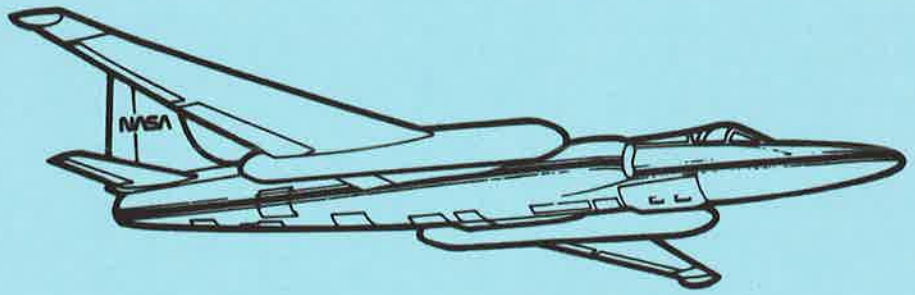
SCIENCE AND APPLICATIONS AIRCRAFT DIVISION

AIRBORNE SCIENCE AND APPLICATIONS PROGRAM



ER-2
FLIGHT SUMMARY REPORT

NASA
National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, California 94035-1000

Aircraft Data Facility
NASA-Ames Research Center
Mail Stop 240-6
Moffett Field, California 94035-1000
(415) 604-6252 • FTS 464-6252

FLIGHT SUMMARY REPORT

Flight Number: 93-116

Calendar/Julian Date: 13 August 1993 • 225

Sensor Package: Wild-Heerbrug RC-10
Thematic Mapper Simulator (TMS)

Area(s) Covered: Central Valley, California

Investigator(s): Penberth, California State Dept. of Conservation Farmland Mapping Bureau

Aircraft #: 709

SENSOR DATA

Accession #:	04617	-----
Sensor ID #:	036	074
Sensor Type:	RC-10	TMS
Focal Length:	6" 153.19 mm	-----
Film Type:	High Definition Aerochrome IR SO-131	-----
Filtration:	2.2 AV + cc.10B	-----
Spectral Band:	510-900 nm	-----
f Stop:	4	-----
Shutter Speed:	1/75	-----
# of Frames:	297	-----
% Overlap:	60	-----
Quality:	Excellent	Good
Remarks:	Camera clock offset 0.8 seconds 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.

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:

Daedalus Channel	TM Band	Wavelength, μm
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)

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-Heerbrug 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. 93-116

Accession # 04617

Sensor # 036

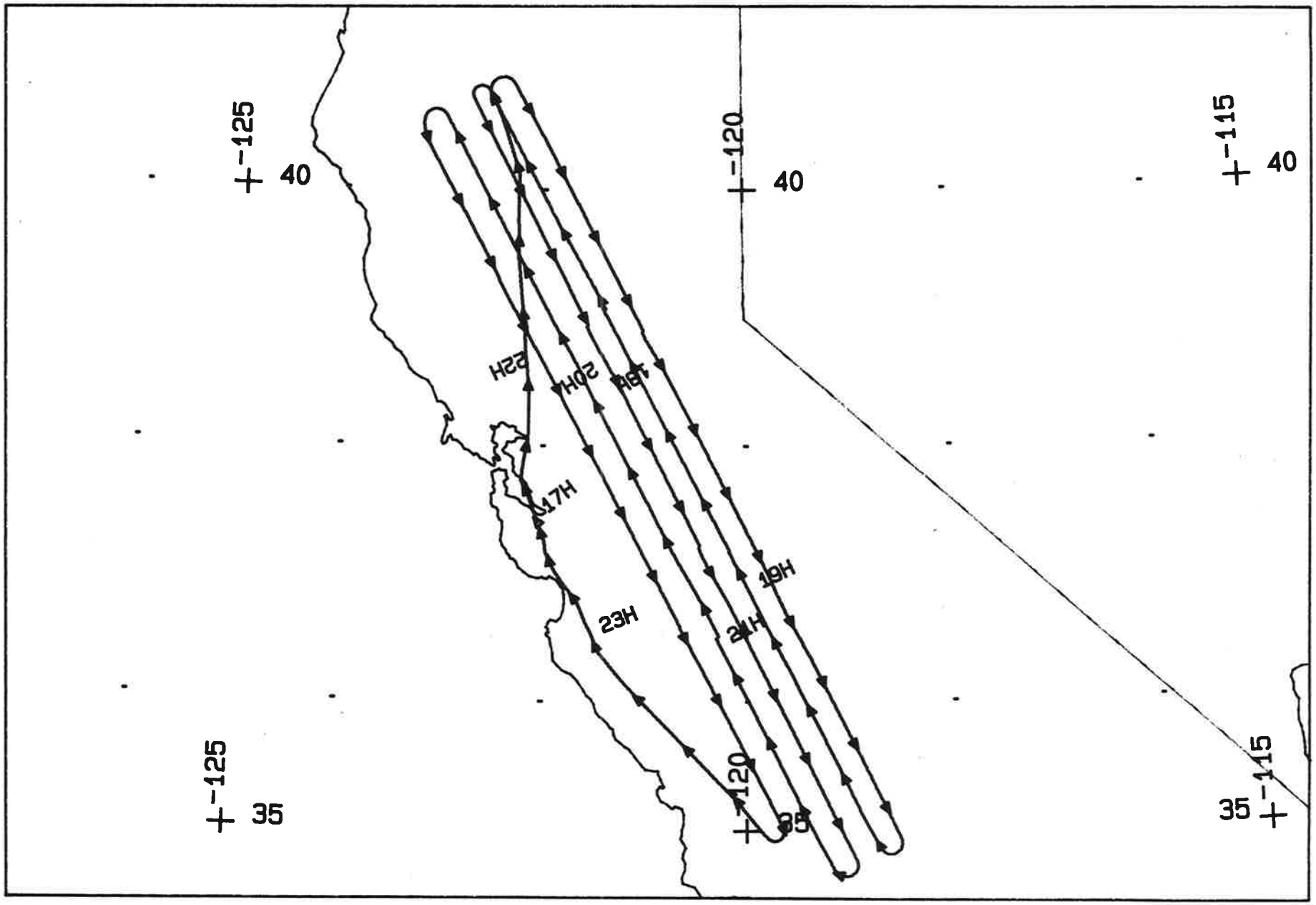
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	7908-7969	17:38:48	18:38:08	65000/19800	Clear
C - D	7970-8028	18:41:19	19:37:26	"	10-20% cumulus (frames 8027-8028)
E - F	8029-8091	19:40:24	20:40:21	"	20% cumulus (frames 8029-8031)
G - H	8092-8149	20:44:57	21:39:50	"	10-40% cumulus (frames 8142-8149)
I	8150	21:44:51	_____	"	30% cumulus
J - K	8151-8204	21:49:15	22:39:07	"	10-30% cumulus (frames 8151-8155); very minor cumulus (frames 8159-8160); 10% cumulus (frames 8187-8189); oblique (frames 8203-8204)

TMS SCANNER FLIGHT LINE DATA

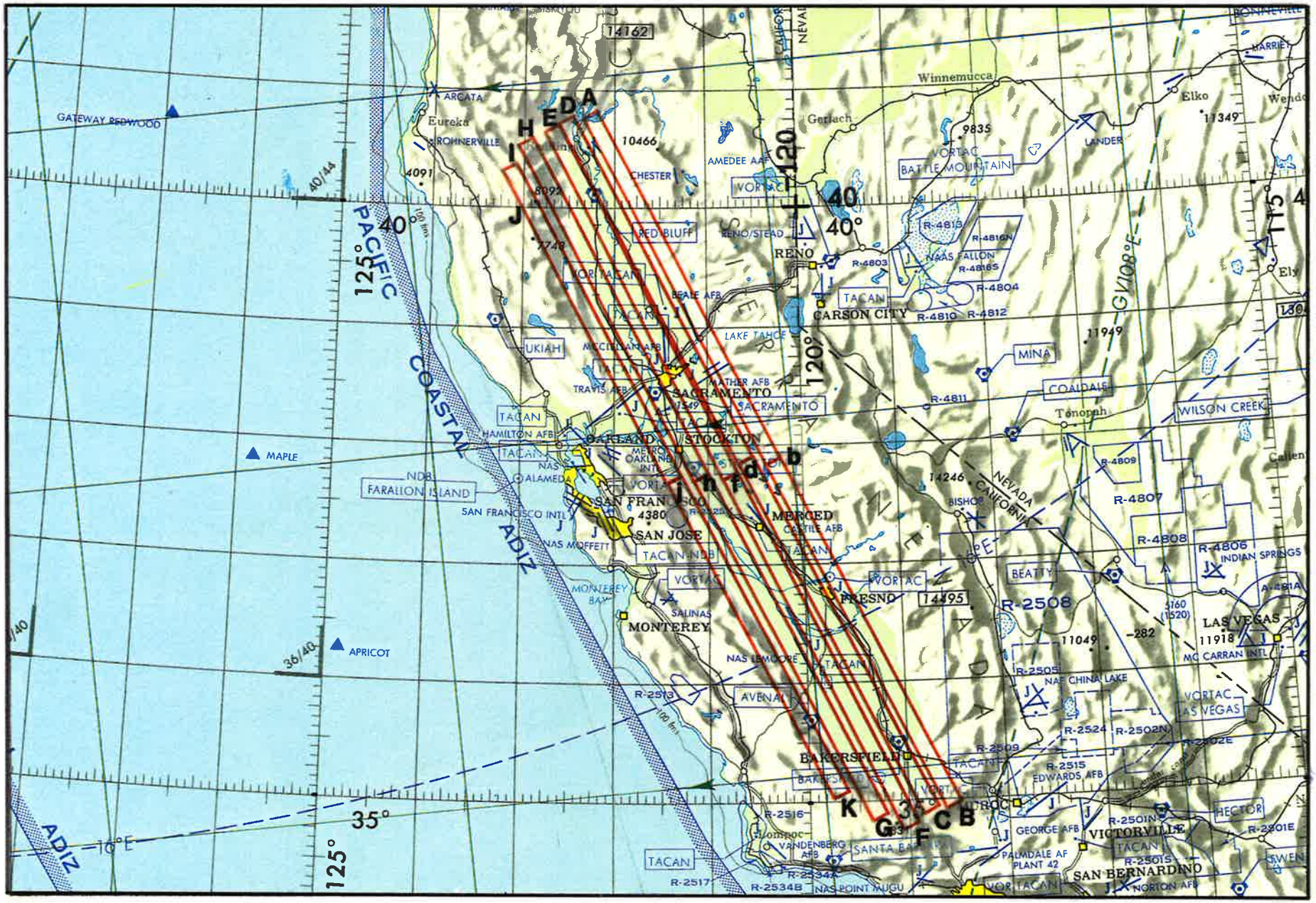
FLIGHT NO. 93-116

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 93-116

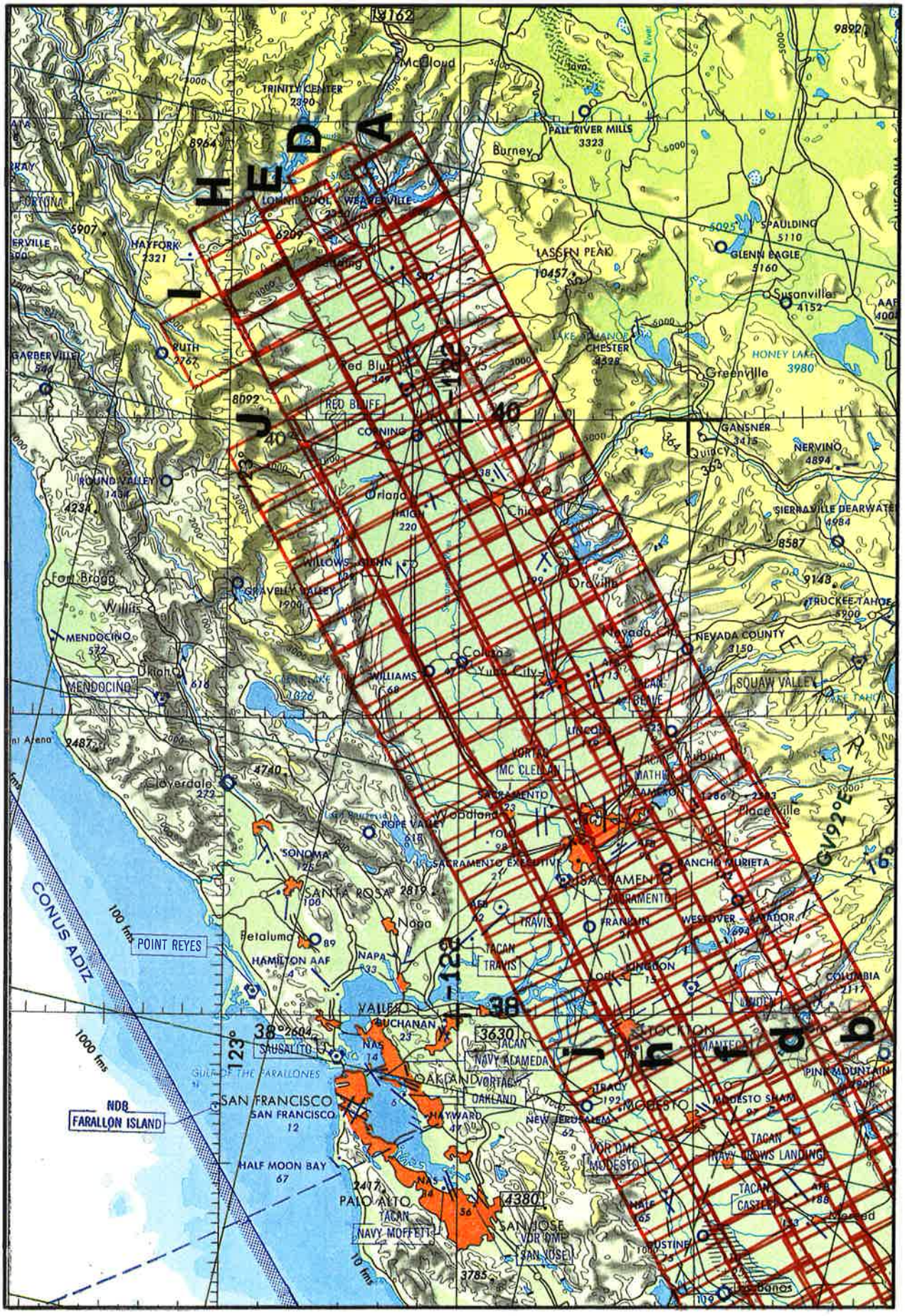
Check Points	Actual time (GMT) begin	Actual time (GMT) end	Actual scanline begin	Actual scanline end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
A-b	17:38:57.8	18:08:41.8	35546	57846	65000/19812	12.50	22300	1	0
b-B	18:08:41.8	18:38:25.8	57847	80147	65000/19812	12.50	22300	1	0
C-d	18:41:43.8	19:09:35.8	82622	103511	65000/19812	12.50	20889	1	0
d-D	19:09:35.8	19:37:20.8	103512	124400	65000/19812	12.50	20887	2	0
E-f	19:45: 4.8	20:15: 7.8	126380	148911	65000/19812	12.50	22531	1	0
f-F	20:15: 7.8	20:45: 9.8	148912	171443	65000/19812	12.50	22513	0	19
G-h	20:44:54.8	21:12:22.8	175007	195599	65000/19812	12.50	20592	1	0
h-H	21:12:22.8	21:39:45.8	195600	216191	65000/19812	12.50	20591	1	0
I-J	21:44: 3.8	22:11:18.8	219359	239798	65000/19812	12.50	20440	0	0
J-K	22:11:18.8	22:38:33.8	239799	260237	65000/19812	12.50	20426	1	12



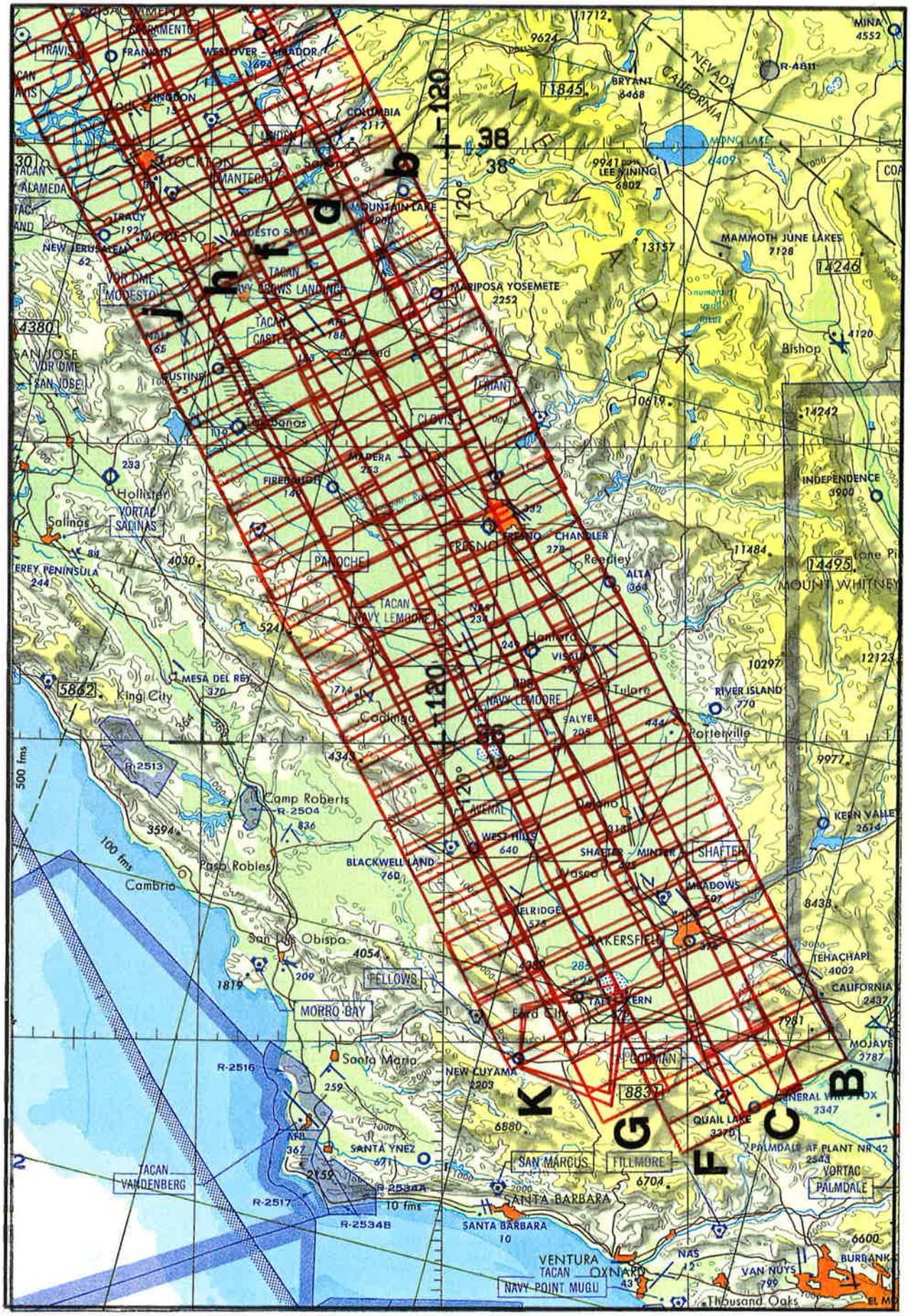
FLIGHT 93-116 13 AUGUST 1993 RC-10 / TMS



FLIGHT 93-116 13 AUGUST 1993 A/C 709 TMB ONC 2



FLIGHT 93-116 13 AUGUST 1993 RC-10 JNC 43



FLIGHT 93-116 13 AUGUST 1993 RC-10 JNC 43