

FLIGHT SUMMARY REPORT

Flight Number: 93-113
Calendar/Julian Date: 02 June 1993 • 153
Sensor Package: Wild-Heerbrug RC-10
Dual Hycon HR-732
Airborne Ocean Color Imager (AOCI)
Electro-Optic Camera System (EOC)
Area(s) Covered: Napa Valley, California

Investigator(s): Functional Sensor Flight

Aircraft #: 708

SENSOR DATA

Accession #:	04570	04571	4572
Sensor ID #:	034	020	039
Sensor Type:	RC-10	HR-732	HR-732
Focal Length:	12" 304.66 mm	24" 609 mm	24" 609 mm
Film Type:	High Definition Aerochrome IR SO-131	High Definition Aerochrome IR SO-131	Aerochrome IR SO-134
Filtration:	cc.10B	cc.10B	Wratten 12
Spectral Band:	510-900 nm	510-900 nm	510-900 nm
f Stop:	4	8	11
Shutter Speed:	1/150	1/75	1/325
# of Frames:	4	10	10
% Overlap:	60	60	60
Quality:	Excellent	Excellent	Fair
Remarks:	Camera clock offset 9.15 minutes from navigation data	Camera clock offset 9.25 minutes from navigation data	Data overexposed; camera clock offset 9.20 minutes from navigation data

93-113
SENSOR DATA continued

Accession #:	----	----
Sensor ID #:	090	111
Sensor Type:	AOCI	EOC
Focal Length:	----	----
Film Type:	----	----
Filtration:	----	----
Spectral Band:	----	----
f Stop:	----	----
Shutter Speed:	----	----
# of Frames:	----	----
% Overlap:	----	----
Quality:	Fair	----
Remarks:	Data offset 9 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 Ocean Color Imager

The Airborne Ocean Color Imager (AOCI) is a high altitude multispectral scanner designed for oceanographic remote sensing. It provides 10-bit digitization of eight bands in the visible/near-infrared region of the spectrum, plus two 8-bit bands in the near and thermal infrared. The bandwidths are as follows:

<u>Channel</u>	<u>Wavelength, μm</u>
1	0.436 - 0.455
2	0.481 - 0.501
3	0.511 - 0.531
4	0.554 - 0.575
5	0.610 - 0.631
6	0.655 - 0.676
7	0.741 - 0.800
8	0.831 - 0.897
9	0.989 - 1.054
10	8.423 - 12.279

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	85°
Swath Width:	19.6 nmi (36.3 km) at 65,000 feet
Pixels/Scan Line:	716
Scan Rate:	6.25 scans/second
Ground Speed:	400 kts (206 m/second)
Digitization:	8-bit channels 9-10 10-bit channels 1-8

Information on data tape format, logical record format, and scanner calibration data may be obtained from the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 415-604-6252).

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).

Electro-Optic Camera System

The NASA-Ames High Definition Electro-Optic Camera System (EOC) is an experimental sensor under development by the High Altitude Missions Branch at NASA-Ames Research Center. The system captures high resolution digitized images from a solid-state video camera and stores the imagery on magnetic tape. System characteristics are as follows:

CCD Video Camera

IFOV:	0.2 mrad
Ground Resolution:	15.8 feet (4.81 meters at 65,000 feet)
Total Scan Angle:	13.96°
Swath Width:	3.3 nmi (6.2 km) x 2.7 nmi (4.9 km) at 65,000 feet
Spectral Coverage:	400-900 nm
Frame Size:	1280 pixels x 1025 pixels
Lens (Interchangeable):	28 mm
Shutter Speed:	Selectable
Aperture:	f/2.8
Filtration:	4 and 6 position filter wheels (4 and 6 spectral filters)

Tracking Capability: Polarizing Filter
Tilt 45° fore and aft

Data Collection

Frame Rate: 1 image every 3 seconds
Frame Overlap: 90% (to 40% w/6 filters)
Data Storage: Tape Cassette
Capacity: 5.0 Gbytes

For further information contact Ted Hildum at NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000.

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). Additional information regarding ER-2 acquired photographic and digital data is also available through the Aircraft Data Facility.

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-113**

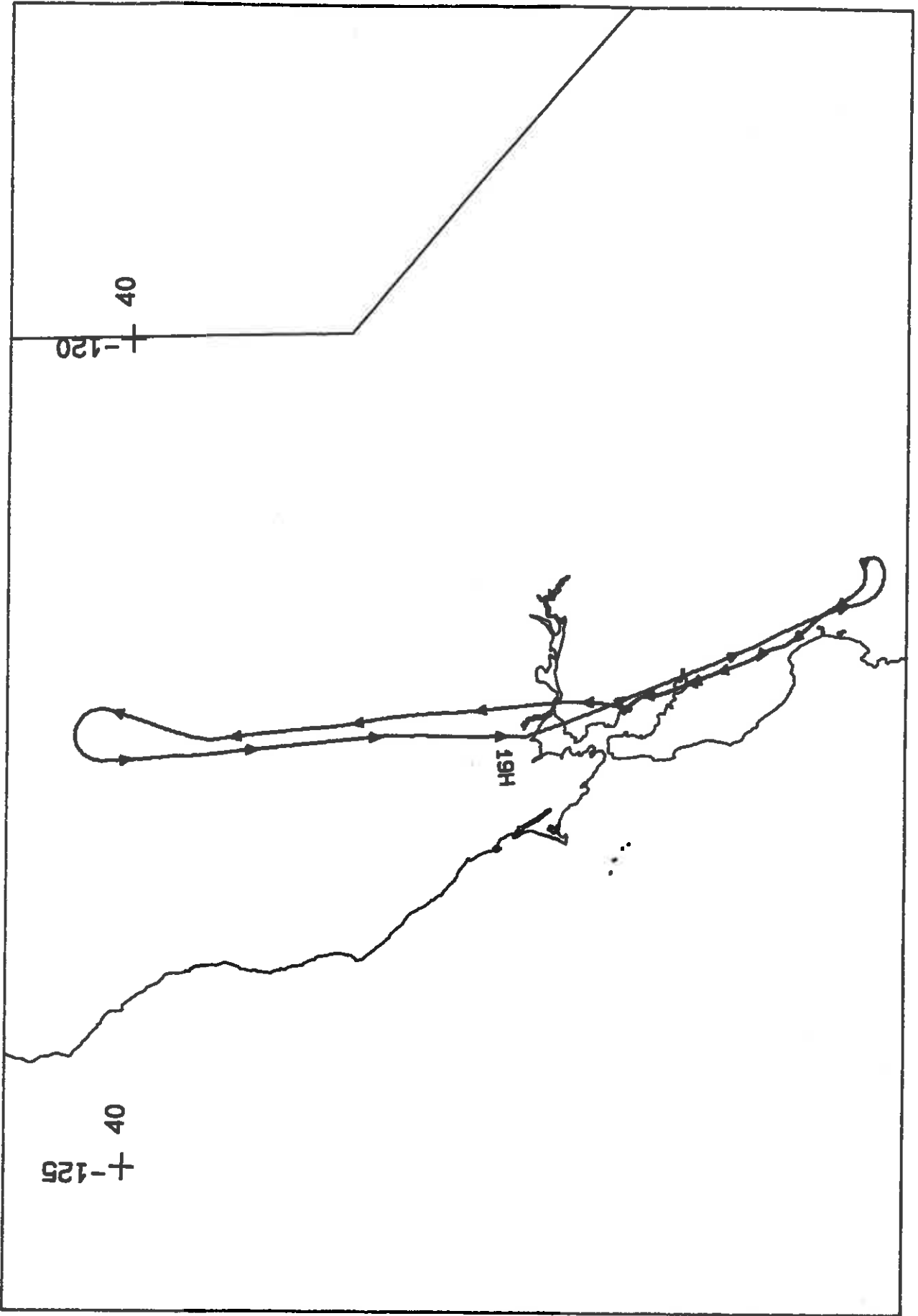
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
Accession # 04570 Sensor # 034 A - B	8093-8096	18:49:22	18:50:47	65000/19800	40% scattered cumulus
Accession # 04571 Sensor # 020 A - B	0001-0010	18:48:53	18:51:01	65000/19800	30-50% scattered cumulus
Accession # 04572 Sensor # 039 A - B	0001-0010	18:48:53	18:51:04	65000/19800	30-50% scattered cumulus

AOCI SCANNER FLIGHT LINE DATA

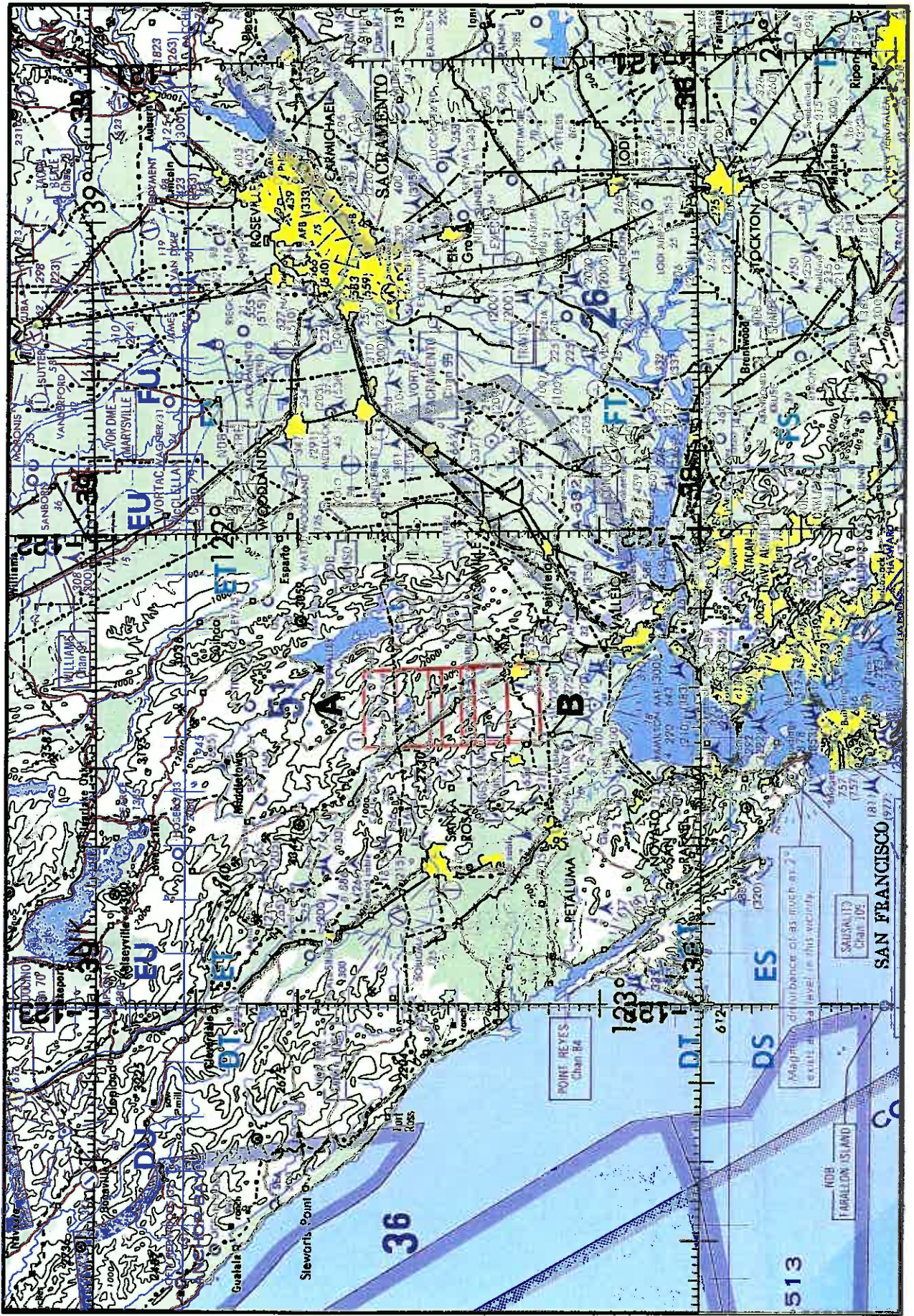
FLIGHT NO. 93-113

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Point	Station	Code	Station	Code	Station	Code	Station	Code
001	0000000000	0000	0000000000	0000	0000000000	0000	0000000000	0000



FLIGHT 93-113 2 JUN 1993 A/C 708 DUAL HR-732 EO CAMERA AOCI



FLIGHT 99-113 2 JUNE 1989 A/C 708 RC-10 / DUAL H752 / ADC1 ONC 0-15