FLIGHT SUMMARY REPORT

Flight Number: 94-014

Calendar/Julian Date: 02 December 1993 • 336

Sensor Package: Wild-Heerbrug RC-10
Airborne Ocean Color Imager (AOCI)
Thermal Infrared Multispectral Scanner (TIMS)

Area(s) Covered: Atchafalaya Flood Basin, LA/Sarasota, FL

Investigator(s): Ferry Flight **Aircraft #:** 708

SENSOR DATA

Accession #:	04652	-----	-----
Sensor ID #:	076	090	086
Sensor Type:	RC-10	AOCI	TIMS
Focal Length:	12" 304.89 mm	-----	-----
Film Type:	High Definition Aerochrome IR SO-131	-----	-----
Filtration:	None	-----	-----
Spectral Band:	510-900 nm	-----	-----
f Stop:	4	-----	-----
Shutter Speed:	1/200	-----	-----
# of Frames:	15	-----	-----
% Overlap:	60	-----	-----
Quality:	Fair	Excellent	Fair
Remarks:			

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 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:

Channel	Wavelength, *μm*
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

Thermal Infrared Multispectral Scanner

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2 μm to 12.2 μm region.

Channel	Wavelength, μm	NET
1	8.2 - 8.6	< 0.3° C
2	8.6 - 9.0	< 0.3° C
3	9.0 - 9.4	< 0.3° C
4	9.4 - 10.2	< 0.3° C
5	10.2 - 11.2	< 0.3° C
6	11.2 - 12.2	< 0.3° C

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56°
Swath Width:	16.9 nmi (31.3 km) at 65,000 feet
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

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. 94-014

Accession # 04652

Sensor # 076

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
E - F	9648-9653	15:54:45	15:57:07	60000/18300	10% cumulus (frames 9648-9653)
K - L	9654-9662	17:12:35	17:16:19	65000/19800	10% cumulus (frame 9662)

TIMS SCANNER FLIGHT LINE DATA

FLIGHT NO. 94-014

TIMS FLIGHT DATA
FLIGHT NUMBER: 94-014

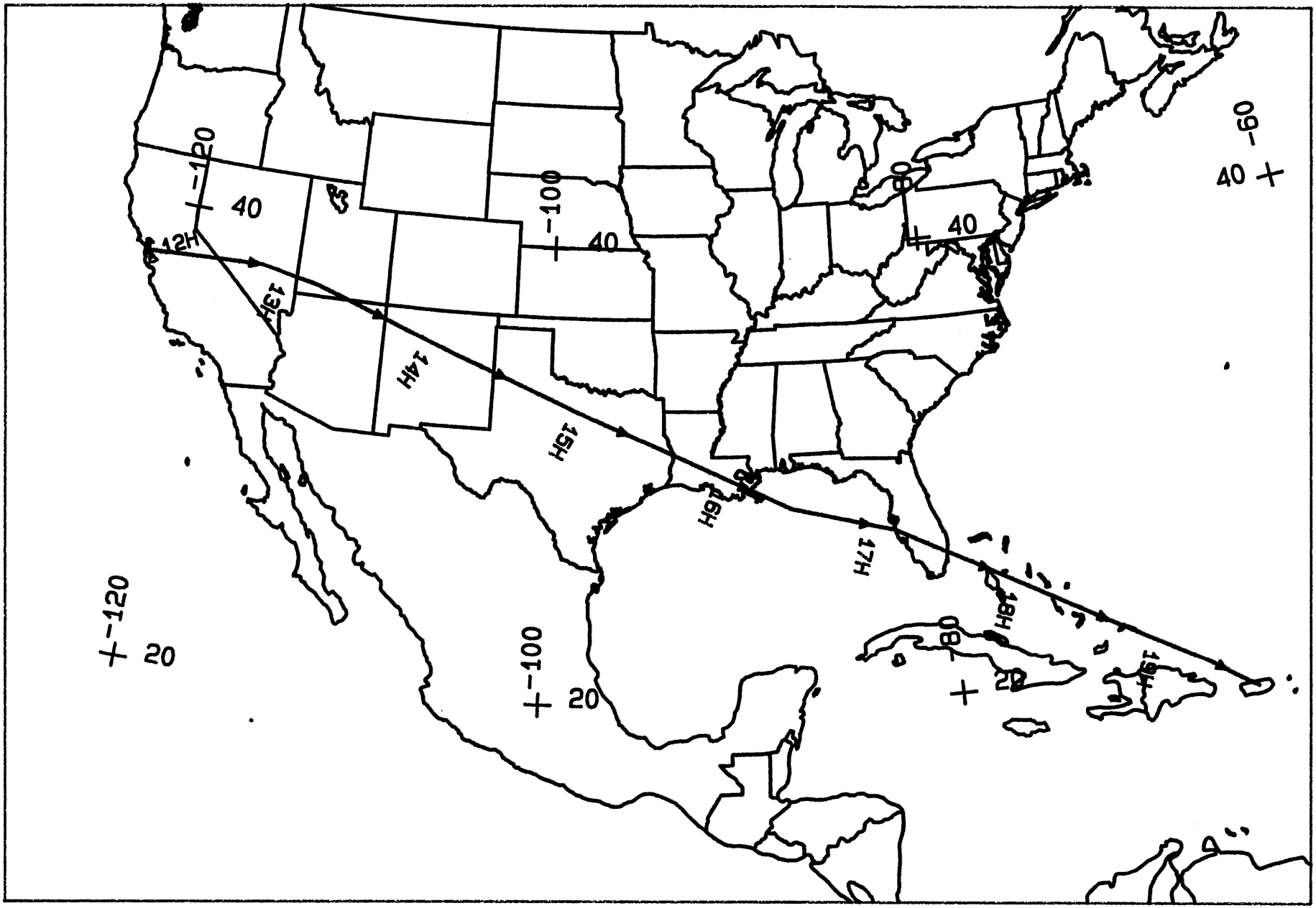
Check Points	Actual Time (GMT) Begin	End	Actual Scanline Begin	End	Altitude feet/meter	Scan Speed (rps)	Total Good Scanlines	Total Interpolated Scanlines	Total Repeated Scanlines
A-B	13:02:40.0	13:10:23.0	31105	34489	65000/19812	7.30	3385	0	0
C-D	13:30:38.0	14:30:48.0	43365	69759	65000/19812	7.30	26395	0	0

AOCI SCANNER FLIGHT LINE DATA

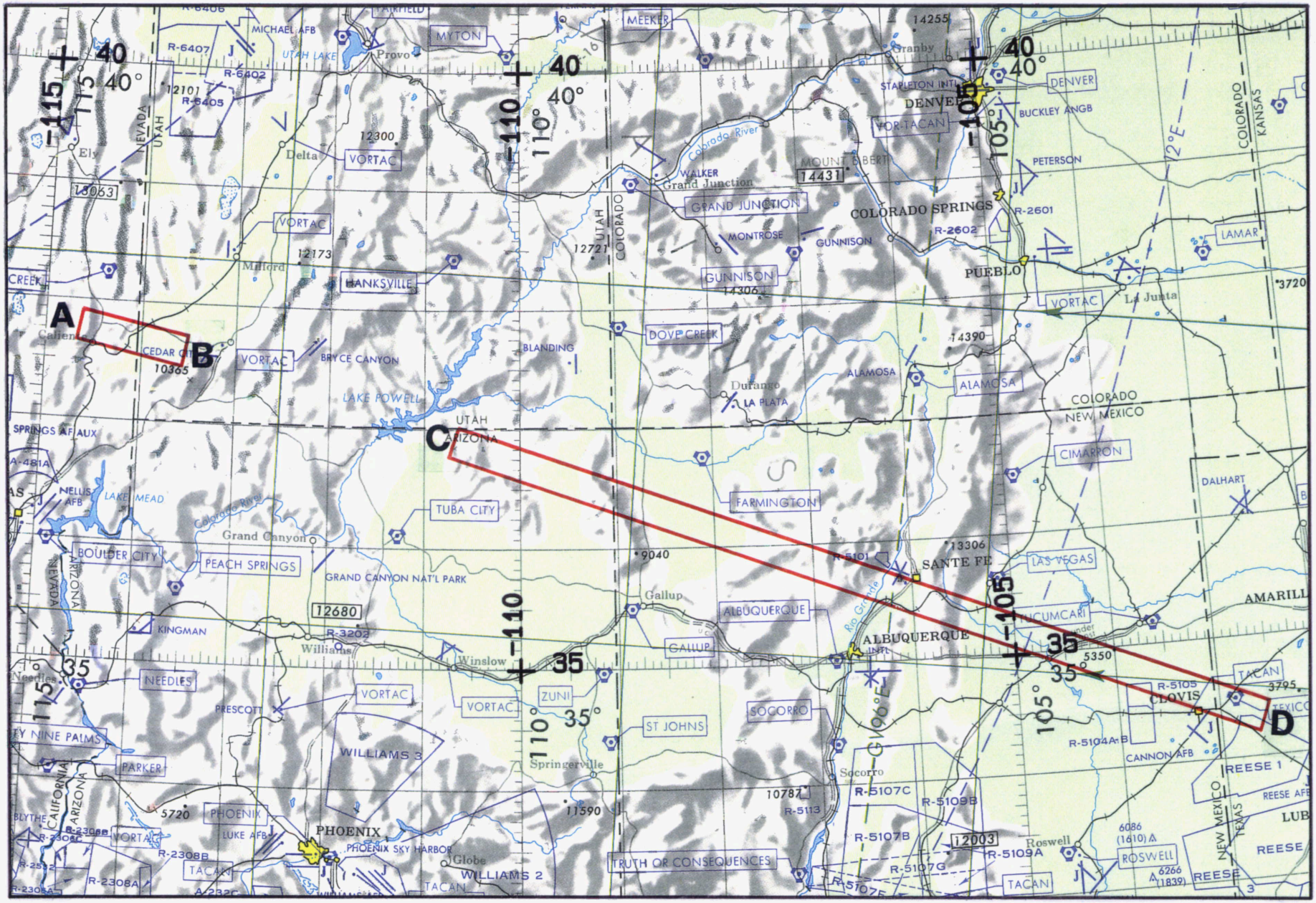
FLIGHT NO. 94-014

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 94-Ø14

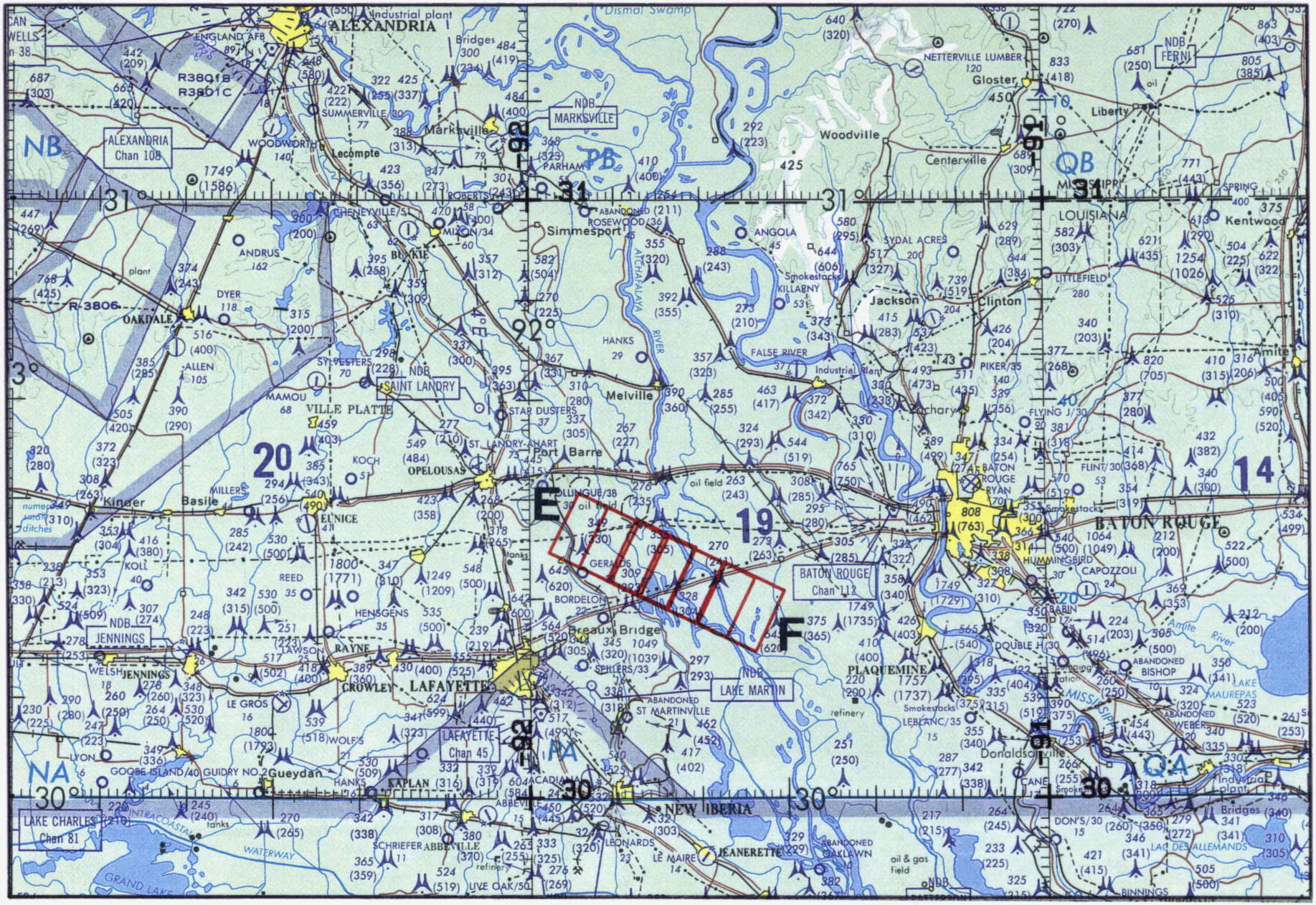
Check Points	Actual time (GMT) begin	Actual time (GMT) end	Actual scanline begin	Actual scanline end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
G-H	16:Ø4:24.Ø	16:19:52.Ø	94713	1ØØ512	65ØØØ/19812	6.25	58ØØ	Ø	Ø
I-J	17:Ø8: 8.Ø	17:11:52.Ø	1186Ø9	12ØØØ9	65ØØØ/19812	6.25	14Ø1	Ø	Ø
M-N	17:39:36.Ø	17:44:4Ø.Ø	13Ø4Ø9	1323Ø9	65ØØØ/19812	6.25	19Ø1	Ø	Ø



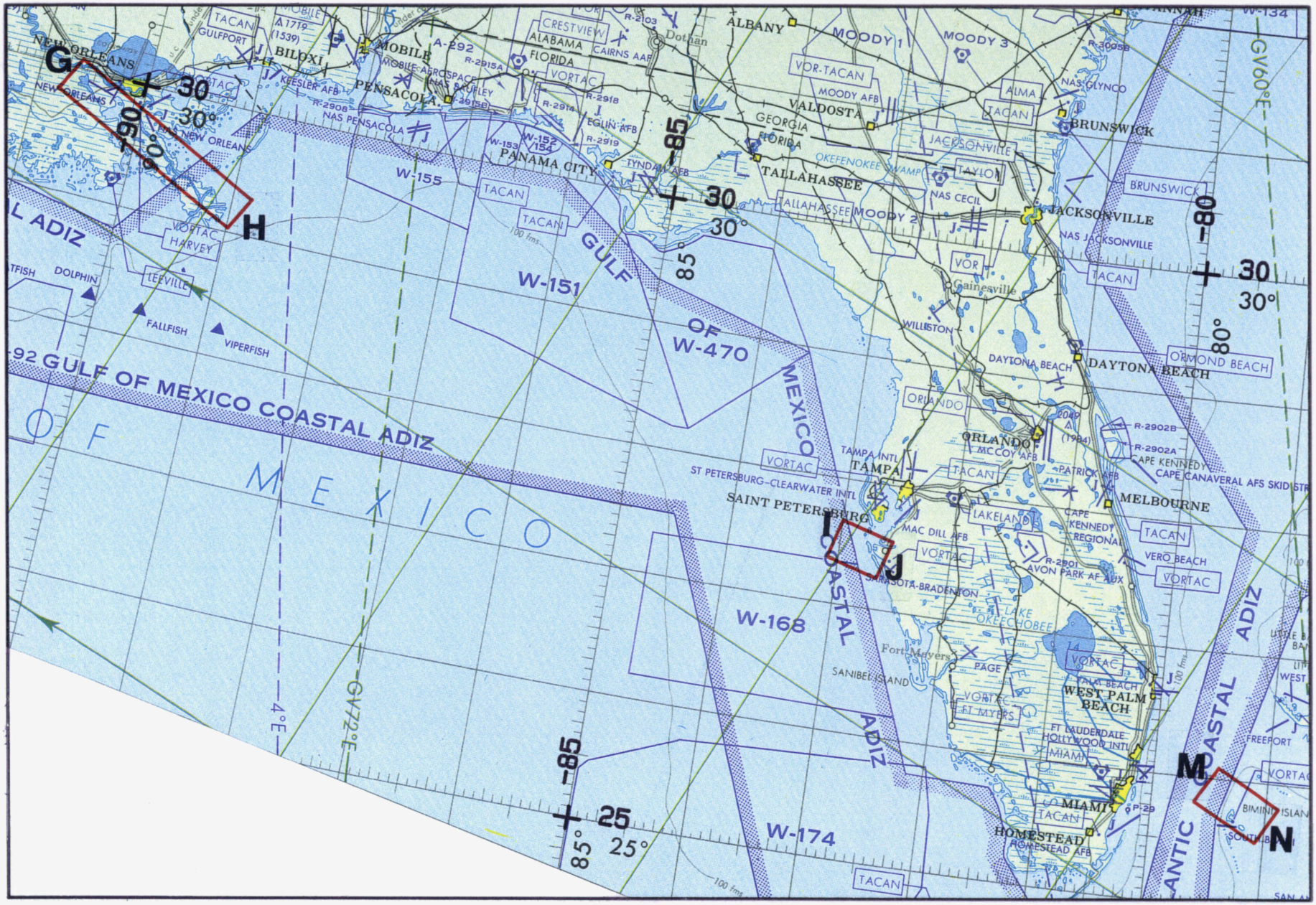
FLIGHT 94-014 FERRY FLIGHT TO PUERTO RICO 2 DECEMBER 1993 A/C 708 DUAL RC-10/AOCI



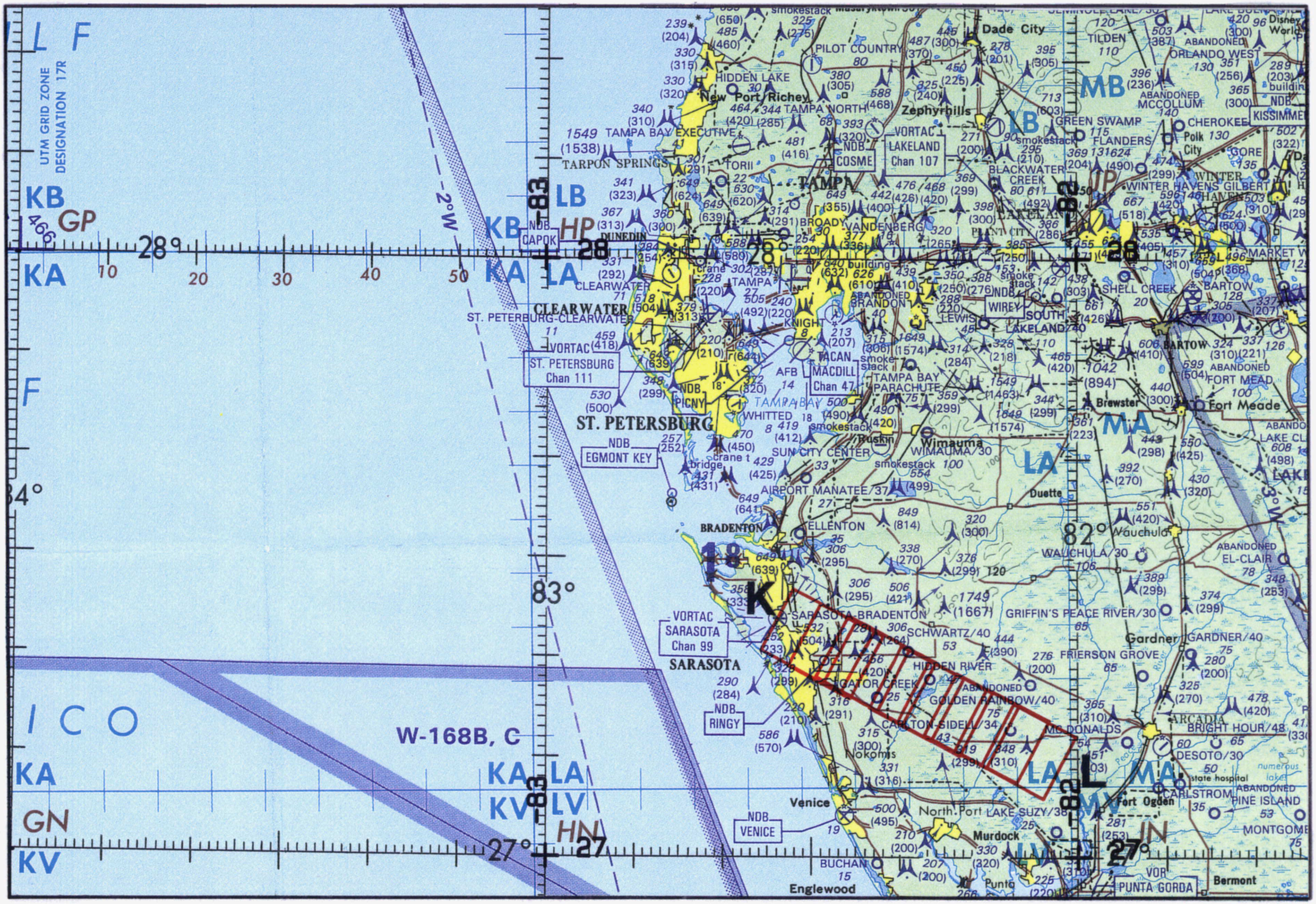
FLIGHT 94-014 2 DECEMBER 1993 A/C 708 TIMS GNC 2



FLIGHT 94-014 02 DECEMBER 1994 A/C 708 RC-10/AOCI/TIMS ONC H-24



FLIGHT 94-014 2 DECEMBER 1993 A/C 708 AOCI GNC 2



FLIGHT 94-014 02 DECEMBER 1994 A/C 708 RC-10/AOCI/TIMS ONC H-25