219

Sensor # 033

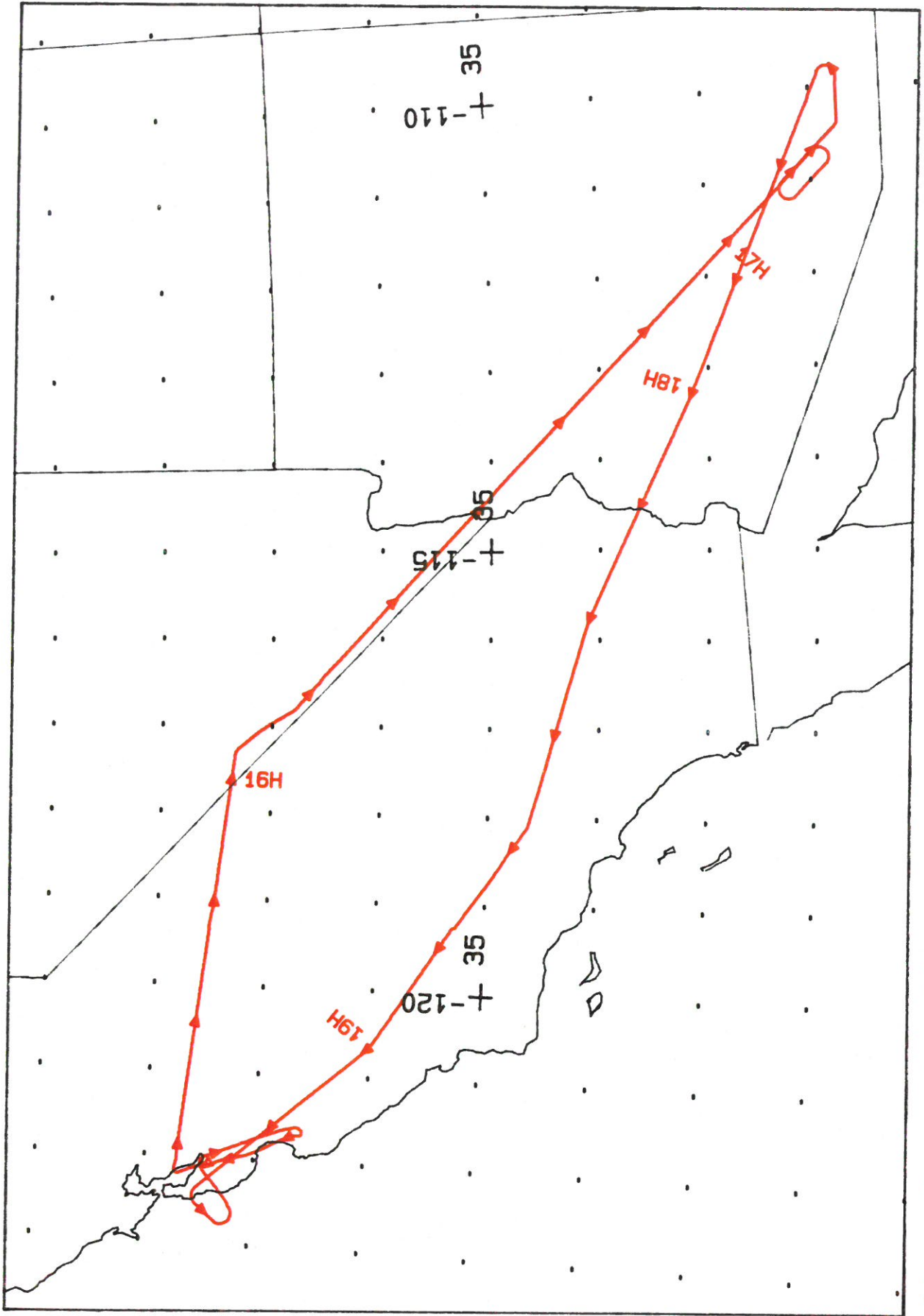
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	5125-5126	17:08:12	17:08:17	65000/19800	Clear; Davis Montham AFB (Tucson, Arizona)
C - D	5127-5133	17:27:08	17:30:01	"	Clear; Walnut Gulch, Arizona
E - F	5134-5138	19:16:08	19:18:28	"	10-20% cumulus (frames 5134-5138) Jasper Ridge, California
G - H	5139-5143	19:26:05	19:28:28	"	10-40% cumulus (frames 5139-5143) Jasper Ridge, California

# SCANNER FLIGHT LINE DATA

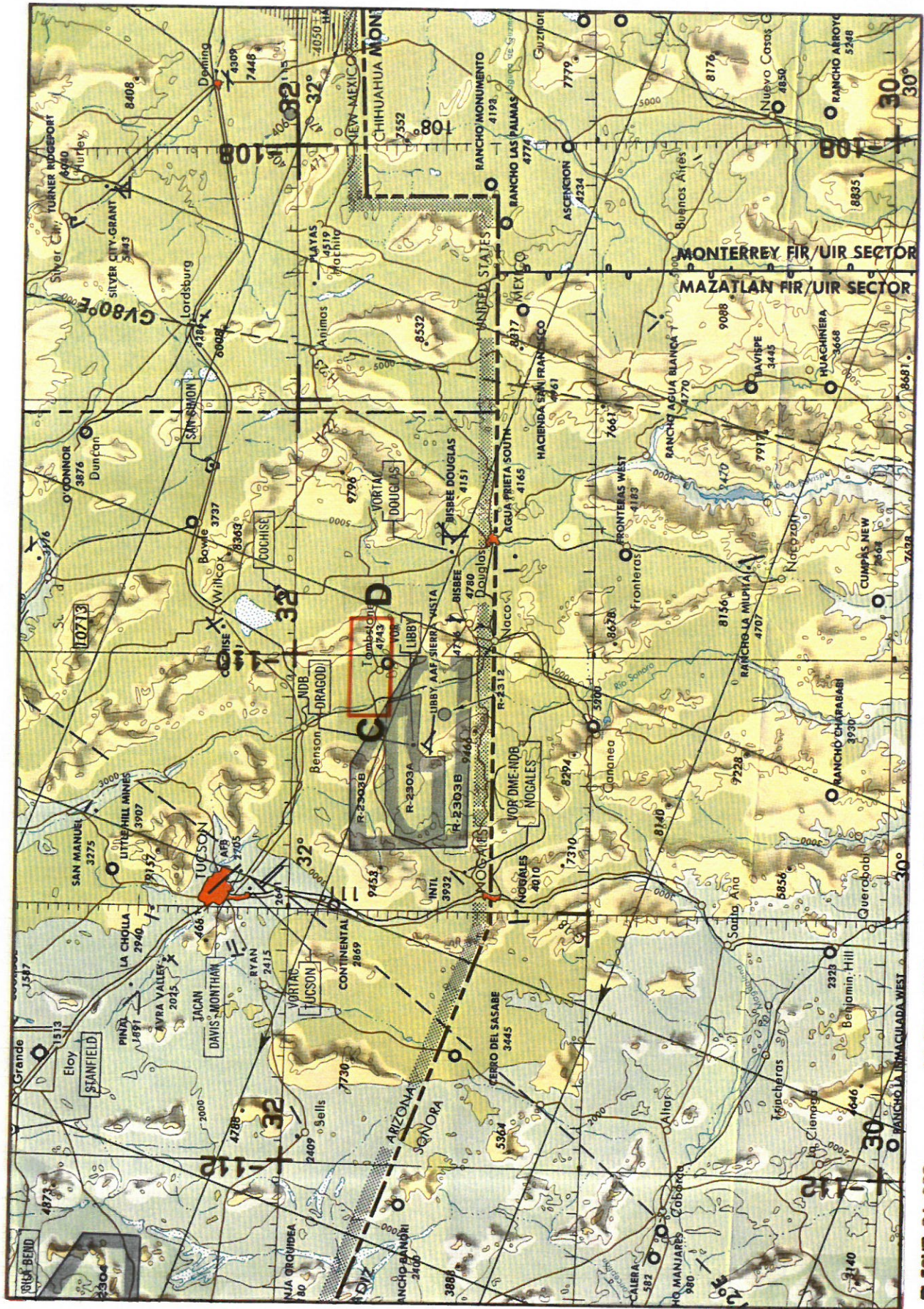
## FLIGHT NO. 91-088

DAEDALUS FLIGHT DATA  
FLIGHT NUMBER: 91-088

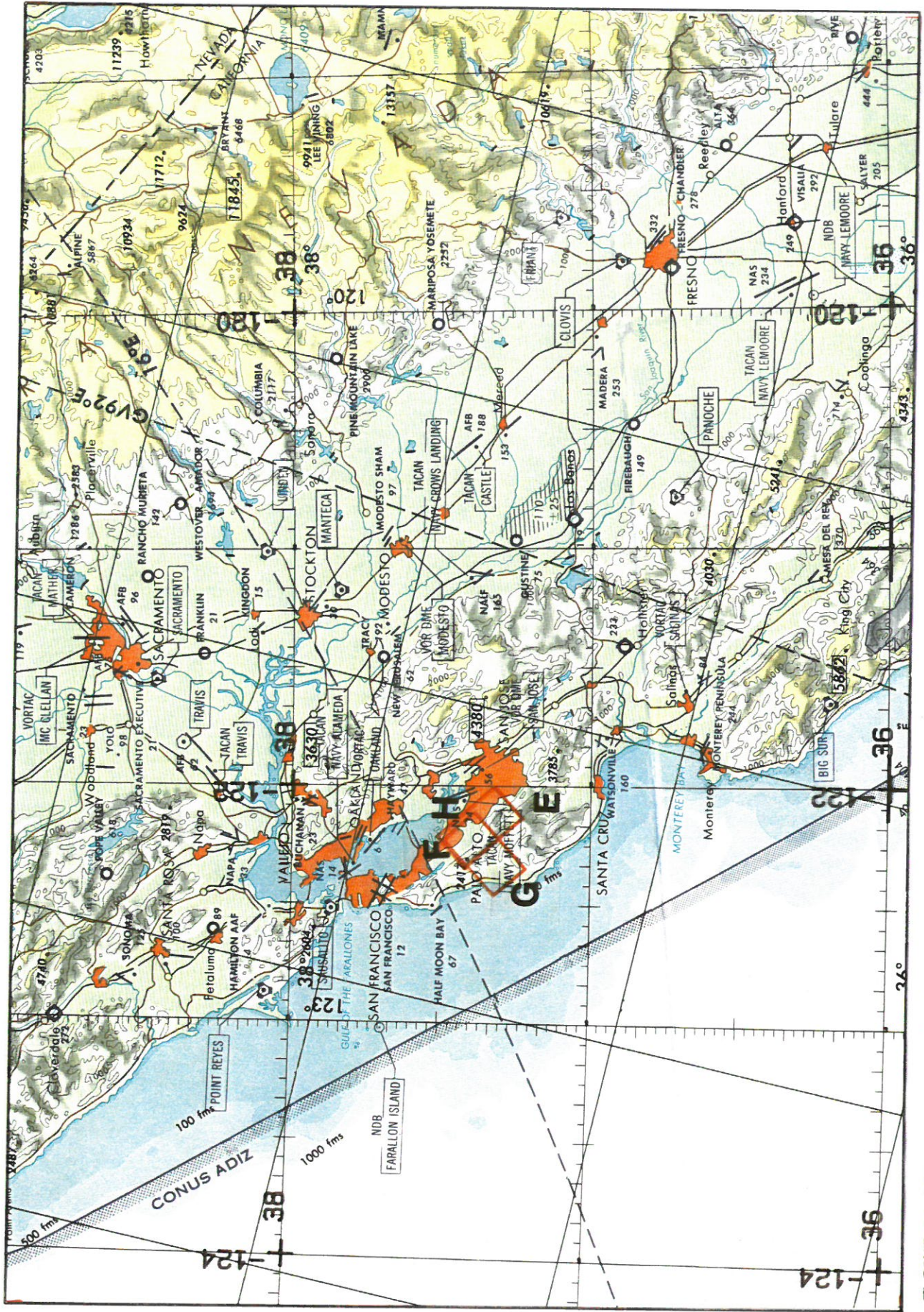
Check Points	A c t u a l t i m e b e g i n	(GMT) e n d	A c t u a l s c a n l i n e b e g i n	e n d	A l t i t u d e f e e t / m e t e r	Scan S p e e d (rps)	t o t a l G o o d s c a n l i n e s	t o t a l I n t e r p o l a t e d s c a n l i n e s	t o t a l R e p e a t e d s c a n l i n e s
C-D	17:27: 8.0	17:30: 4.0	101594	103902	65000/19812	12.50	2201	0	8
E-F	19:16: 1.0	19:18:14.0	183400	185072	65000/19812	12.50	1671	0	2
G-H	19:26: 8.0	19:28:24.0	190990	192690	65000/19812	12.50	1701	0	0



FLIGHT 91-088 14 May 1991 A/C 706 AVIRIS / TMS / TIMS / RC-10







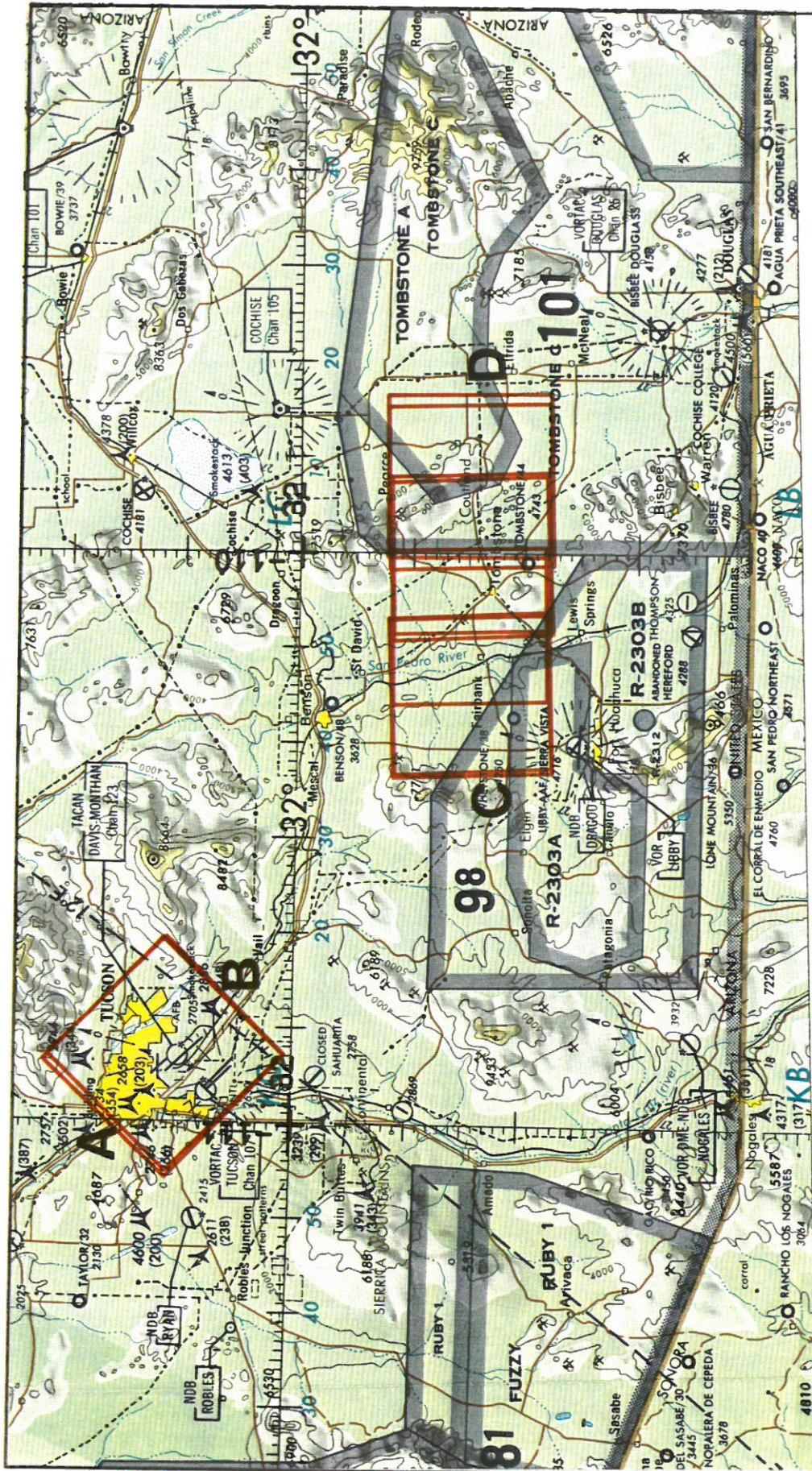
FLIGHT 91-088

14 May 1991

A/G 706

TMS Coverage

JNC 43



110° L

+ 31  
- 110

111° K

+ 31  
- 111

