FLIGHT SUMMARY REPORT

Flight Number: 98-080

Calendar/Julian Date: 18 June 1998 • 169

Sensor Package: Wild Heerbrugg RC-10
Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)
Modis Airborne Simulator (MAS)

Area(s) Covered: Nevada/Southern California

Investigator(s): Green, JPL; Keller, U of Texas; Dozier and Robers, UCSB; Martinez, U of Colorado

Aircraft #: 809

SENSOR DATA

Accession #:	05260	-----	-----
Sensor ID #:	034	099	108
Sensor Type:	RC-10	AVIRIS	MAS-50
Focal Length:	12” 304.66 mm	-----	-----
Film Type:	Aerochrome IR SO-134	-----	-----
Filtration:	Wratten 12	-----	-----
Spectral Band:	510-900 nm	-----	-----
f Stop:	11	-----	-----
Shutter Speed:	1/325	-----	-----
# of Frames:	121	-----	-----
% Overlap:	60	-----	-----
Quality:	Good	-----	-----
Remarks:	Subtract 32 seconds for correct UTC		

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.

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 mm).

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 mm
Pixels/Scan Line:	614
Number of Spectral Bands:	224
Digitization:	10-bits
Data Rate:	17 MBPS

Spectrometer	Wavelength Range	Number of Bands	Sampling Interval
1	0.41 - 0.70 mm	31	9.4 nm
2	0.68 - 1.27 mm	63	9.4 nm
3	1.25 - 1.86 mm	63	9.7 nm
4	1.84 - 2.45 mm	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.

MODIS Airborne Simulator

The MODIS Airborne Simulator (MAS) is a modified Daedalus multispectral scanner configured to replicate the capabilities of the Moderate-Resolution Imaging Spectrometer (MODIS), an instrument to be orbited on an EOS platform. MODIS is designed for the measurement of biological and physical processes and atmospheric temperature sounding. The MODIS Airborne Simulator records fifty 16-bit channels of multispectral data and is configured as follows:

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
1	0.4649	0.0397	0.4451-0.4848
2	0.5494	0.0417	0.5285-0.5703
3	0.6550	0.0511	0.6294-0.6805
4	0.7024	0.0415	0.6816-0.7231
5	0.7431	0.0420	0.7221-0.7641
6	0.8248	0.0427	0.8034-0.8461
7	0.8667	0.0414	0.8460-0.8874
8	0.9072	0.0409	0.8867-0.9276
9	0.9476	0.0397	0.9277-0.9674
10	1.6422	0.0519	1.6163-1.6682
11	1.6975	0.0505	1.6722-1.7228
12	1.7499	0.0506	1.7245-1.7752
13	1.8014	0.0491	1.7768-1.8259
14	1.8548	0.0489	1.8303-1.8792
15	1.9044	0.0487	1.8801-1.9288
16	1.9553	0.0483	1.9312-1.9794
17	2.0048	0.0487	1.9804-2.0291
18	2.0551	0.0484	2.0309-2.0793
19	2.1037	0.0486	2.0794-2.1280
20	2.1532	0.0483	2.1291-2.1774
21	2.2019	0.0481	2.1779-2.2259
22	2.2522	0.0486	2.2278-2.2675
23	2.3021	0.0487	2.2777-2.3265
24	2.3512	0.0476	2.3274-2.3750
25	2.4005	0.0483	2.3764-2.4246

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
26	3.1192	0.1616	3.0384-3.2000
27	3.2809	0.1486	3.2066-3.3552
28	3.4330	0.1617	3.3521-3.5138
29	3.5940	0.1539	3.5170-3.6709
30	3.7449	0.1449	3.6724-3.8174
31	3.9069	0.1602	3.8267-3.9870
32	4.0707	0.1554	3.9929-4.1484
33	4.1699	0.0669	4.1365-4.2034
34	4.4029	0.1255	4.3401-4.4656
35	4.5404	0.1512	4.4648-4.6160
36	4.6979	0.1591	4.6184-4.7775
37	4.8536	0.1516	4.7778-4.9294
38	5.0033	0.1468	4.9298-5.0767
39	5.1588	0.1400	5.0888-5.2288
40	5.3075	0.1327	5.2412-5.3738
41	5.3977	0.0755	5.3590-5.4365
42	8.5366	0.3950	8.3391-8.7341
43	9.7224	0.5365	9.4541-9.9906
44	10.5071	0.4579	10.278-10.736
45	11.0119	0.4710	10.776-11.247
46	11.9863	0.4196	11.776-12.196
47	12.9013	0.3763	12.713-13.089
48	13.2702	0.4584	13.041-13.500
49	13.8075	0.5347	13.540-14.075
50	14.2395	0.3775	14.051-14.428

NOTE: Bandpass centers approximate

Sensor/Aircraft Parameters:

Spectral Bands:	50 (digitized to 16-bit resolution)
IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meter at 65,000 feet)
Swath Width:	22.9 nmi/19.9 nmi (36 km)
Total Scan Angle:	85.92^{o}
Pixels/Scan Line:	716
Scan Rate:	6.25 scans/second
Ground Speed:	400 kts (206 m/second)
Roll Correction:	Plus or minus 3.5 degrees (approx.)

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).

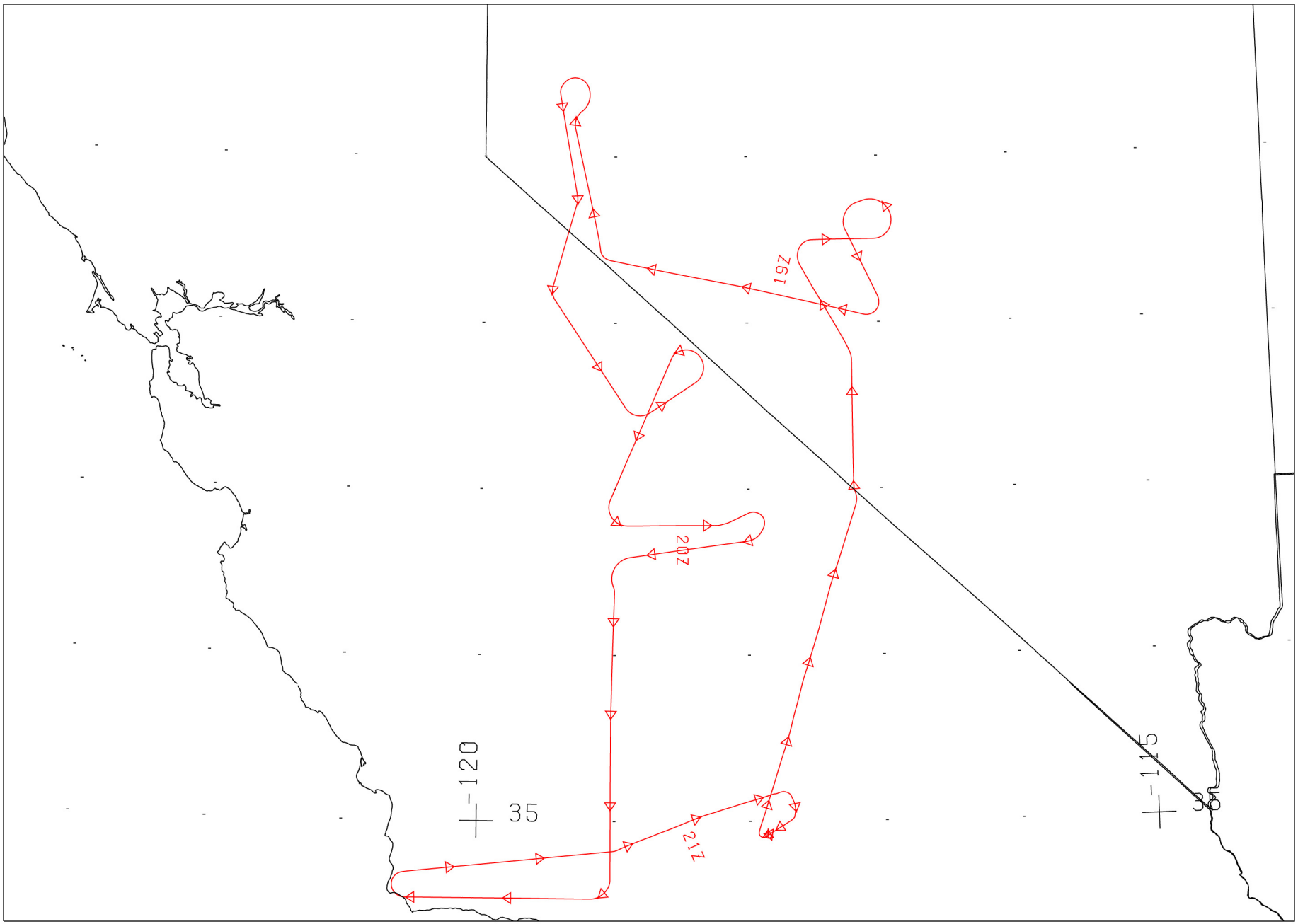
Additional information regarding ER-2 acquired photographic and digital data is available through the Airborne Sensor Facility at Ames Research Center. For specific information regarding flight documentation, sensor parameters, and areas of coverage contact the Airborne Sensor Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 650-604-6252).

CAMERA FLIGHT LINE DATA
FLIGHT NO. 98-080

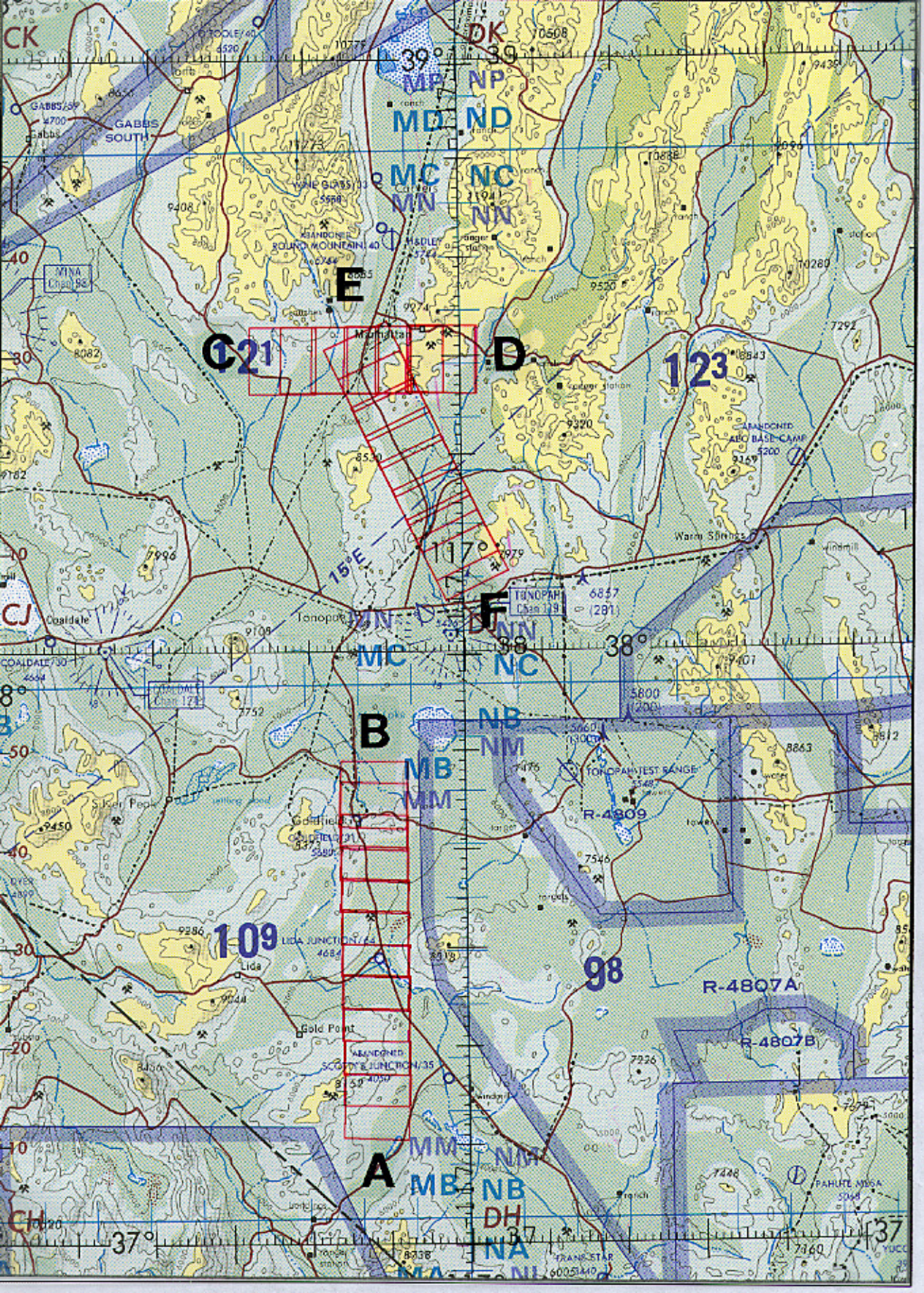
Accession # 05260

Sensor # 034

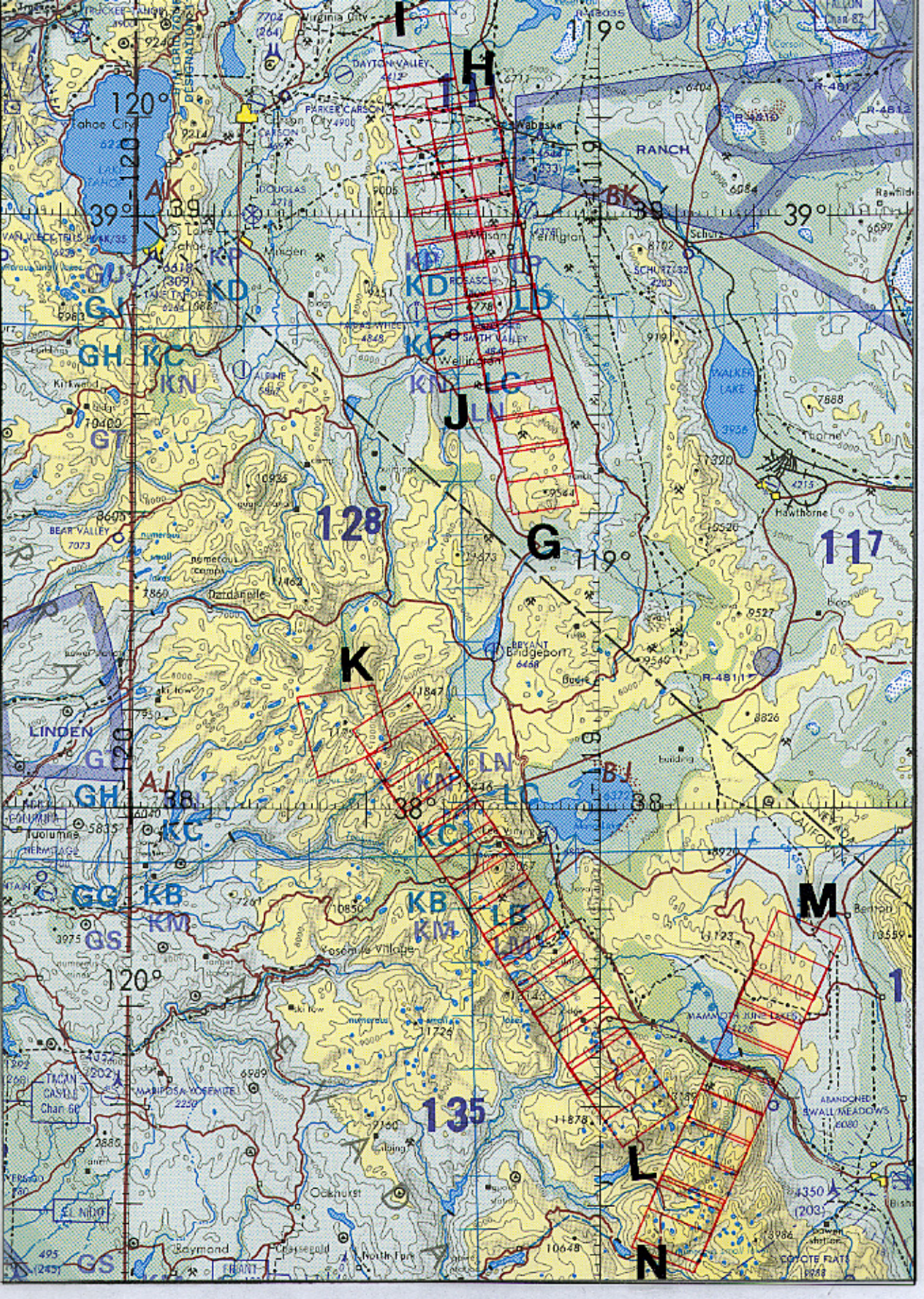
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	7015-7025	18:29:25	18:34:05	64045/19521	Clear
C - D	7026-7032	18:42:27	18:44:54	64900/19782	Clear
E - F	7033-7040	18:51:27	18:54:39	66012/20120	Clear
G - H	7041-7053	19:11:28	19:16:50	64469/19650	Clear
I - J	7054-7064	19:22:29	19:27:03	65227/19881	Clear
K - L	7065-7080	19:32:38	19:39:42	65931/20096	Clear; oblique (frame 7065)
M - N	7081-7091	19:48:06	19:52:28	65291/19901	Clear; emulsion abrasion (frame 7081)
O - P	7092-7101	19:58:17	20:02:30	65390/19931	Clear
Q - R	7102-7114	20:07:03	20:12:41	65123/19849	Clear; oblique (frame 7102)
S - T	7115-7135	20:32:31	20:41:50	65262/19892	Minor-20% coastal stratus (frames 7127-7135); oblique (frame 7115)

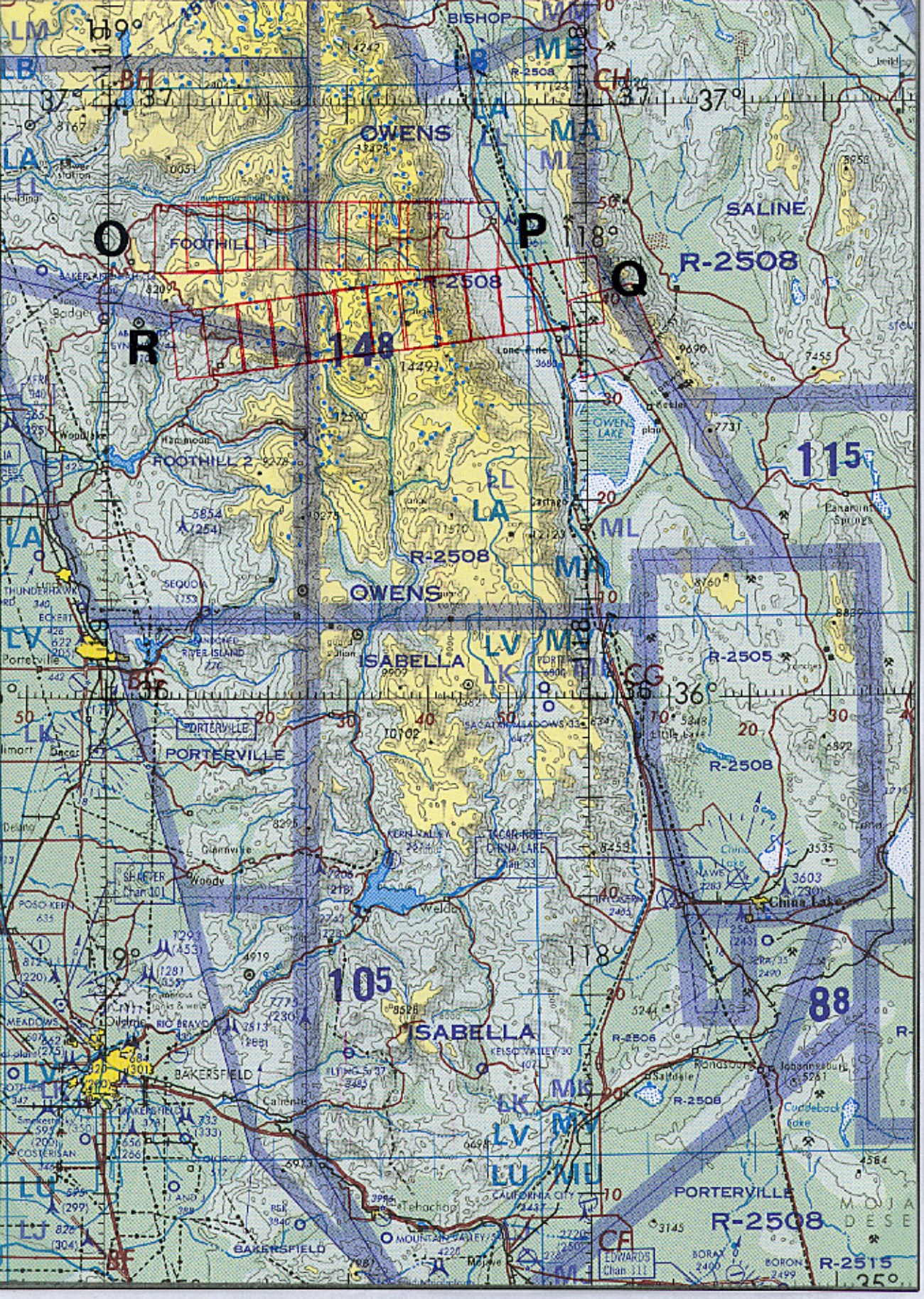


FLIGHT 98-080 18 JUNE 1998 A/C 809 RC-10 / AVIRIS / MAS-50



FLIGHT 98-080 18 JUNE 1998 A/C 809 RC-10 / AVIRIS ONC G-18


FLIGHT 98-080
18 JUNE 1998
A/C 809
RC-10 / AVIRIS
ONC G-18
I
H
J
G
K
L
M
N
120°
119°
39°
38°
128
117
135
1
Virginia City
DAYTON VALLEY
PARKER/CARSON
Carson City
Lake Tahoe
Tahoe City
Minden
Gardnerville
Wabuska
RANCH
Yerington
Schurz
Wellington
SMITH VALLEY
WALKER LAKE
Hawthorne
BEAR VALLEY
Dardanelle
Bridgeport
BRYANT
LINDEN
Sonora
Yosemite Village
Oakhurst
Raymond
Chaseguld
North Fork
Mammoth Lakes
ABANDONED MEADOWS
COYOTE FLATS
EL NIDO
TWAIN CASTLE
Chan 66
MARIPOSA-YOSEMITE
R-4811
R-4812
R-4813
R-4813B
R-4811A
AK
KP
KD
GJ
GK
GH
KC
KN
GT
LP
LS
LC
LN
BK
GS
KB
KM
LB
GG
AL
BJ
CS



FLIGHT 98-080 18 JUNE 1998 A/C 809 RC-10 / AVIRIS ONC G-18

FLIGHT 98-080 18 JUNE 1998 A/C 809 RC-10 / AVIRIS ONC G-18