FLIGHT SUMMARY REPORT

Flight Number: 98-034

Calendar/Julian Date: 12 March 1998 • 071

Sensor Package: Wild Heerbrugg RC-10
Multi-angle Imaging SpectroRadiometer (MISR)

Area(s) Covered: Rogers Lake, CA

Investigator(s): Conel, JPL **Aircraft #:** 709

SENSOR DATA

Accession #:	05245	-----
Sensor ID #:	023	120
Sensor Type:	RC-10	MISR
Focal Length:	6” 153.21 mm	-----
Film Type:	Aerochrome IR SO-134	-----
Filtration:	Wratten 12 + 2.2 AV	-----
Spectral Band:	510-900 nm	-----
f Stop:	8	-----
Shutter Speed:	1/175	-----
# of Frames:	44	-----
% Overlap:	60	-----
Quality:	Fair	-----
Remarks:	Severe emulsion abrasions; subtract 39 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.

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).

Airborne Multi-angle Imaging SpectroRadiometer

The Multi-angle Imaging SpectroRadiometer (MISR) is a new type of instrument, designed to view the Earth with cameras pointed in 9 different directions. As the instrument flies overhead, each piece of the Earth's surface below is successively imaged by the 9 cameras comprising the MISR system, in each of 4 wavelengths (blue, green, red, and near-infrared). The Airborne MISR (AirMISR) is currently flown aboard the ER-2 to facilitate the development and test the capabilities of the satellite MISR before it is launched in orbit in 1998.

In addition to improving our understanding of scattering of sunlight in the Earth environment, MISR data can also distinguish different types of clouds, particles, and surfaces. Specifically, MISR will monitor the monthly, seasonal, and long-term trends in:

- The amount and type of atmospheric particles (aerosols), including those formed by natural sources and by human activities
- The amounts, types, and heights of clouds
- The distribution of land surface cover, including vegetation canopy structure

To accomplish its scientific objectives, the MISR instrument will measure the Earth's brightness in 4 spectral bands, at each of 9 look angles spread out in the forward and aft directions along the flight path. Spatial samples are acquired every 275 meters. Over a period of 7 minutes, a 360 km wide swath of Earth comes into view at all 9 angles. Special attention has been paid to providing highly accurate absolute and relative calibration, using on-board hardware consisting of deployable solar diffuser plates and several types of photodiodes. To complement the on-board calibration effort, a validation program of *in situ* measurements is planned, involving field instruments, one of which is the "PARABOLA III", which automatically scans the sky and ground at many angles. The aircraft camera, AirMISR will continue to operate on the ER-2 also as a complement to the orbiting MISR. Global coverage with the satellite MISR will be acquired about once in 9 days at the equator; the nominal mission lifetime is 6 years.

MISR is being built for NASA by the Jet Propulsion Laboratory in Pasadena, California. MISR is one of five instruments scheduled to be launched into polar orbit aboard the first Earth Observing System spacecraft (EOS-AM1) in June 1998, as part of NASA's Mission to Planet Earth. The spacecraft will fly in a "sun-synchronous" orbit, designed so that it crosses the equator every 98 minutes, always at 10:30 a.m. local time, as the Earth rotates below.

Further information regarding MISR is available on the following web page: http:www-misr.jpl.nasa.gov

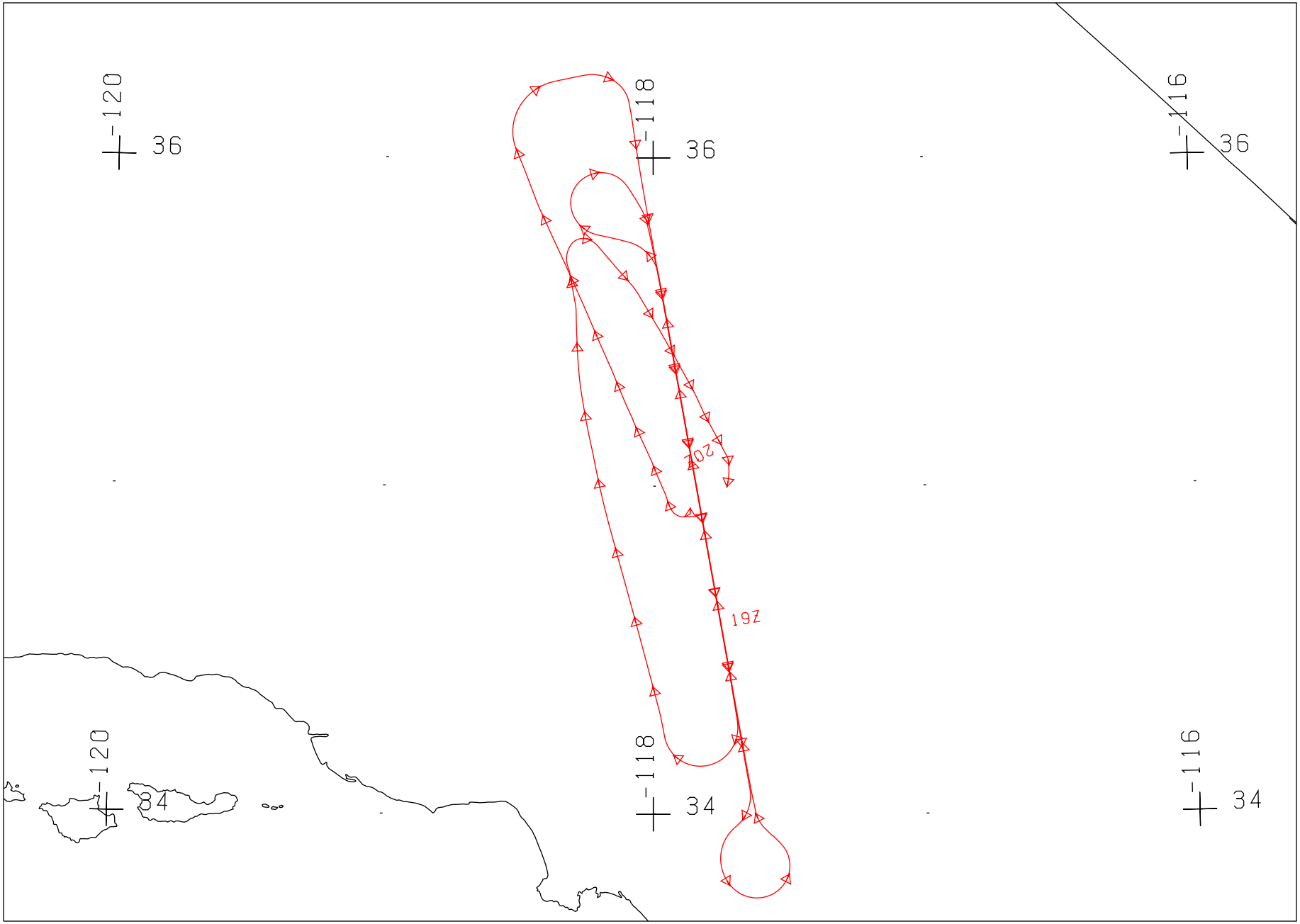
Information regarding ER-2 acquired photographic and digital data is available through the Aircraft Data Facility at Ames Research Center. For specific information regarding flight documentation, sensor parameters, and areas of coverage contact the Aircraft Data Facility, NASA-Ames Research Center, Mail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

CAMERA FLIGHT LINE DATA
FLIGHT NO. 98-034

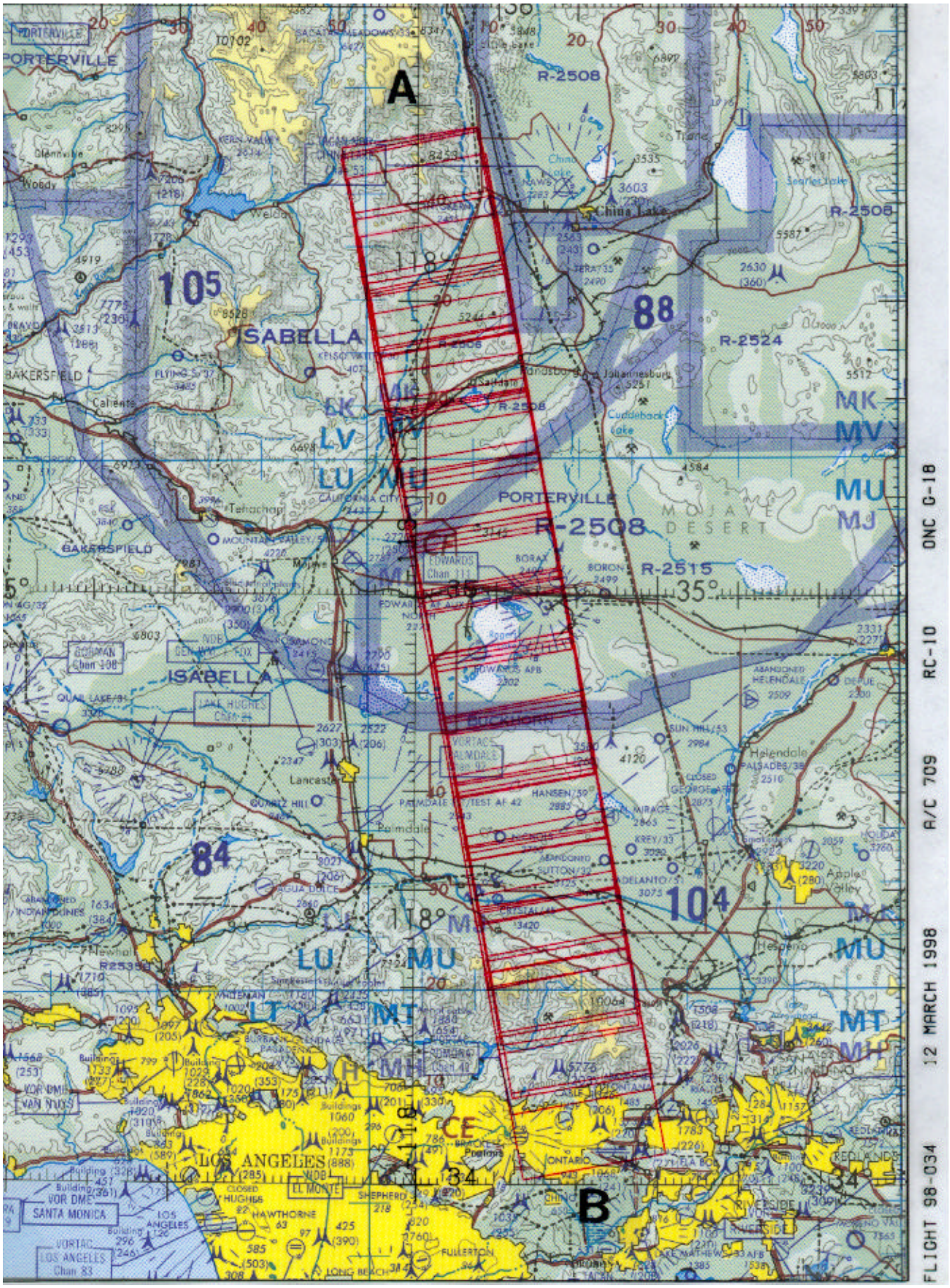
Accession # 05245

Sensor # 023

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	8872-8888	18:34:45	18:47:57	66887/20387	10-80% cirrus
B - A	8889-8901	18:58:04	19:10:21	65540/19977	10-30% cirrus
A - B	8902-8915	19:18:26	19:29:46	65493/19962	10-60% cirrus



FLIGHT 98-034 12 MARCH 1998 A/C 709 RC-10 / MISR


A
B
R-2508
R-2524
R-2515
PORTERVILLE
ISABELLA
BAKERSFIELD
China Lake
Tehachapi
Palmdale
Lancaster
Hesperia
Apple Valley
Helendale
LOS ANGELES
SANTA MONICA
ONTARIO
REDLANDS
105
88
84
104
34
MOJAVE DESERT
ONC G-18
RC-10
R/C 709
12 MARCH 1998
FLIGHT 98-034