

# FLIGHT SUMMARY REPORT

**Flight Number:** 94-123  
**Calendar/Julian Date:** 04 August 1994 • 216  
**Sensor Package:** Wild-Heerbrug RC-10  
Airborne Visible and Infrared Imaging  
Spectrometer (AVIRIS)  
Airborne Ocean Color Imager (AOCI)  
**Area(s) Covered:** Canada

**Investigator(s):** Sellers, GSFC

**Aircraft #:** 708

## SENSOR DATA

<b>Accession #:</b>	04775	----	----
<b>Sensor ID #:</b>	076	099	090
<b>Sensor Type:</b>	RC-10	AVIRIS	AOCI
<b>Focal Length:</b>	12" 304.89 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>	1/150	----	----
<b># of Frames:</b>	176	----	----
<b>% Overlap:</b>	60	----	----
<b>Quality:</b>	Excellent	----	----
<b>Remarks:</b>	Camera clock offset 8.2 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.

## Airborne Visible and Infrared Imaging Spectrometer

The Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) is the second in the series of imaging spectrometer instruments developed at the Jet Propulsion Laboratory (JPL) for earth remote sensing. This instrument uses scanning optics and four spectrometers to image a 614 pixel swath simultaneously in 224 contiguous spectral bands (0.4-2.4  $\mu\text{m}$ ).

AVIRIS parameters are as follows:

IFOV:	1 mrad
Ground Resolution:	66 feet (20 meters) at 65,000 feet
Total Scan Angle:	30°
Swath Width:	5.7 nmi (10.6 km) at 65,000 feet
Spectral Coverage:	0.41-2.45 $\mu\text{m}$
Pixels/Scan Line:	614
Number of Spectral Bands:	224
Digitization:	10-bits
Data Rate:	17 MBPS

<u>Spectrometer</u>	<u>Wavelength Range</u>	<u>Number of Bands</u>	<u>Sampling Interval</u>
1	0.41 - 0.70 $\mu\text{m}$	31	9.4 nm
2	0.68 - 1.27 $\mu\text{m}$	63	9.4 nm
3	1.25 - 1.86 $\mu\text{m}$	63	9.7 nm
4	1.84 - 2.45 $\mu\text{m}$	63	9.7 nm

All AVIRIS data is decommutated and archived at JPL and not currently available for public distribution. For further information contact Rob Green at Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, California 91109-8099.

## 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

## 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. 94-123**

Accession # 04775

Sensor # 076

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	5335-5345	15:25:00	15:29:33	65000/19800	Clear
C - D	5346-5350	15:39:58	15:41:48	"	Clear
E - F	5351-5356	15:47:10	15:49:27	"	Clear
G - H	5357-5363	15:54:21	15:57:06	"	Very thin cirrus (frames 5362-5363)
I - J	5364-5370	16:01:34	16:04:18	"	Very thin cirrus (frames 5364-5368)
K - L	5371-5377	16:09:01	16:11:46	"	Clear
M - N	5378-5384	16:16:02	16:18:47	"	Thin cirrus (frames 5378-5380)
O - P	5385-5391	16:23:12	16:25:57	"	10% cumulus (frame 5385)
Q - R	5392-5420	16:33:07	16:45:59	"	Very thin cirrus (frames 5405-5409); 10% cirrus (frames 5412-5420)
S - T	5421-5446	16:52:58	17:04:28	"	10-40% cirrus (frames 5421-5425); 10% cirrus (frames 5436-5446)

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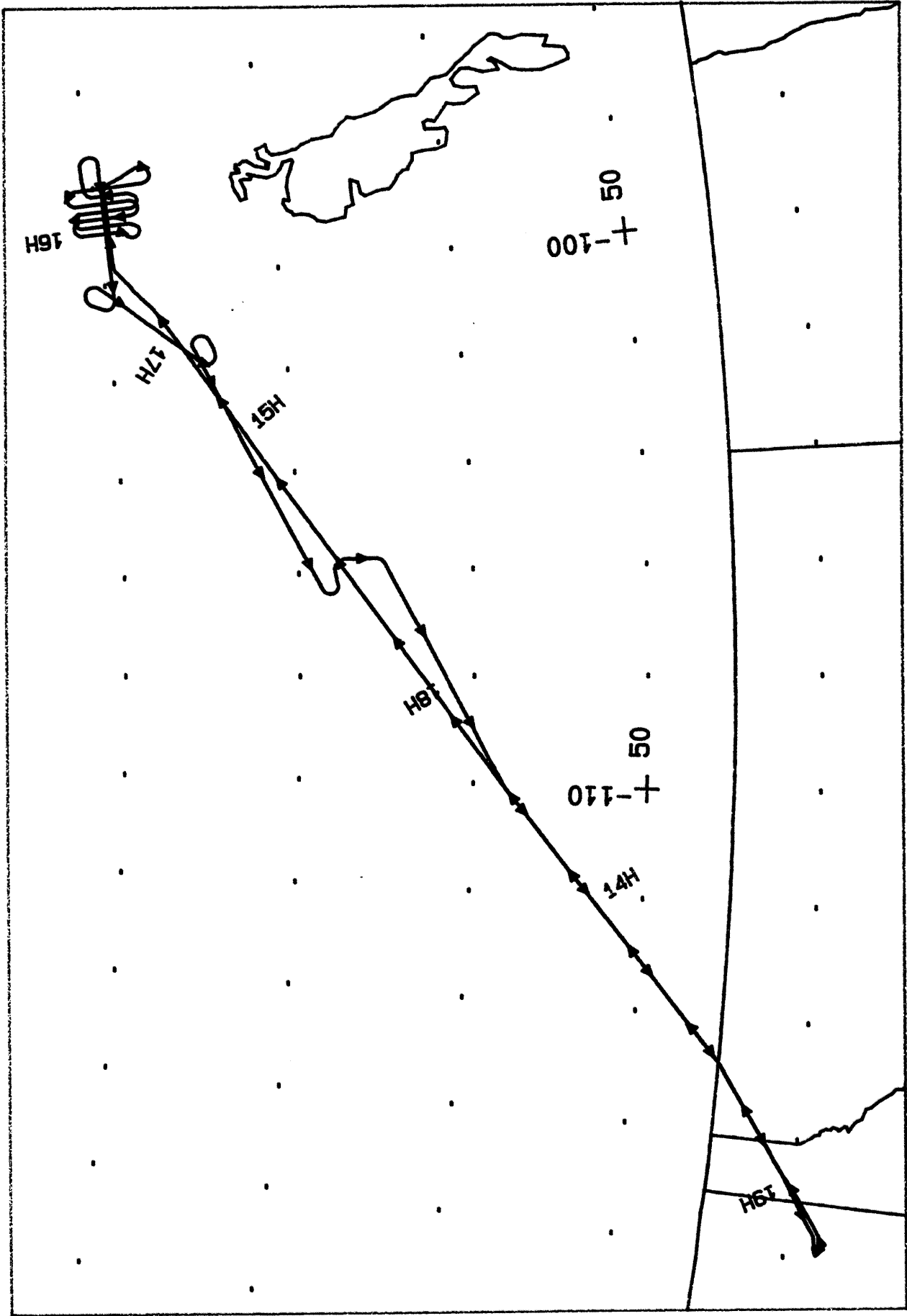
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
U - V	5447-5504	17:11:27	17:37:45	65000/19800	10-40% cirrus (frames 5455-5478); 10-20% cumulus (frames 5499-5504)
W - X	5505-5510	17:43:42	17:46:00	"	Clear

# AOCI SCANNER FLIGHT LINE DATA

## FLIGHT NO. 94-123

DAGDALUS FLIGHT DATA  
FLIGHT NUMBER: 94-123

Check Points	Act u a l t i a v (GMT) 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	Scan s p e e d (f p s)	t o t a l b 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-G	15:24:2.0 15:22:17.0	51542 55500	65000/17812	6.25	1757	0	0
C-D	15:37:19.0 15:43:44.0	56570 58946	65000/19812	6.25	2377	0	0
E-F	15:46:3.0 15:50:36.0	59837 61617	65000/17812	6.25	1783	0	0
G-H	15:53:52.0 15:58:40.0	62708 64490	65000/19812	6.25	1763	0	0
I-J	16:01:21.0 16:04:17.0	65400 66557	65000/17812	6.25	1090	0	0
K-L	16:08:49.0 16:13:6.0	68252 69836	65000/19812	6.25	1585	0	0
M-N	16:16:18.0 16:20:13.0	71024 72507	65000/17812	6.25	1486	0	0
O-P	16:22:58.0 16:26:11.0	73499 74667	65000/19812	6.25	1189	0	0
QR	16:32:31.0 16:36:11.0	77162 82112	65000/17812	6.25	4751	0	0
S-T	16:52:35.0 17:04:36.0	86488 88943	65000/19812	6.25	4435	1	0
U-V	17:11:55.0 17:57:45.0	71517 101217	65000/17812	6.25	9703	0	0
W-X	17:43:38.0 17:46:19.0	103397 104387	65000/19812	6.25	991	0	0



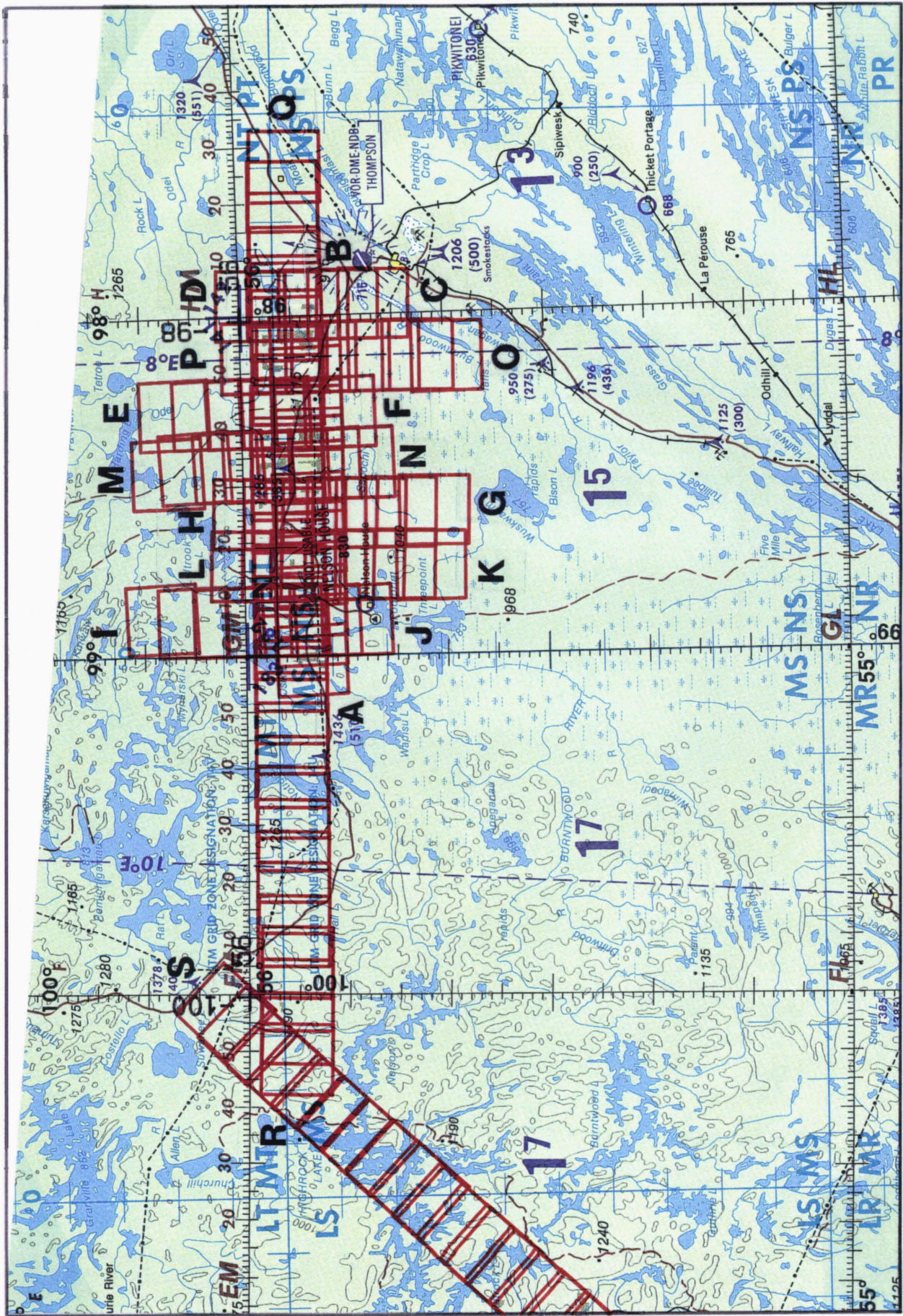
RC-10 / AVIRIS / AOCI

A/C 708

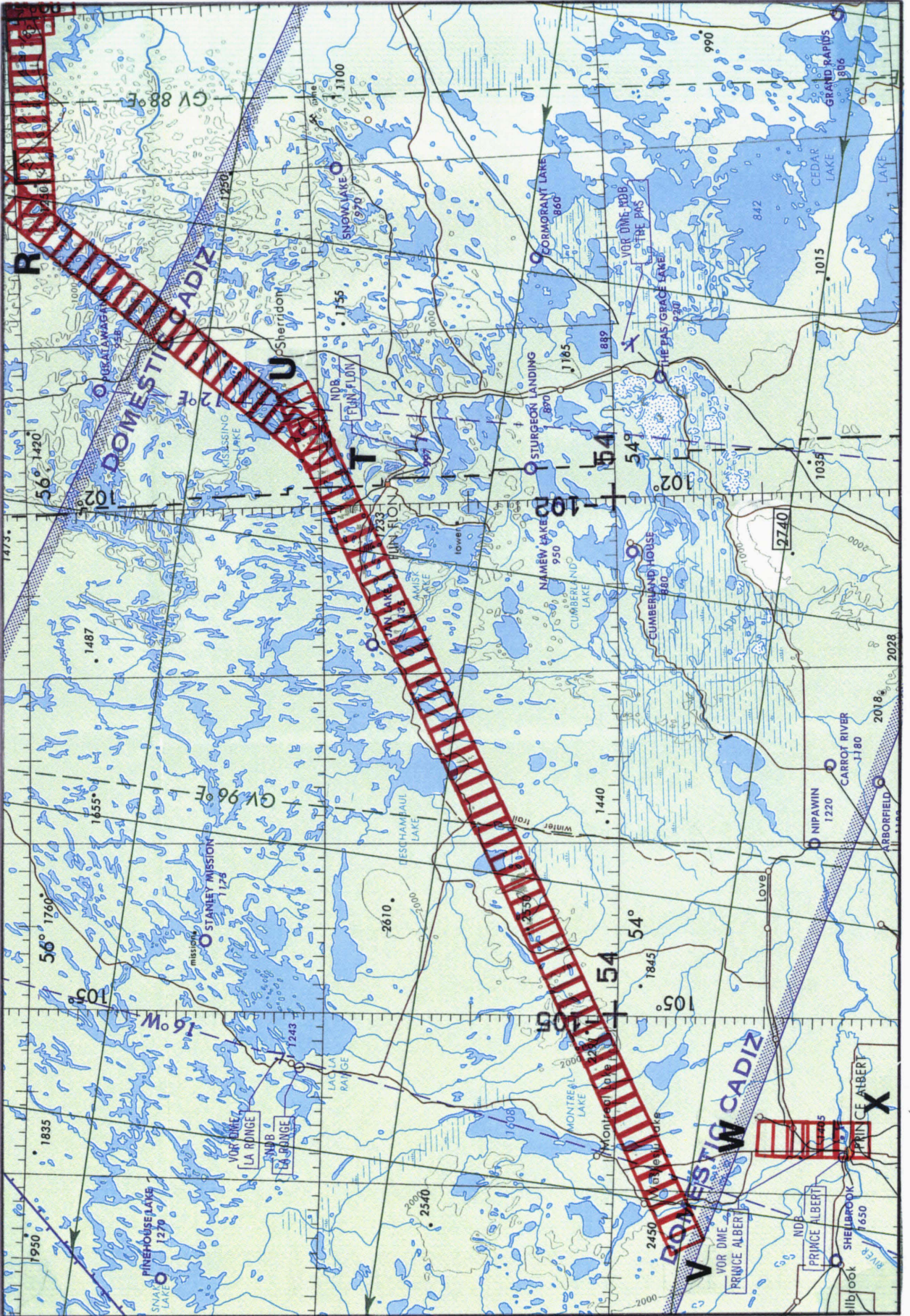
4 AUGUST 1994

FLIGHT 94-123





FLIGHT 94-123 4 AUGUST 1994 A/C 708 FC-10 / AVIRIS / AOCI ONC E-16



FLIGHT 94-123      4 AUGUST 1994      A/C 708      RC-10 / AVIRIS / AOCI      JNC 18