

# FLIGHT SUMMARY REPORT

**Flight Number:** 93-122  
**Calendar/Julian Date:** 06 June 1993 • 157  
**Sensor Package:** Wild-Heerbrug RC-10  
Airborne Ocean Color Imager (AOCI)  
Electro-Optic Camera System (EOC)  
**Area(s) Covered:** Gulf of Mexico

**Investigator(s):** MacDonald, Texas A&M

**Aircraft #:** 708

## SENSOR DATA

<b>Accession #:</b>	04573	----	----
<b>Sensor ID #:</b>	034	090	111
<b>Sensor Type:</b>	RC-10	AOCI	EOC
<b>Focal Length:</b>	12" 304.66 mm	----	----
<b>Film Type:</b>	Aerial Color SO-242	----	----
<b>Filtration:</b>	None	----	----
<b>Spectral Band:</b>	400-700 nm	----	----
<b>f Stop:</b>	4	----	----
<b>Shutter Speed:</b>	1/200	----	----
<b># of Frames:</b>	115	----	----
<b>% Overlap:</b>	60	----	----
<b>Quality:</b>	Excellent	Fair	----
<b>Remarks:</b>	Processing marks throughout data; camera clock offset 9.21 minutes from navigation data	Time offset 9.26 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, <math>\mu\text{m}</math></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. 93-122**

Accession # 04573

Sensor # 034

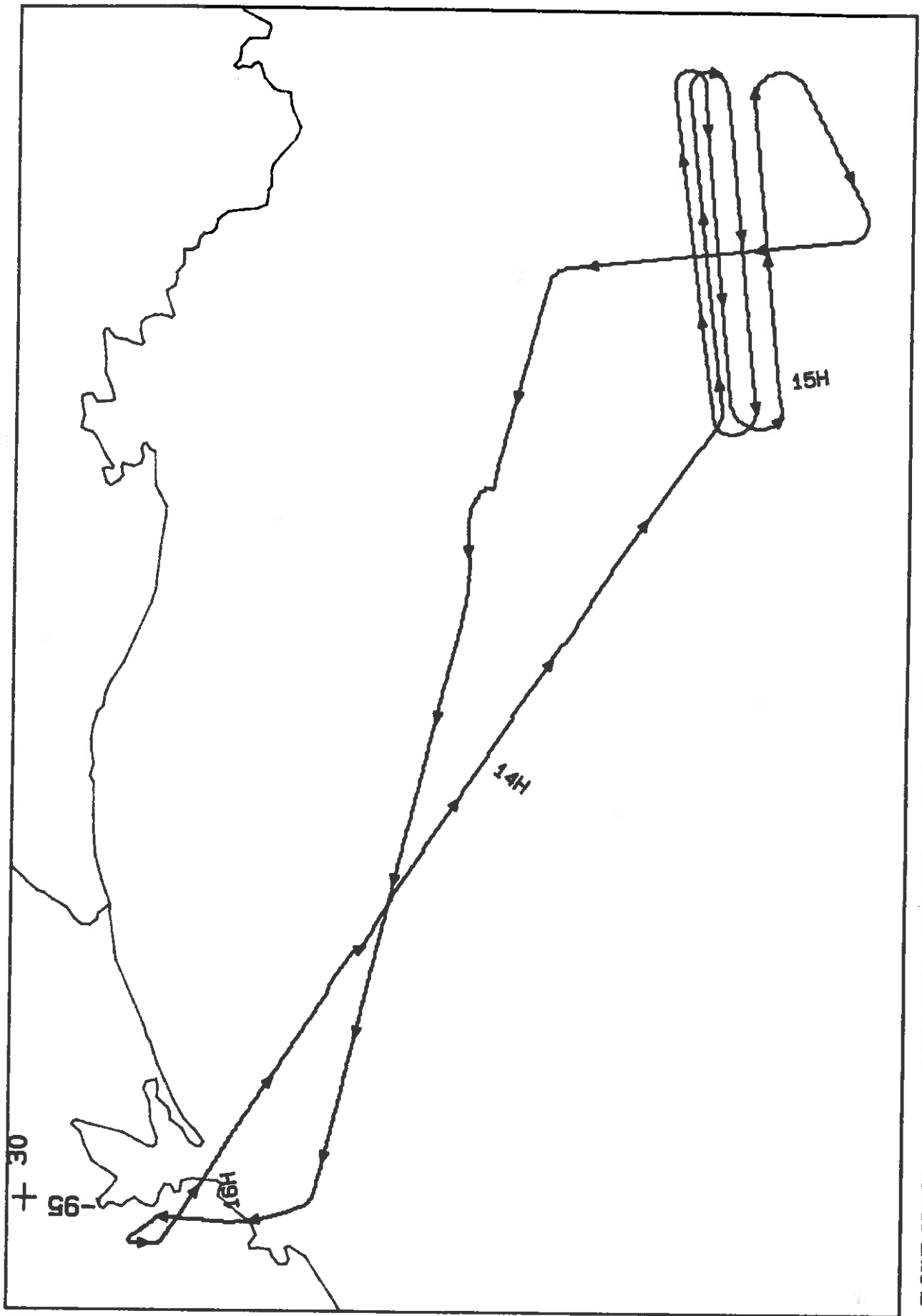
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	8163-8181	14:04:02	14:12:40	63000/19200	10-50% scattered cumulus; light leak (frames 8163-8164)
C - D	8182-8200	14:15:32	14:23:47	"	10-70% scattered cumulus
E - F	8201-8219	14:27:16	14:35:53	"	20-50% scattered cumulus
G - H	8220-8238	14:38:55	14:47:31	"	10-60% scattered cumulus
I - J	8239-8257	14:50:39	14:59:15	"	Minor-30% scattered cumulus (frames 8249-8257)
M - N	8258-8275	15:07:14	15:15:20	"	10-70% cirrus and scattered cumulus (frames 8265-8275)
O	8276-8277	15:21:48	15:21:51	"	50% scattered cumulus

# AOCI SCANNER FLIGHT LINE DATA

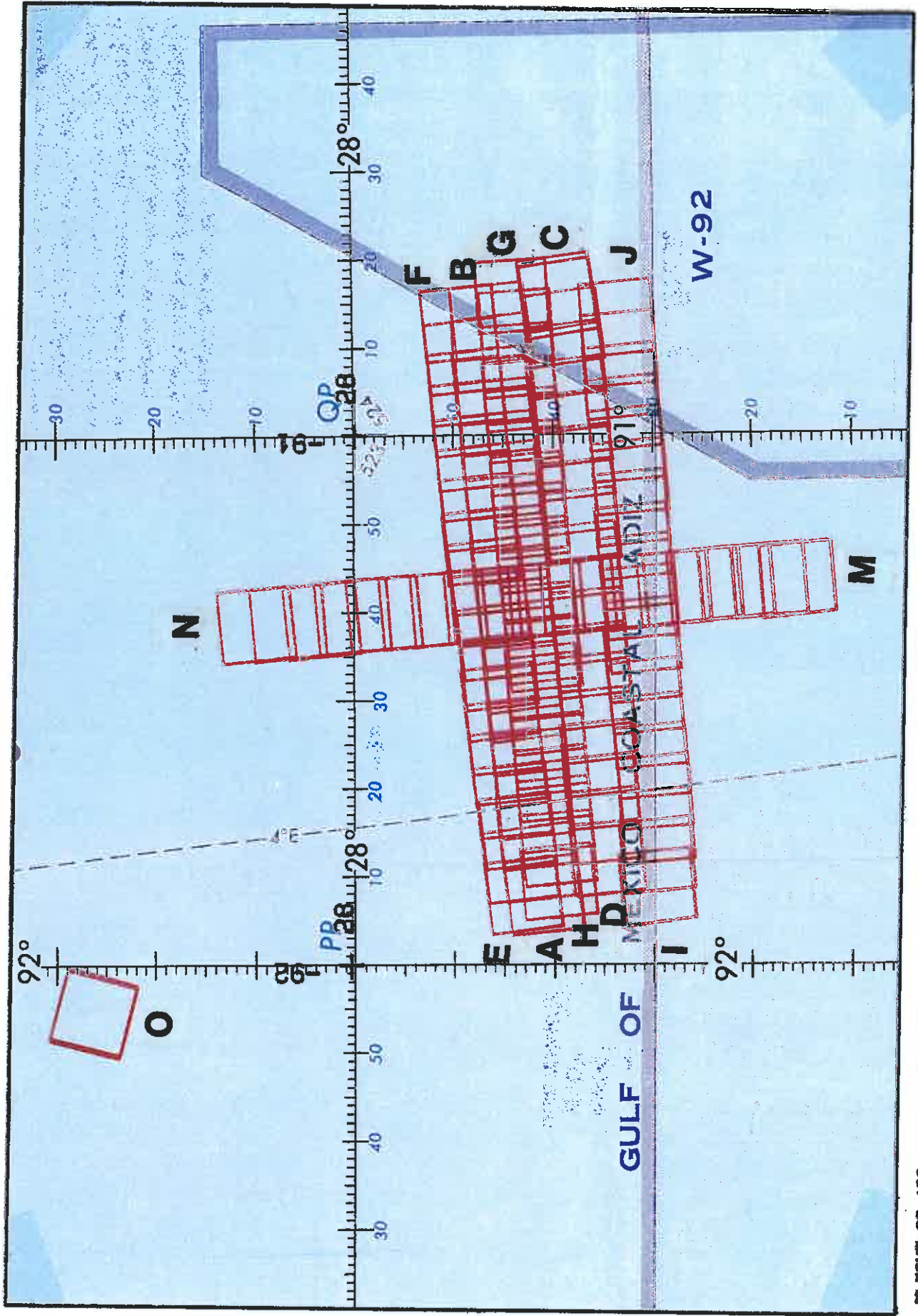
## FLIGHT NO. 93-122

DATE: DALUS FLIGHT DATA  
 FLIGHT NUMBER: 93-122

Check Points	Actual		Total		Scan Speed (pps)	Altitude feet/meter	Total		total Repeated scanlines
	Time (GMT)	begin end	scanline	begin end			Good scanlines	Interpolated scanlines	
A-B	14:03:39.0	14:12:38.0	16737	20503	6.20	63000/19202	3367	0	0
C-D	14:15:36.0	14:24:19.0	21293	24260	6.20	63000/19202	3268	0	0
E-F	14:26:37.0	14:36:27.0	23550	27114	6.20	63000/19202	3365	0	0
G-H	14:38:50.0	14:47:33.0	30005	33272	6.20	63000/19202	3268	0	0
I-J	14:50:43.0	14:59:23.0	34460	37727	6.20	63000/19202	3269	0	0
J-K	14:59:41.0	15:01:48.0	37826	38616	6.20	63000/19202	793	0	0
K-L	15:02:4.0	15:05:46.0	39717	40103	6.20	63000/19202	1387	0	0
L-M	15:06:1.0	15:06:49.0	40202	40499	6.20	63000/19202	298	0	0
M-N	15:07:5.0	15:15:32.0	40593	43765	6.20	63000/19202	3169	0	0



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A/C 708

RC-10

Accession #04573

ONC H-24



