

FLIGHT SUMMARY REPORT

Flight #: 91-020
Date: 25 October 1990
Sensor Package: Wild-Heerbrug RC-10
NASA Aircraft Satellite Instrument
Calibration (NASIC)
Thematic Mapper Simulator (TMS)
Area(s) Covered: White Sands, New Mexico

Investigator(s): Guenther, NASA-GSFC

Aircraft #: 706

Flight Request: 91D254

Julian Date: 298

SENSOR DATA

| | | | |
|-----------------------|--|-------|------------------|
| Accession #: | 04157 | ---- | ---- |
| Sensor ID #: | 076 | 104 | 101 |
| Sensor Type: | RC-10 | NASIC | TMS |
| Focal Length: | 12" 304.89 mm | ---- | ---- |
| Film Type: | High Definition Aerochrome IR SO-131 | ---- | ---- |
| Filtration: | cc.10B | ---- | ---- |
| Spectral Band: | 510-900 nm | ---- | ---- |
| f Stop: | 4 | ---- | ---- |
| Shutter Speed: | 1/100 | ---- | ---- |
| # of Frames: | 42 | ---- | ---- |
| % Overlap: | 60 | ---- | ---- |
| Quality: | Excellent | ---- | Good |
| Remarks: | | | Only 10 channels |

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 used for data collection during this flight.

Thematic Mapper Simulator

The Daedalus Thematic Mapper Simulator (TMS) is a multispectral scanner flown aboard the ER-2 aircraft which simulates spatial and spectral characteristics of the seven Landsat-D Thematic Mapper bands. The specific bands are as follows:

| <u>Daedalus Channel</u> | <u>TM Band</u> | <u>Wavelength, μm</u> |
|-------------------------|----------------|---|
| 1 | A | 0.42 - 0.45 |
| 2 | 1 | 0.45 - 0.52 |
| 3 | 2 | 0.52 - 0.60 |
| 4 | B | 0.60 - 0.62 |
| 5 | 3 | 0.63 - 0.69 |
| 6 | C | 0.69 - 0.75 |
| 7 | 4 | 0.76 - 0.90 |
| 8 | D | 0.91 - 1.05 |
| 9 | 5 | 1.55 - 1.75 |
| 10 | 7 | 2.08 - 2.35 |
| 11 | 6 | 8.5 - 14.0 low gain |
| 12 | 6 | 8.5 - 14.0 high gain |

Sensor/aircraft parameters are as follows:

| | |
|--------------------|------------------------------------|
| IFOV: | 1.25 mrad |
| Ground Resolution: | 81 feet (25 meters) at 65,000 feet |
| Total Scan Angle: | 43° |
| Swath Width: | 8.4 nmi (15.6 km) at 65,000 feet |
| Pixels/Scan Line: | 716 |
| Scan Rate: | 12.5 scans/second |
| Ground Speed: | 400 kts (206 m/second) |

NASA Aircraft Satellite Instrument Calibration

The NASA Aircraft Satellite Instrument Calibration (NASIC) is a scanner developed to calibrate research and operational instruments in orbit onboard NOAA and NASA satellites. The NASIC consists of a double Ebert Monochrometer flown on NASA-Ames ER-2 aircraft. Airborne Satellite Calibration System missions are flown coincident with satellite overpasses and fly the same view vector as the satellite instrument over a selected ground scene. The system is used to calibrate instruments such as the Advanced Very High Resolution Radiometer (AVHRR), the Thematic Mapper (TM), and the Coastal Zone Color Scanner (CZCS).

Sensor parameters are as follows:

| | |
|----------------------------|---|
| Detector: | Double Monochrometer with Holographic Grating |
| Across Track FOV: | 8° |
| Along Track FOV: | 4° |
| Ground Swath Dimensions: | 1.5 x 0.75 nmi (2.8 x 1.4 km) |
| Spectral Range: | 400-1035 nm |
| Scans/Data Collection Leg: | 36 + 2 Baseline Housekeeping |
| Data Points/Scan Line: | 184 |
| Data Point Spectral Range: | 3.5 nm |

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, areas of coverage, data tape format, logical record format, and scanner calibration data contact the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: (415) 604-6252).

For information regarding the NASIC project and data contact Peter Abel, Laboratory for Terrestrial Physics, Code 920.1, NASA-Goddard Space Flight Center, Greenbelt, Maryland 20771. (Telephone: (301) 286-7754).

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 91-020**

Accession # 04157

Sensor # 076

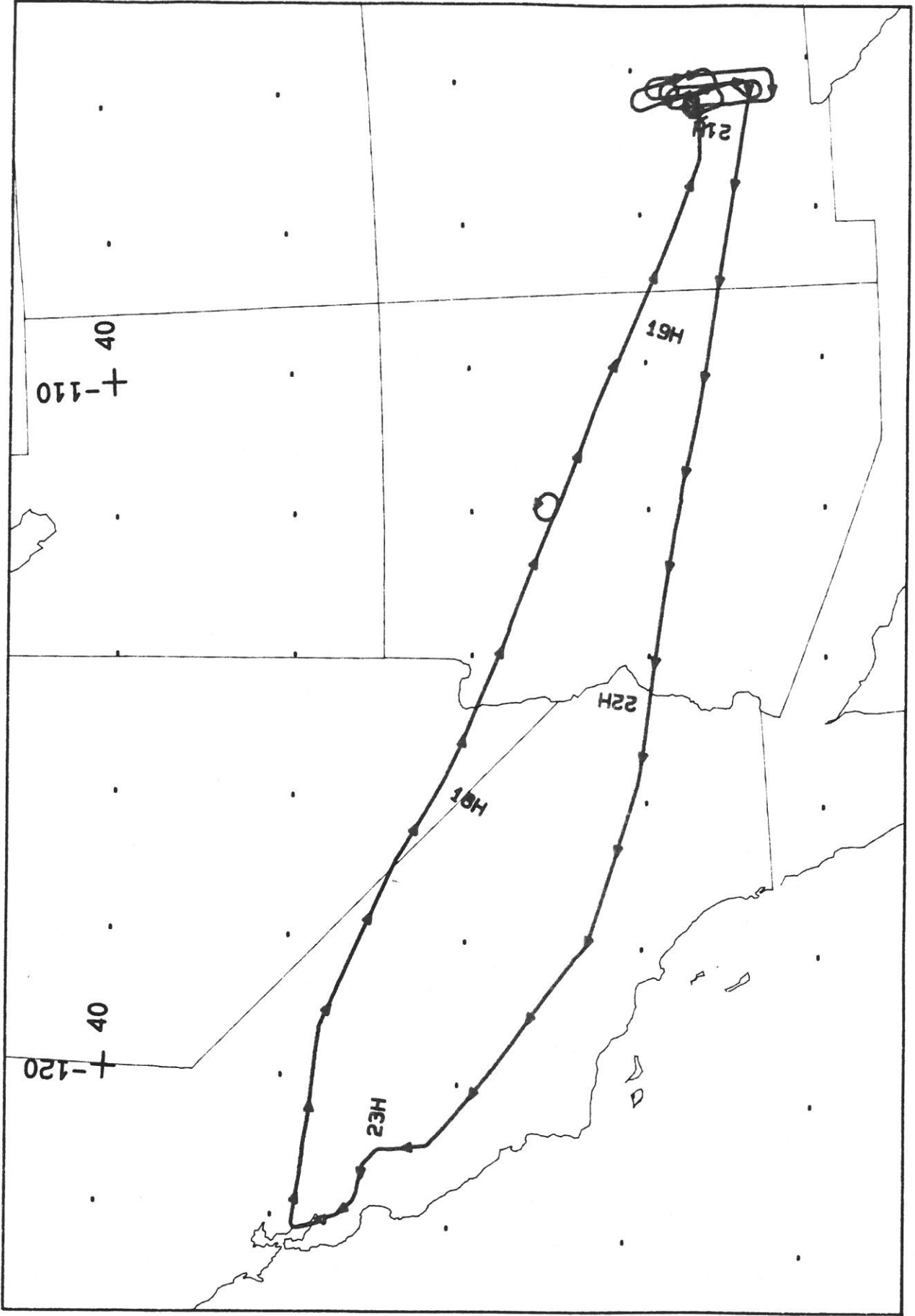
| Check Points | Frame Numbers | Time (GMT-hr, min, sec) | | Altitude, MSL feet/meters | Cloud Cover/Remarks |
|--------------|---------------|-------------------------|----------|------------------------------|---------------------|
| | | START | END | | |
| A - B | 4743-4753 | 19:32:46 | 19:37:18 | 65000/19800 | Clear |
| C - D | 4754-4763 | 20:03:20 | 20:07:01 | " | Clear |
| E - F | 4764-4773 | 20:33:40 | 20:37:20 | " | Clear |
| G - H | 4774-4784 | 20:50:09 | 20:54:16 | " | Clear |

SCANNER FLIGHT LINE DATA

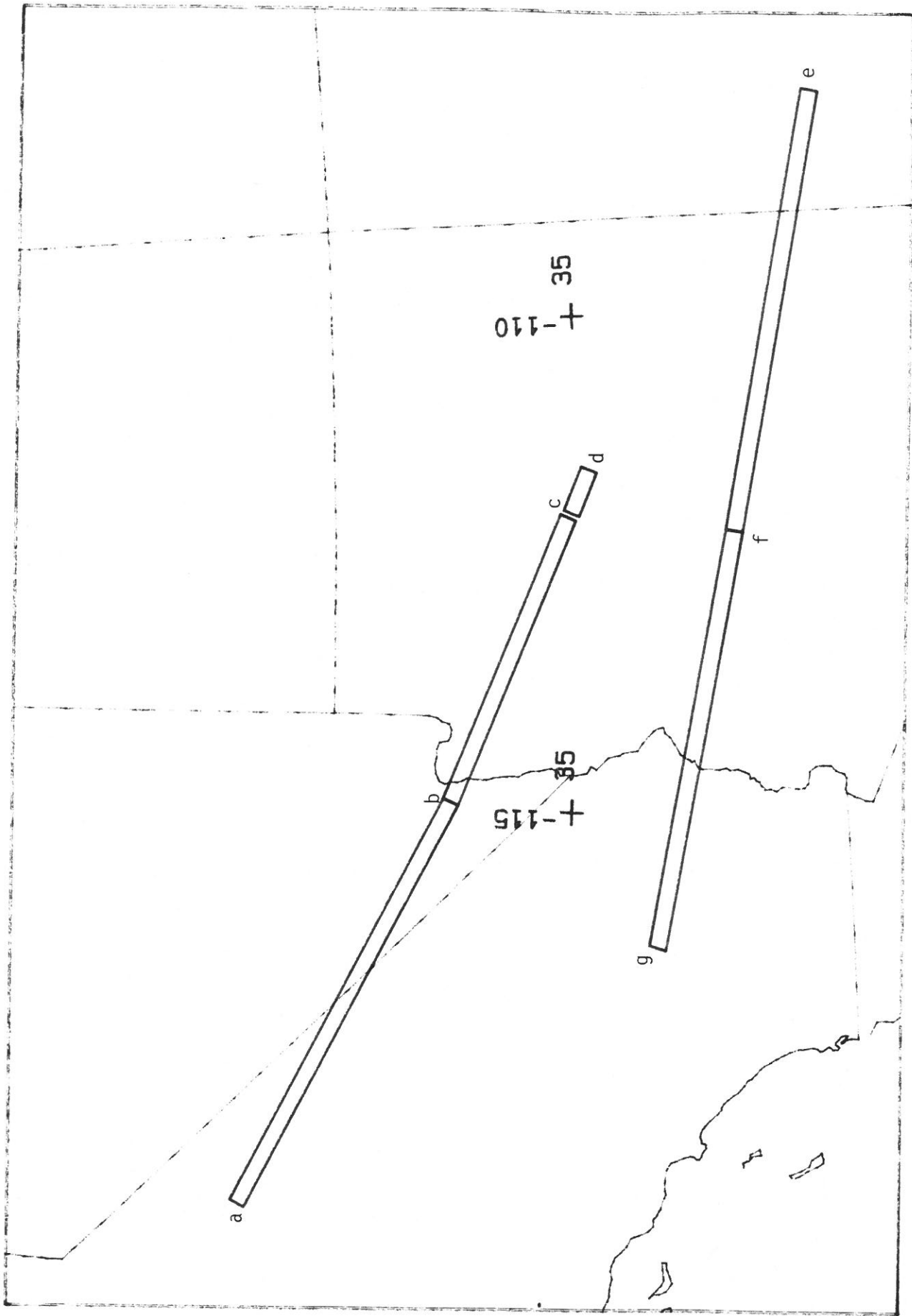
FLIGHT NO. 91-020

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 91-020

| Check Points | A c t u a l t i m e b e g i n e n d | A c t u a l s c a n l i n e b e g i n e n d | A l t i t u d e f e e t / m e t e r | S c a n S p e e d (r p s) | t o t a l G o o d s c a n l i n e s | t o t a l I n t e r p o l a t e d s c a n l i n e s | t o t a l R e p e a t e d s c a n l i n e s |
|--------------|---|---|--|-----------------------------------|---|---|---|
| a-b | 17:33:51.0 18:07:37.0 | 22665 43665 | 65000/19812 | 12.50 | 20990 | 0 | 11 |
| b-c | 18:07:37.0 18:31:15.0 | 43666 58381 | 65000/19812 | 12.50 | 14711 | 0 | 5 |
| c-d | 18:39:35.0 18:43:12.0 | 63581 65833 | 65000/19812 | 12.50 | 2253 | 0 | 0 |
| e-f | 21:07:48.0 21:41:28.0 | 156023 177023 | 65000/19812 | 12.50 | 20990 | 0 | 11 |
| f-g | 21:41:28.0 22:13:41.0 | 177024 197128 | 65000/19812 | 12.50 | 19857 | 0 | 248 |



FLIGHT 91-020 25 October 1990 A/C 706 ASCS / TMS / RC-10 White Sands, NM

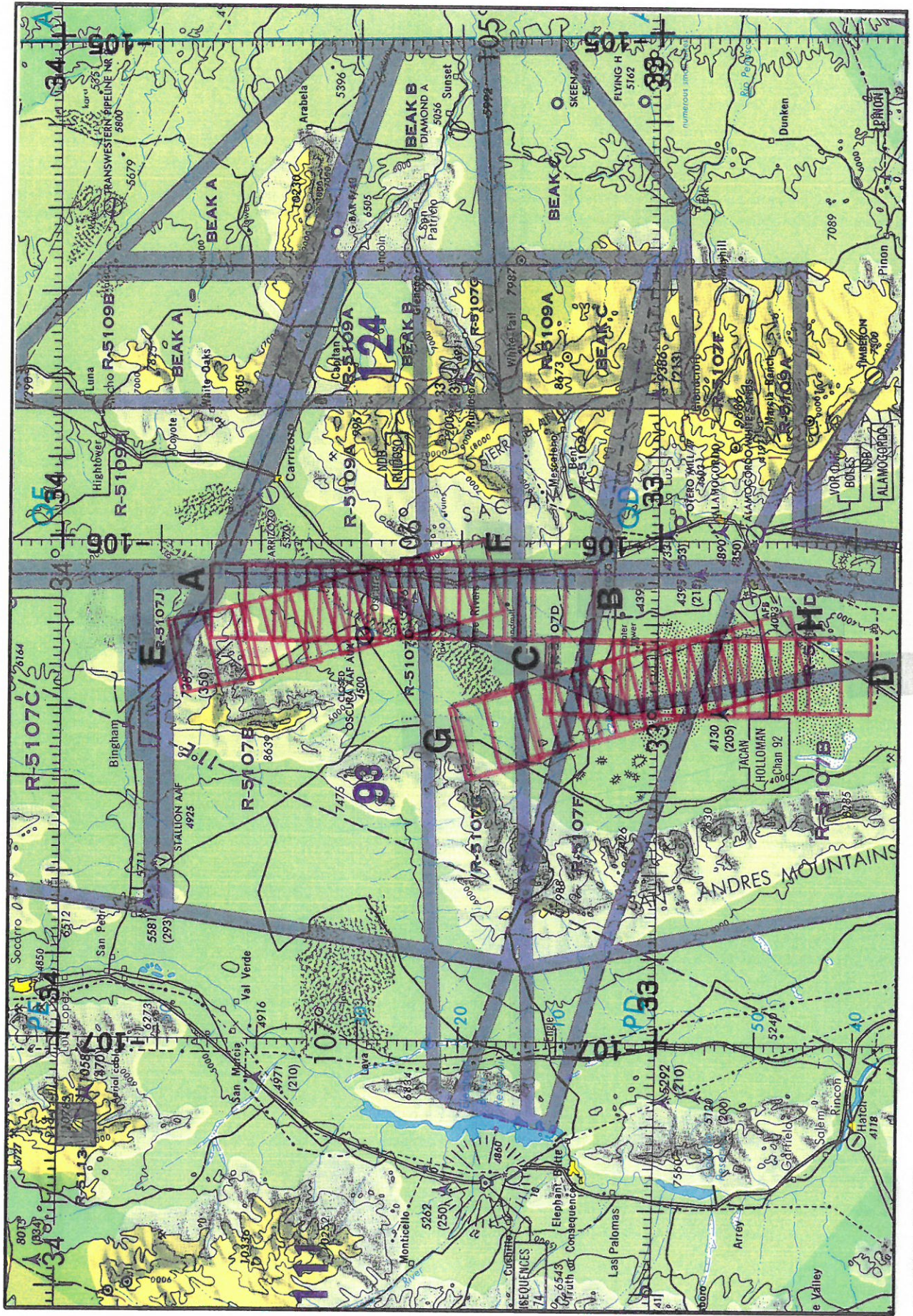


FLIGHT 91-020

25 October 1990

A/C 706

TMS



FLIGHT 91-020 25 October 1990 A/C 706 RC-10 Color Infrared Accession # 04157 ONC 6-19