

# FLIGHT SUMMARY REPORT

**Flight Number:** 94-099  
**Calendar/Julian Date:** 15 June 1994 • 166  
**Sensor Package:** Wild-Heerbrug RC-10  
Modis Airborne Simulator (MAS)  
**Area(s) Covered:** Mt. Shasta

**Investigator(s):** Shelton, NASA-ARC

**Aircraft #:** 708

## SENSOR DATA

<b>Accession #:</b>	04738	----
<b>Sensor ID #:</b>	034	108
<b>Sensor Type:</b>	RC-10	MAS
<b>Focal Length:</b>	12" 304.66 mm	----
<b>Film Type:</b>	Aerochrome IR SO-060	----
<b>Filtration:</b>	Wratten 12	----
<b>Spectral Band:</b>	510-900 nm	----
<b>f Stop:</b>	11	----
<b>Shutter Speed:</b>	1/200	----
<b># of Frames:</b>	44	----
<b>% Overlap:</b>	60	----
<b>Quality:</b>	Good	Good
<b>Remarks:</b>	Camera clock offset 9.9 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.

### Modis Airborne Simulator

The Modis Airborne Simulator (MAS) is a modified Daedalus multispectral scanner. It records up to twelve 8-bit channels which can be selected from an array of fifty available spectral bands. The band selection is made prior to flight and the instrument is hard-wired to that configuration. Channel 1 is used to store additional bits which provide 10-bit resolution for Channels 9 through 12. The following MAS band combination (MAST1 configuration) was used on this flight:

<u>Data System Channel</u>	<u>MAS Channel</u>	<u>Band edges <math>\mu\text{m}</math></u>
1	---	LSBs for Channels 9-12
2	1	0.635 - 0.688
3	2	0.852 - 0.893
4	8	1.595 - 1.652
5	10	1.855 - 1.905
6	14	2.126 - 2.173
7	15	2.255 - 2.305
8	16	3.825 - 3.975
9*	31	3.659 - 3.810
10*	42	8.342 - 8.738
11*	44	10.791 - 11.239
12*	46	11.799 - 12.246

\*10-bit resolution

#### Sensor/Aircraft Parameters:

Spectral Channels:	50
Output Channels:	Seven 8-bit and four 10-bit
IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters at 65,000 feet)

Total Scan Angle:	85.92°
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-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).

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. 94-099**

Accession # 04738

Sensor # 034

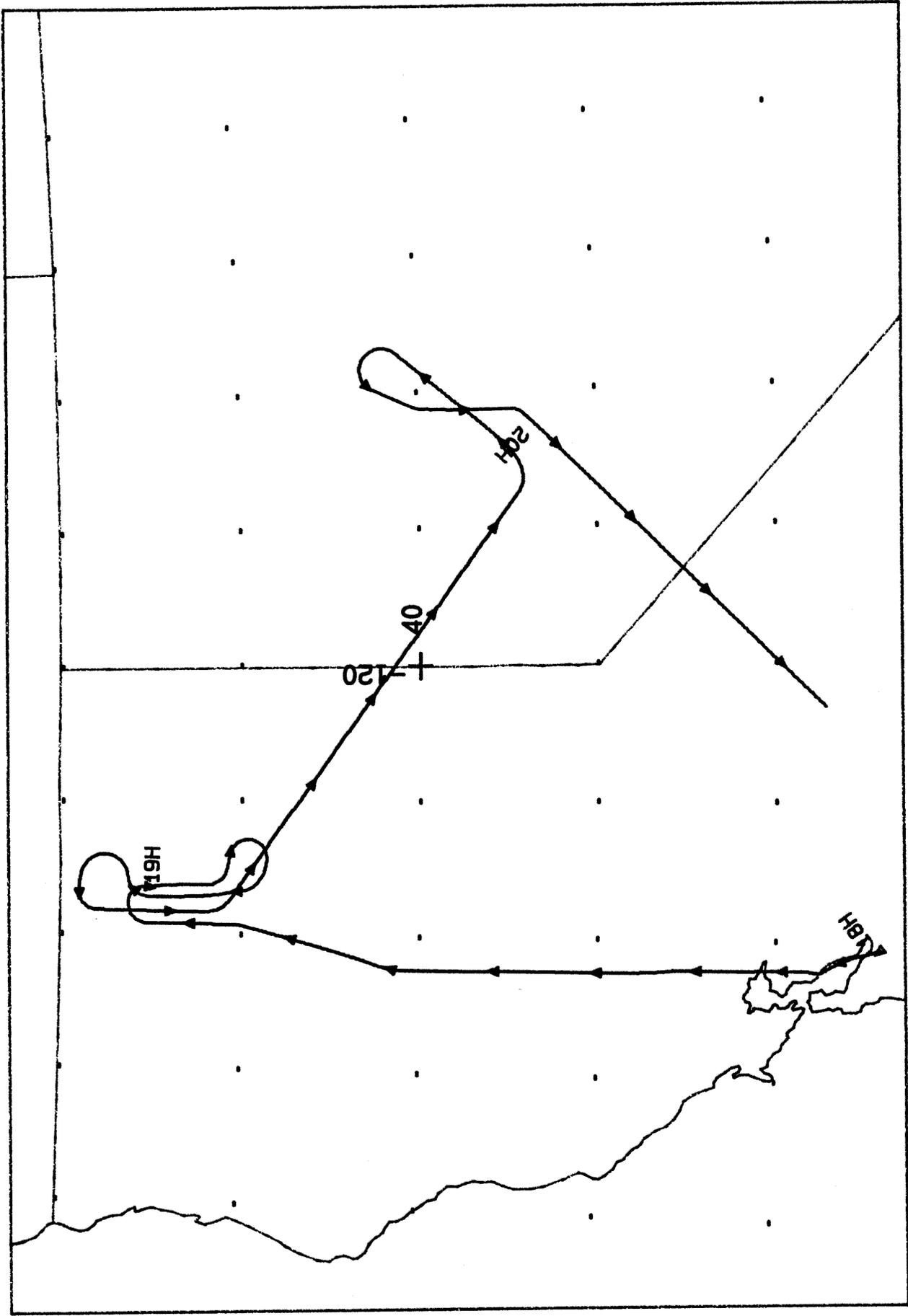
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3404-3410	18:39:59	18:42:57	65000/19800	10-20% scattered cumulus (frames 3404-3410)
C - D	3411-3416	18:46:27	18:48:55	"	10-50% scattered cumulus (frames 3411-3415)
E - F	3417-3422	18:57:52	19:00:19	"	10-60% scattered cumulus (frames 3417-3422)
G - H	3423-3429	19:10:14	19:13:11	"	10-30% scattered cumulus (frames 3423-3429)
I - J	3430-3441	19:43:17	19:48:39	"	Clear
K - L	3442-3447	19:56:16	19:58:42	"	Clear; minor emulsion damage (frame 3445)

# MAS SCANNER FLIGHT LINE DATA

## FLIGHT NO. 94-099

DALDALUS FLIGHT DATA  
FLIGHT NUMBER: 94-099

Check Points	A c t u a l		A c t u a l scanline begin end	Altitude feet/meter	Scan Speed (pps)	total		total Repeats scanlines
	t i m e begin end	(OH)				G o o d scanlines	I n t e r p o l a t e d scanlines	
A-B	18:38:57.0 18:42:57.0		19771 21157	63000/19812	6.25	1387	0	0
C-D	18:46:22.0 18:48:45.0		22543 25434	63000/19812	6.25	892	0	0
E-F	18:56:25.0 19:00:27.0		26305 27691	63000/19812	6.25	1387	0	0
G-H	19:08:22.0 19:12:52.0		30760 32443	63000/19812	6.25	1684	0	0
I-J	19:41:46.0 19:43:21.0		37234 38707	63000/19812	6.25	2475	1	0
K-L	19:55:24.0 19:58:45.0		48184 49570	63000/19812	6.25	1387	0	0



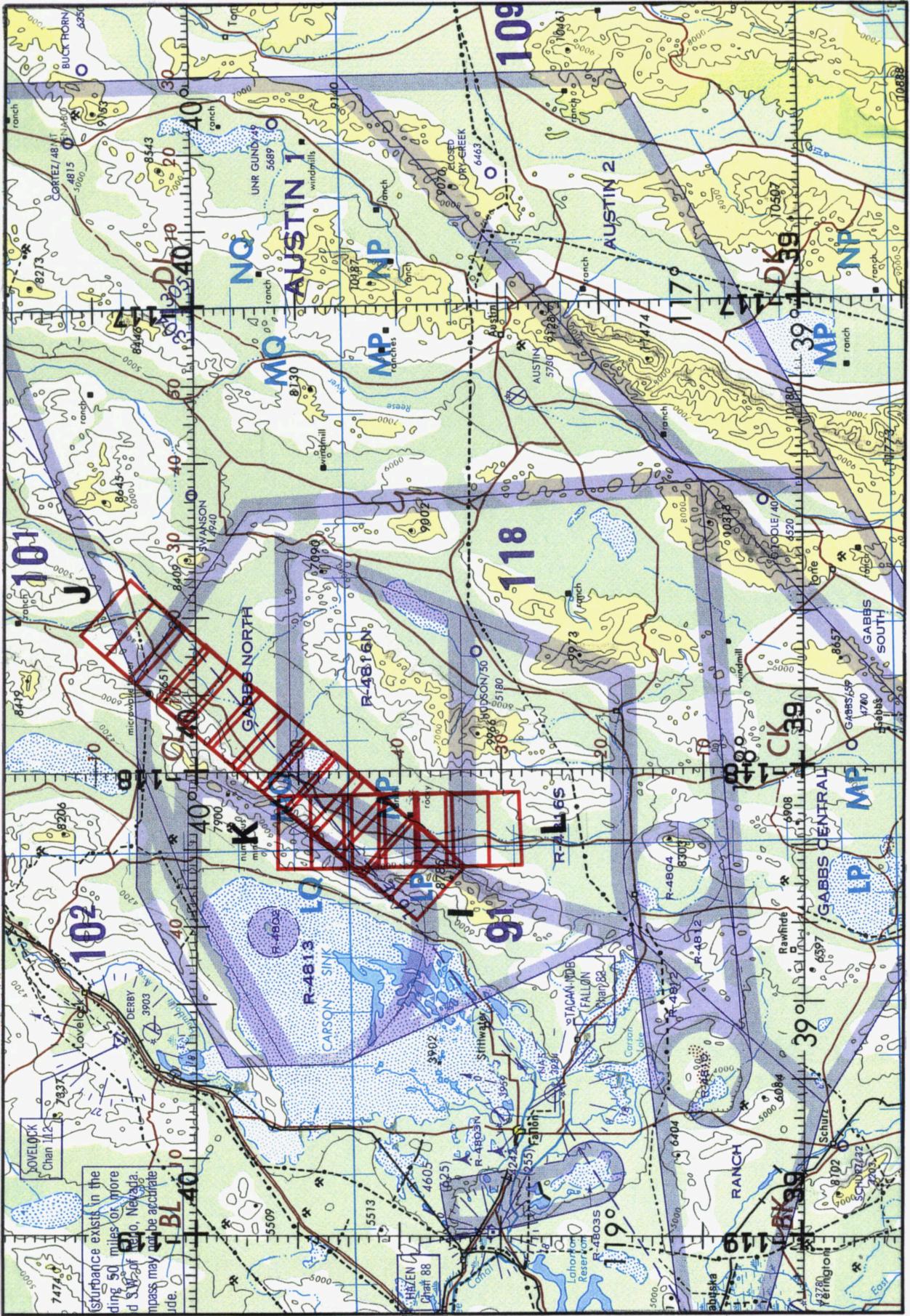
MAS / RC-10 / VIS

A/C 708

15 JUNE 1994

FLIGHT 94-099





Disturbance exists in the  
 ding 50 miles or more  
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