

## FLIGHT SUMMARY REPORT

**Flight Number:** 99-005-02  
**Calendar/Julian Date:** 29 May 1999 • 149  
**Sensor Package:** Wild Heerbrugg RC-30  
MASTER Airborne Simulator (MASTER)  
**Area(s) Covered:** Goldstone, CA (Site #964)

**Investigator(s):** Gillespie, University of Washington  
Hook, JPL

**Aircraft #:** 798  
Department of Energy  
King Air B200

### SENSOR DATA

|                       |                         |        |
|-----------------------|-------------------------|--------|
| <b>Accession #:</b>   | 05347                   | ----   |
| <b>Sensor ID #:</b>   | 126                     | 124    |
| <b>Sensor Type:</b>   | RC-30                   | MASTER |
| <b>Focal Length:</b>  | 6"<br>153.21mm          | ----   |
| <b>Film Type:</b>     | Aerochrome IR<br>SO-134 | ----   |
| <b>Filtration:</b>    | Wratten 12 + 2.2 AV     | ----   |
| <b>Spectral Band:</b> | 510-900nm               | ----   |
| <b>f Stop:</b>        | 4                       | ----   |
| <b>Film Speed:</b>    | Variable                | ----   |
| <b># of Frames:</b>   | 23                      | ----   |
| <b>% Overlap:</b>     | 60%                     | ----   |
| <b>Quality:</b>       | Excellent               | ----   |
| <b>Remarks:</b>       |                         |        |

## **Airborne Science Program**

The Airborne Science Program 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.

## **Department of Energy Remote Sensing Laboratory**

The NASA Airborne Science Program at Dryden Flight Research Center and Ames Research Center contracted with the Department of Energy Remote Sensing Laboratory (RSL) in Las Vegas, Nevada to acquire remote sensing data with the DOE King Air B-200 aircraft.

The DOE King Air B-200 is a low and medium altitude, moderate speed aircraft. It can operate from 4,000 to 35,000 feet above sea level at speeds between 135 and 225 knots. There are two instrument ports in the aircraft. The NASA MASTER Scanner was mounted over the forward port and the DOE Wild Heerbrugg RC-30 Mapping Camera was mounted over the aft port.

## **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/RC-30 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

**MASTER (MODIS/ASTER Airborne Simulator)**

The MASTER is similar to the MAS, with the thermal bands modified to more closely match the NASA EOS ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) satellite instrument, which is scheduled for launch in 1998. It is intended primarily to study geologic and other Earth surface properties. Flying on both high and low altitude aircraft, the MASTER became operational in early 1998. Its fifty spectral bands are configured as follows:

| Spectral Channel | Band center (µm ) | Bandwidth (µm ) | Spectral Range |
|------------------|-------------------|-----------------|----------------|
| 1                | 0.460             | 0.04            | 0.440-0.480    |
| 2                | 0.500             | 0.04            | 0.480-0.520    |
| 3                | 0.540             | 0.04            | 0.520-0.560    |
| 4                | 0.580             | 0.04            | 0.560-0.600    |
| 5                | 0.660             | 0.06            | 0.630-0.690    |
| 6                | 0.710             | 0.04            | 0.690-0.730    |
| 7                | 0.750             | 0.04            | 0.730-0.770    |
| 8                | 0.800             | 0.04            | 0.780-0.820    |
| 9                | 0.865             | 0.04            | 0.845-0.885    |
| 10               | 0.905             | 0.04            | 0.885-0.925    |
| 11               | 0.945             | 0.04            | 0.925-0.965    |
| 12               | 1.625             | 0.05            | 1.600-1.650    |
| 13               | 1.675             | 0.05            | 1.650-1.700    |
| 14               | 1.725             | 0.05            | 1.700-1.750    |
| 15               | 1.775             | 0.05            | 1.750-1.800    |
| 16               | 1.825             | 0.05            | 1.800-1.850    |
| 17               | 1.875             | 0.05            | 1.850-1.900    |
| 18               | 1.925             | 0.05            | 1.900-1.950    |
| 19               | 1.975             | 0.05            | 1.950-2.000    |
| 20               | 2.075             | 0.05            | 2.050-2.100    |
| 21               | 2.160             | 0.05            | 2.135-2.185    |
| 22               | 2.210             | 0.05            | 2.185-2.235    |
| 23               | 2.260             | 0.05            | 2.235-2.285    |
| 24               | 2.3295            | 0.065           | 2.297-2.362    |
| 25               | 2.3945            | 0.065           | 2.362-2.427    |

| Spectral Channel | Band center (µm ) | Bandwidth (µm ) | Spectral Range |
|------------------|-------------------|-----------------|----------------|
| 26               | 3.150             | 0.15            | 3.075-3.225    |
| 27               | 3.300             | 0.15            | 3.225-3.375    |
| 28               | 3.3450            | 0.15            | 3.375-3.525    |
| 29               | 3.600             | 0.15            | 3.525-3.675    |
| 30               | 3.750             | 0.15            | 3.675-3.825    |
| 31               | 3.900             | 0.15            | 3.825-3.975    |
| 32               | 4.050             | 0.15            | 3.975-4.125    |
| 33               | 4.200             | 0.15            | 4.125-4.275    |
| 34               | 4.575             | 0.6             | 4.275-4.875    |
| 35               | 4.500             | 0.15            | 4.425-4.575    |
| 36               | 4.650             | 0.15            | 4.575-4.725    |
| 37               | 4.800             | 0.15            | 4.725-4.875    |
| 38               | 4.950             | 0.15            | 4.875-5.025    |
| 39               | 5.100             | 0.15            | 5.025-5.175    |
| 40               | 5.250             | 0.15            | 5.175-5.325    |
| 41               | 7.900             | 0.4             | 7.70-8.10      |
| 42               | 8.300             | 0.4             | 8.10-8.50      |
| 43               | 8.700             | 0.4             | 8.50-8.90      |
| 44               | 9.100             | 0.4             | 8.90-9.30      |
| 45               | 9.700             | 0.4             | 9.50-9.90      |
| 46               | 10.100            | 0.4             | 9.90-10.30     |
| 47               | 10.625            | 0.65            | 10.30-10.95    |
| 48               | 11.300            | 0.7             | 10.95-11.65    |
| 49               | 12.050            | 0.5             | 11.80-12.30    |
| 50               | 12.750            | 0.5             | 12.50-13.00    |

Sensor/Aircraft Parameters:

Spectral Bands: 50 (16-bit resolution)  
 IFOV: 2.5 mrad  
 Swath width: 19.9 nmi (36 km) at 65,000 ft  
 Ground Resolution: 12-50 meters (variable w/ altitude)  
 Total FOV: 85.92 degrees

Pixels/Scanline: 716  
Scan Rate: 6.25 - 25 Hz

(See the homepage at [asterweb.jpl.nasa.gov](http://asterweb.jpl.nasa.gov))

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: 650-604-6252).

### **Data Availability**

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for Airborne Science Program aircraft acquired photographic and digital imagery. The photographic archive consists of photography acquired by the program from 1971 to April 1996. 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).

As of April 1996 the EROS Data Center no longer receives an archive copy of newly acquired Airborne Science Program photography. Original photography is archived with the Airborne Sensor Facility at Ames Research Center. A user copy of the photography is provided to the principal investigators for each flight. Principal investigators are cited on the first page of their respective flight summary reports. For information regarding photography acquired from April 1996 to the present contact the Airborne Sensor Facility as follows:

### **Flight Documentation and Data Archive Searches**

The following is the web site for flight documentation as published by the Airborne Sensor Facility at NASA Ames Research Center:

<http://asapdata.arc.nasa.gov/er-2fsr.html>

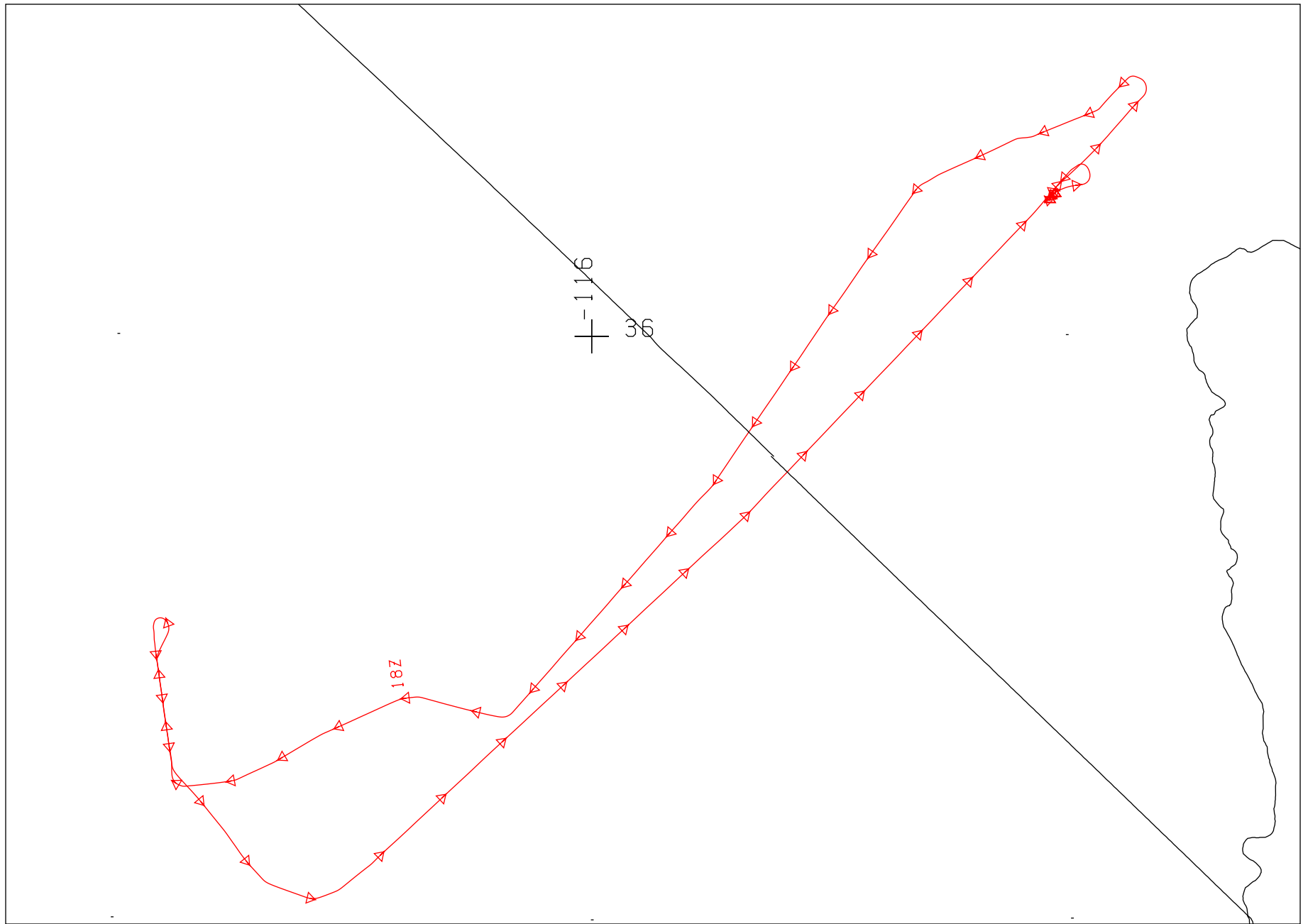
Additional information regarding flight documentation to include data archive searches, data availability, sensor parameters, and areas of coverage may be obtained from the following:

Airborne Sensor Facility  
MS 240-6  
NASA Ames Research Center  
Moffett Field, CA 94035-1000  
Telephone: (650)604-6252 (FAX 4987)

MODIS/ASTER AIRBORNE SIMULATOR (MASTER) FLIGHT LINE INFORMATION FOR 28-MAY-1999  
 NASA FLIGHT NUMBER 99-005-02

| FILE | SITE | LINE | RUN | START OF FLIGHT LINE |            |            | END OF FLIGHT LINE |            |            | FLIGHT DATA   |                   |       |             |                |
|------|------|------|-----|----------------------|------------|------------|--------------------|------------|------------|---------------|-------------------|-------|-------------|----------------|
|      |      |      |     | TIME<br>HH:MM:SS     | LAT<br>DEG | LON<br>DEG | TIME<br>HH:MM:SS   | LAT<br>DEG | LON<br>DEG | SCAN<br>LINES | SOLAR<br>ZEN AZIM |       | HEAD<br>DEG | ALT<br>M (GPS) |
| 1    | 964  | 1    | 1   | 18:09:22             | 35.304     | -116.884   | 18:12:21           | 35.438     | -116.909   | 2225          | 24.7              | 118.0 | 344.86      | 4135           |
| 2    | 964  | 1    | 2   | 18:15:47             | 35.454     | -116.912   | 18:19:40           | 35.302     | -116.884   | 2895          | 23.6              | 120.4 | 177.75      | 4099           |

NUMBER OF FILES FOR THIS FLIGHT = 2  
 TOTAL NUMBER OF SCAN LINES = 5120  
 DATE THESE FILES WERE PROCESSED = 04-Aug-99  
 DATE THIS LIST WAS CREATED = 05-Aug-99  
 GRANULE VERSION = 9



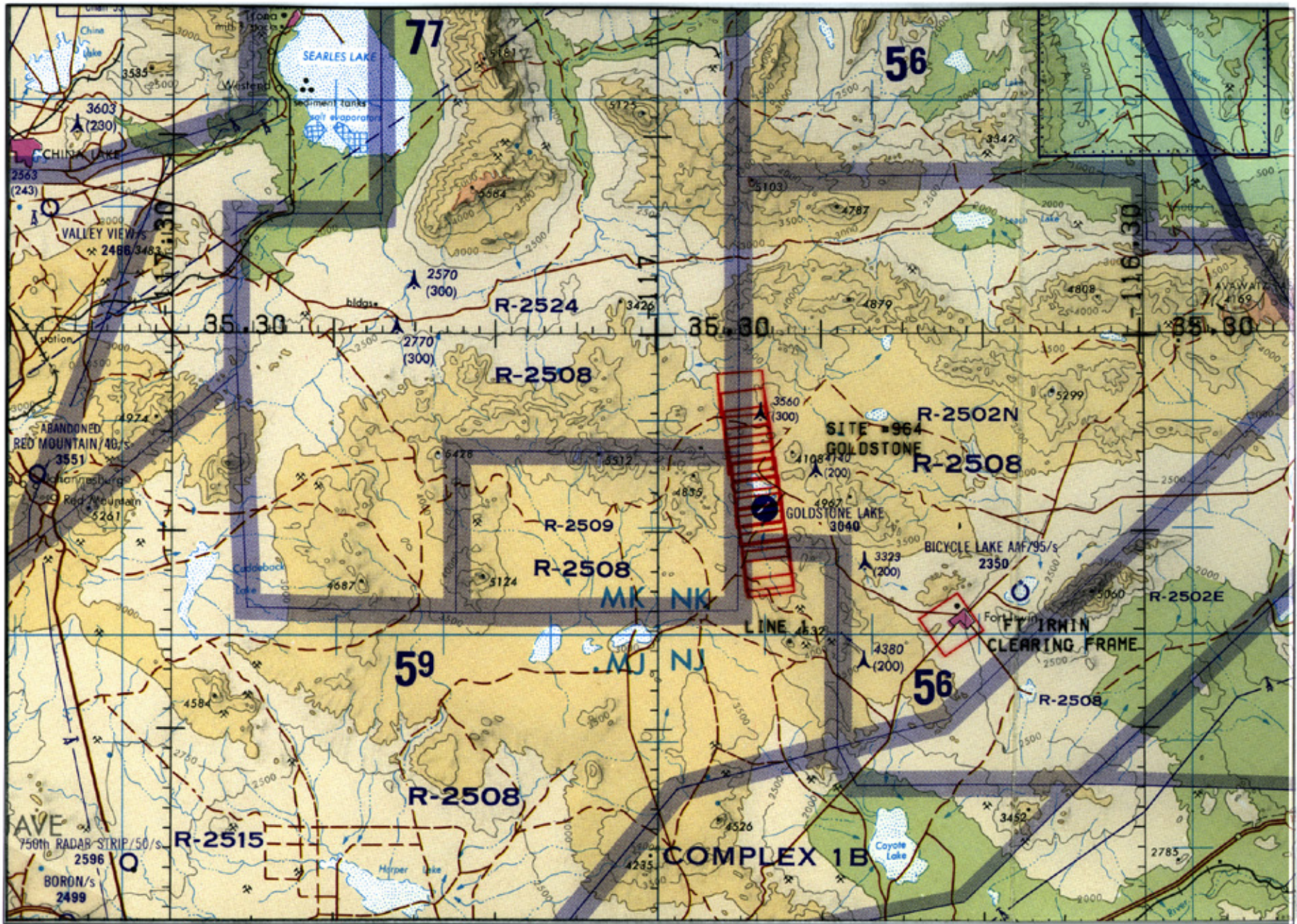
FLIGHT 99-005-02

29 MAY 1999

A/C 798

(DOE B200)

MASTER / RC-30



FLIGHT 99-005-02

29 MAY 1999

A/C 798

(DOE B200)

RC-30 / MASTER

TPC G-18C