

## FLIGHT SUMMARY REPORT

**Flight Number:** 96-134  
**Calendar/Julian Date:** 14 June 1996 • 166  
**Sensor Package:** Dual Wild-Heerbrugg RC-10  
Airborne Visible and Infrared Imaging  
Spectrometer (AVIRIS)  
**Area(s) Covered:** Oregon/Washington (AVIRIS sites)

**Investigator(s):** Green and Abrams, JPL; Ustin, UC Davis  
Cohen, USFS **Aircraft #:** 708

### SENSOR DATA

<b>Accession #:</b>	05089	05090	----
<b>Sensor ID #:</b>	026	076	099
<b>Sensor Type:</b>	RC-10	RC-10	AVIRIS
<b>Focal Length:</b>	12" 304.97 mm	12" 304.89 mm	----
<b>Film Type:</b>	Aerochrome IR SO-060	Aerochrome IR SO-060	----
<b>Filtration:</b>	Wratten 12	Wratten 12	----
<b>Spectral Band:</b>	510-900 nm	510-900 nm	----
<b>f Stop:</b>	11	8	----
<b>Shutter Speed:</b>	1/275	1/550	----
<b># of Frames:</b>	92	47	----
<b>% Overlap:</b>	60	60	----
<b>Quality:</b>	Excellent	Excellent	----
<b>Remarks:</b>	Camera clock offset 39 seconds from navigation data	Camera clock offset 1.35 minutes from navigation 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(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  $\mu\text{m}$ ).

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.

## 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

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for NASA-Ames aircraft acquired photographic and digital imagery. 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).

Additional information regarding ER-2 acquired photographic and digital data is available through the Aircraft Data Facility at Ames Research Center. For specific information regarding flight documentation, sensor parameters, and areas of coverage contact the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 415-604-6252).

**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 96-134**

Accession # 05089

Sensor # 026

Page 1/2

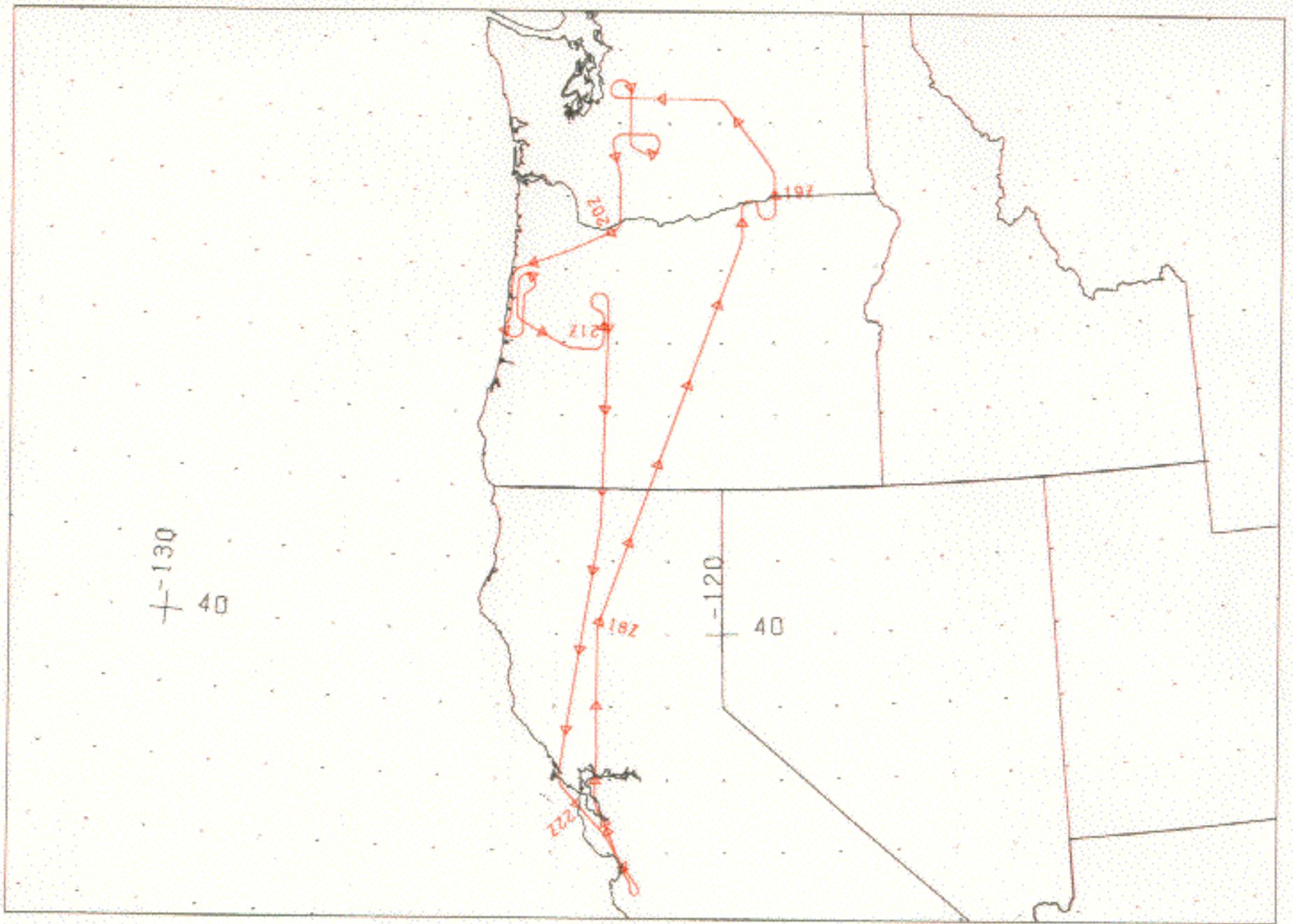
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - C	6582-6588	18:49:35	18:52:24	63857/19464	Clear
D - E	6589-6596	18:59:31	19:02:48	63425/19332	Clear
F - G	6597-6605	19:21:45	19:25:29	64056/19524	Minor-20% scattered cumulus (frames 6603-6605)
H - I	6606-6613	19:33:50	19:37:06	64200/19568	Minor-10% cumulus (frames 6606-6612)
J - K	6614-6619	19:44:45	19:47:05	64417/19634	10-20% cumulus (frames 6618-6619)
L - M	6620-6629	19:54:52	19:59:04	64470/19650	Clear
N - O	6630-6636	20:15:17	20:18:04	64814/19755	Thin cirrus (frames 6635-6636)
P - Q	6637-6643	20:24:39	20:27:26	64886/19777	Very thin cirrus (frame 6643)
R - S	6644-6650	20:33:36	20:36:24	64614/19694	Clear
T - U	6651-6656	20:49:16	20:51:35	65500/19964	Clear; oblique (frame 6651)

**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 96-134**

Accession # 05090

Sensor # 076

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
B - C	1492-1495	18:51:48	18:53:14	63900/19477	Clear
D - E	1496-1504	19:00:09	19:03:38	63389/19321	Clear
F - G	1505-1513	19:22:23	19:25:52	64022/19514	10-20% scattered cumulus (frames 1512-1513)
H - I	1514-1522	19:34:28	19:37:57	64233/19578	Minor cumulus (frames 1514-1521)
J - K	1523-1529	19:45:23	19:47:53	64371/19620	10-20% cumulus (frames 1528-1529)
X - Y	1530-1538	21:09:49	21:13:18	66244/20191	10% cumulus (frames 1533-1535 and 1537-1538)

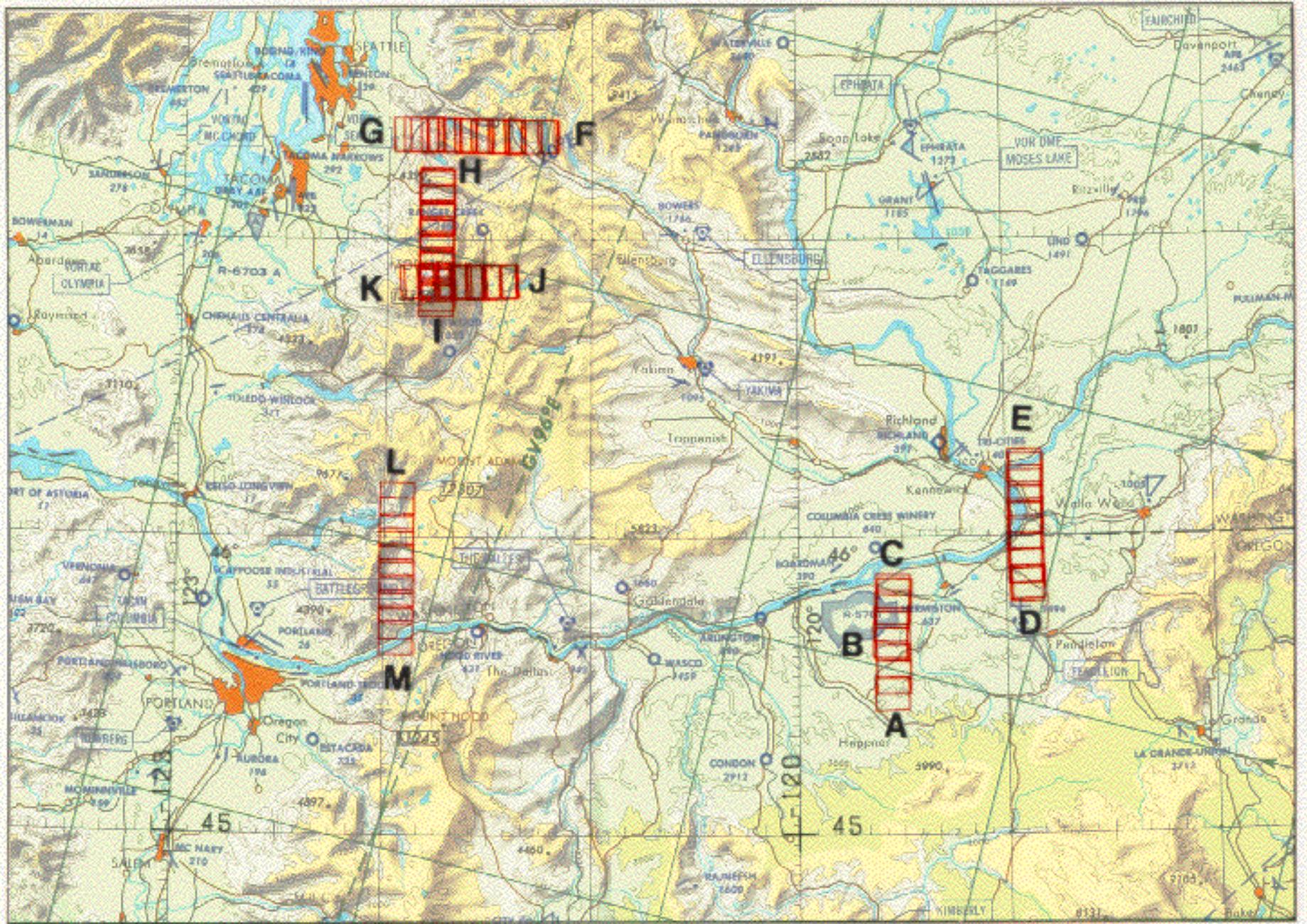


FLIGHT 96-134

14 JUNE 1996

A/C 708

RC-10 / AVIRIS



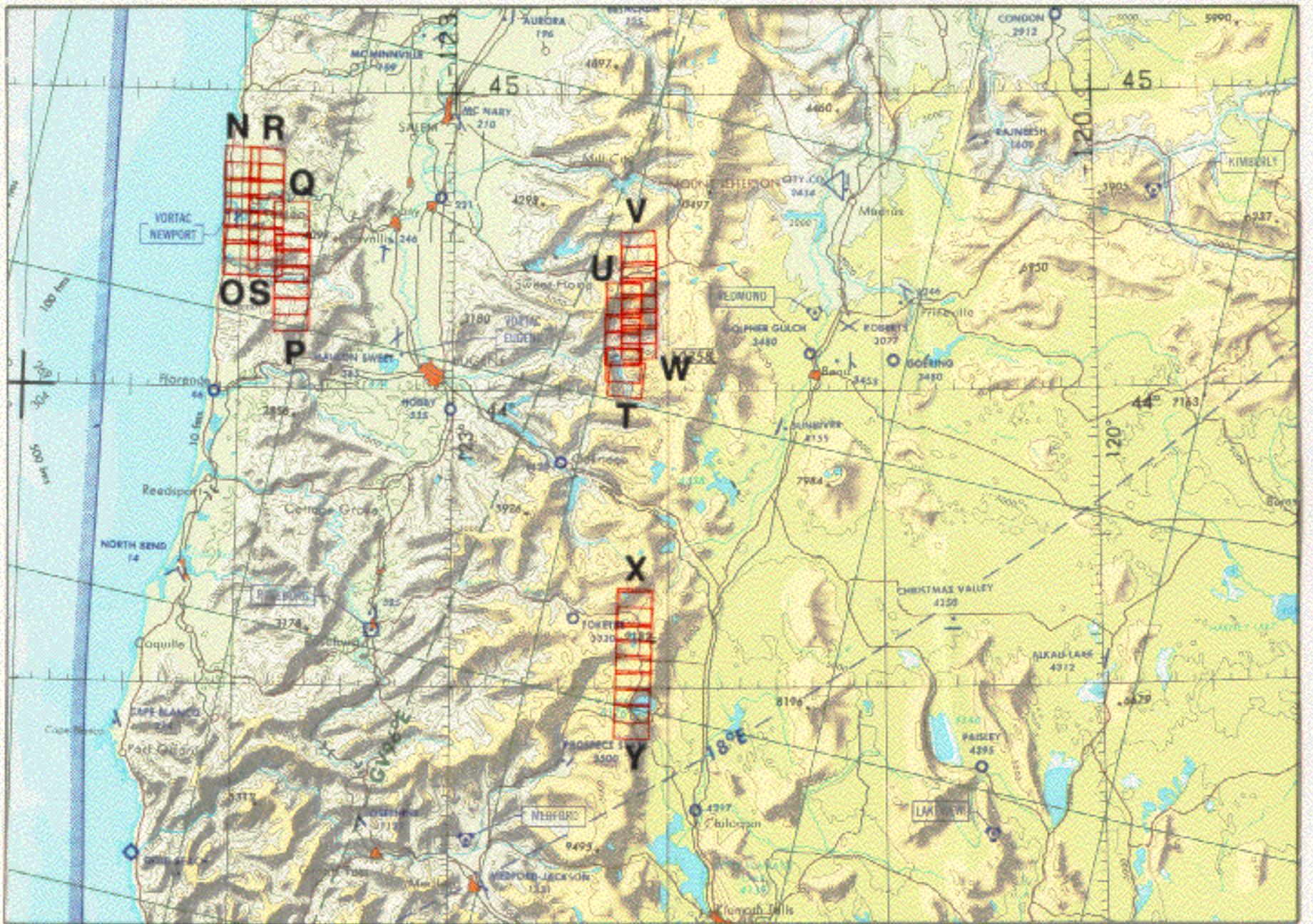
FLIGHT 96-134

14 JUNE 1996

A/C 708

DUAL RC-10 / AVIRIS

JNC 43



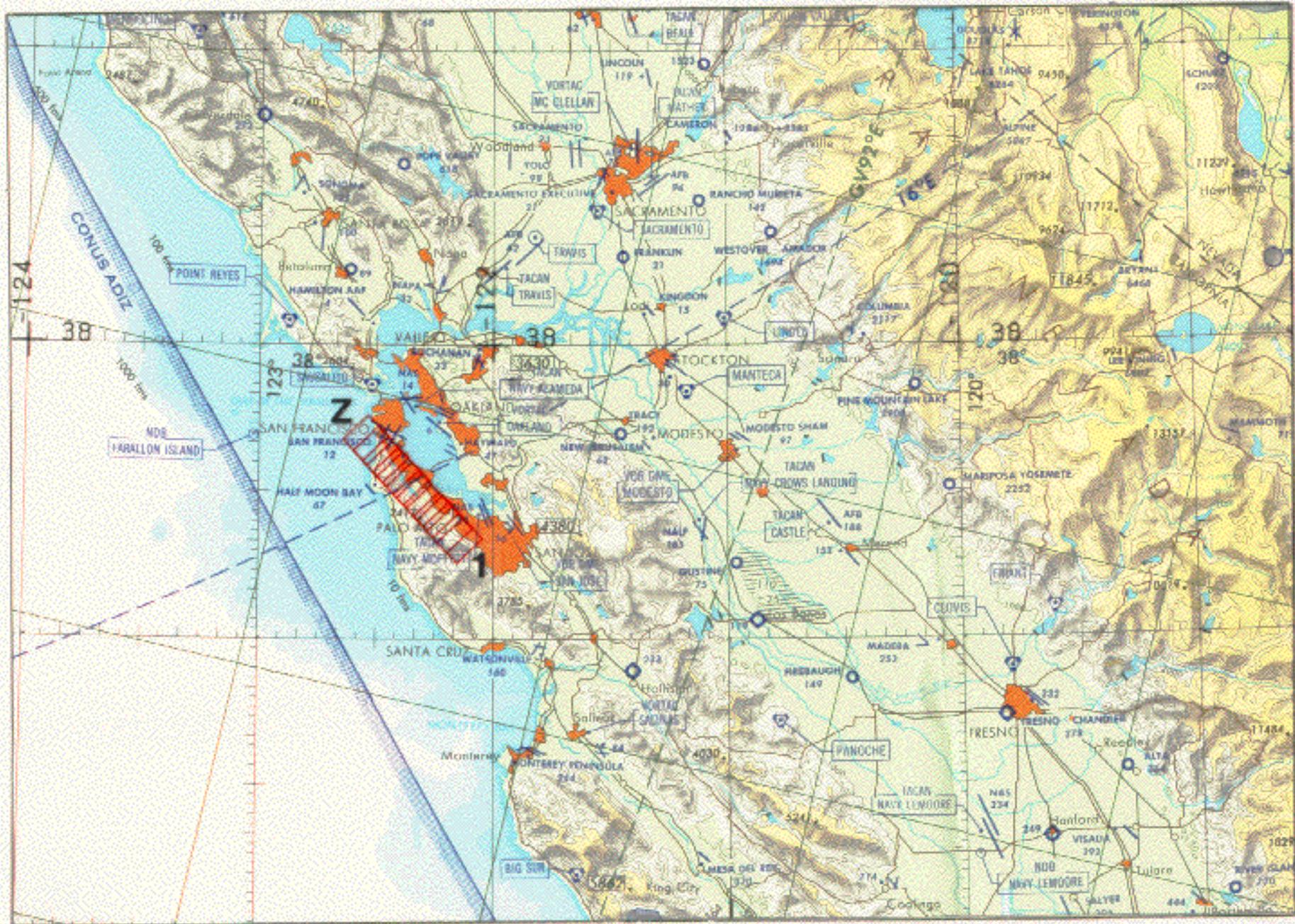
FLIGHT 96-134

14 JUNE 1996

R/C 708

RC-10 / AVIRIS

JNC 43



FLIGHT 96-134

14 JUNE 1996

R/C 708

RC-10 / RV1R15

J/C 43