

FLIGHT SUMMARY REPORT

Flight Number: 10-943
Calendar/Julian Date: 29 August 2010 (241)
Sensor Package: Cirrus Digital Camera System (DCS)
Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)
MODIS/ASTER Airborne Simulator
Area(s) Covered: Gulf of Mexico
Investigator(s): Clark (USGS) **Aircraft:** ER-2 #809

SENSOR DATA

Accession #:	05966	—	—
Sensor ID #:	167	099	124
Sensor Type:	DCS	AVIRIS	MASTER
Focal Length:	50mm	—	—
Film Type:	—	—	—
Filtration:	Wratten 12	—	—
Spectral Band:	510-990nm	—	—
f-Stop:	11	—	—
Shutter Speed:	1/500	—	—
# of Frames:	267	—	—
% Overlap:	40%	—	—
Quality:	Excellent		Good
Remarks:			

NASA Airborne Science Program

The National Aeronautics and Space Administration maintains a variety of aircraft and sensor systems dedicated to the support of remote sensing research. Two Lockheed ER-2s (S-model U-2); two WB-57 high altitude aircraft; a DC-8; a Lockheed Orion P-3B; Global Hawk and the Altair unmanned aerial vehicle (supported by General Atomics) provide multi-level platforms for both NASA and investigator-owned sensors. Data are collected for atmospheric, land, and ocean processes in support of the NASA Earth Science program, as well as for universities and other government agencies.

Additionally contracted aircraft from Department of Energy, and Twin Otter International provide remote sensing platforms for the program.

The NASA aircraft, located at the Dryden Aircraft Operations Facility, Ellington Field and Wallops Flight Facility, are used as test-beds for advanced sensor design and satellite simulation, as well as to support scientific and operational data collection campaigns. Numerous sensor systems are in use and under development by NASA, including multispectral imaging devices, a SAR system, and a suite of medium-format digital cameras. All instruments are spectrally, spatially, and radiometrically calibrated on a routine basis. The aircraft themselves are equipped with navigation systems that continuously record GPS location and platform attitude data.

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 μm).

AVIRIS parameters are as follows:

IFOV:	1 mrad
Ground Resolution:	66 feet (20 meters) at 65,000 feet
Total Scan Angle:	34°
Swath Width:	5.9 nautical mile (11 km) at 65,000 feet
Spectral Coverage:	0.41-2.45 μm
Pixels/Scan Line:	677
Number of Spectral Bands:	224
Digitization:	12-bits
Data Rate:	20.4 MBPS

<u>Spectrometer</u>	<u>Wavelength Range</u>	<u>Number of Bands</u>	<u>Sampling Interval</u>
1	0.41 - 0.70 μm	31	9.4 nm
2	0.68 - 1.27 μm	63	9.4 nm
3	1.25 - 1.86 μm	63	9.7 nm
4	1.84 - 2.45 μm	63	9.7 nm

All AVIRIS data is processed and archived at JPL. For further information contact Rob Green at Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, California 91109-8099. <http://aviris.jpl.nasa.gov/>

MASTER (MODIS/ASTER Airborne Simulator)

The MODIS/ASTER Airborne Simulator (MASTER) is designed to closely match NASA's EOS ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer). It is intended primarily to study geologic and other Earth surface properties. It has a variable scan speed which allows data to be acquired on both high and low altitude aircraft. Its fifty spectral bands are configured below:

Band	Bandwidth	Resolution	Band	Bandwidth	Resolution
1	0.438-0.482	5-50m	26	3.075-3.231	5-50m
2	0.479-0.522	5-50m	27	3.231-3.377	5-50m
3	0.521-0.564	5-50m	28	3.385-3.535	5-50m
4	0.562-0.603	5-50m	29	3.538-3.694	5-50m
5	0.633-0.692	5-50m	30	3.692-3.826	5-50m
6	0.692-0.734	5-50m	31	3.846-3.999	5-50m
7	0.731-0.773	5-50m	32	3.999-4.154	5-50m
8	0.781-0.823	5-50m	33	4.157-4.310	5-50m
9	0.848-0.889	5-50m	34	4.307-4.460	5-50m
10	0.886-0.927	5-50m	35	4.456-4.603	5-50m
11	0.927-0.966	5-50m	36	4.597-4.760	5-50m
12	1.582-1.636	5-50m	37	4.753-4.911	5-50m
13	1.638-1.691	5-50m	38	4.906-5.054	5-50m
14	1.694-1.745	5-50m	39	5.044-5.205	5-50m
15	1.749-1.801	5-50m	40	5.203-5.342	5-50m
16	1.803-1.853	5-50m	41	7.587-7.943	5-50m
17	1.852-1.898	5-50m	42	7.950-8.398	5-50m
18	1.896-1.953	5-50m	43	8.447-8.806	5-50m
19	1.956-2.006	5-50m	44	8.882-9.307	5-50m
20	2.057-2.105	5-50m	45	9.503-9.902	5-50m
21	2.134-2.185	5-50m	46	9.912-10.327	5-50m
22	2.185-2.236	5-50m	47	10.338-10.922	5-50m
23	2.233-2.284	5-50m	48	10.977-11.652	5-50m
24	2.294-2.363	5-50m	49	11.864-12.364	5-50m
25	2.362-2.426	5-50m	50	12.638-13.119	5-50m

Sensor/Aircraft Parameters:

Spectral Bands: 50 (16-bit resolution)
IFOV: 2.5mrad
Swath width: 19.9nm (36km) at 65,000ft
Ground Resolution 5-50m (variable w/ altitude)
Total FOV: 85.92 degrees
Pixels/Scanline: 716
Scan Rate: 6.25 – 25 Hz
URL Reference: <http://masterweb.jpl.nasa.gov>

Cirrus Digital Camera System (DCS)

Cirrus Digital Systems provides the digital camera. It consists of a Hasselblad camera body with a Kodak camera back and CCD array. It can be configured to acquire either false color infrared or natural color imagery.

Lens	Array Size	Array Width	Field of View (FOV)	Altitude (feet)	Ground Coverage	Nominal Resolution
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	65000	7.9nm	3.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	45000	5.4nm	2.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	28000	3.4nm	1.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	13000	1.6nm	0.7m

Note: Nominal resolution references the smallest target that can be imaged.

Airborne Sensor Facility

The Airborne Sensor Facility at NASA Ames Research Center web site:

<http://asapdata.arc.nasa.gov/>

Additional information regarding flight documentation to include archive searches may be obtained from the following:

Airborne Sensor Facility
MS 244-15
NASA Ames Research Center
Moffett Field, CA 94035
Telephone: (650)604-6252 (FAX 4987)

CAMERA FLIGHT LINE DATA

FLIGHT NO. 10-943

Accession # 05966

Sensor # 167

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Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	True Heading / Line ID
		START	END		
A - B	7535-7537	15:34:01	15:35:13	63900/19480	88° / Jefferson County Airport TX
B - A	7538-7540	15:42:14	15:43:26	64400/19630	270° / Jefferson County Airport TX
C - D	7541-7543	15:48:19	15:49:32	64100/19540	245° / Bolivar Penninsula Beaches
E - F	7544-7545	15:54:48	15:55:24	64800/19760	230° / Galveston Island Beaches
G - H	7546-7549	15:59:02	16:00:51	63500/19360	180° / Gulf of Mexico
I - J	7550-7553	16:07:34	16:09:22	62500/19060	152° / Gulf of Mexico
K - L	7554-7568	16:17:12	16:25:38	62300/18990	190° / Gulf of Mexico
L - M	7569-7597	16:28:40	16:45:33	62400/19020	117° / Gulf of Mexico
M - N	7598-7624	16:48:05	17:03:45	62800/19150	123° / Gulf of Mexico
O - P	7625-7655	17:11:41	17:29:46	62800/19150	296° / Gulf of Mexico
Q - R	7656-7671	17:33:55	17:42:57	63100/19240	334° / Gulf of Mexico
S - T	7672-7700	17:50:27	18:07:20	63400/19330	90° / Gulf of Mexico
U - V	7701-7723	18:28:26	18:41:42	63800/19450	55° / Gulf of Mexico

CAMERA FLIGHT LINE DATA

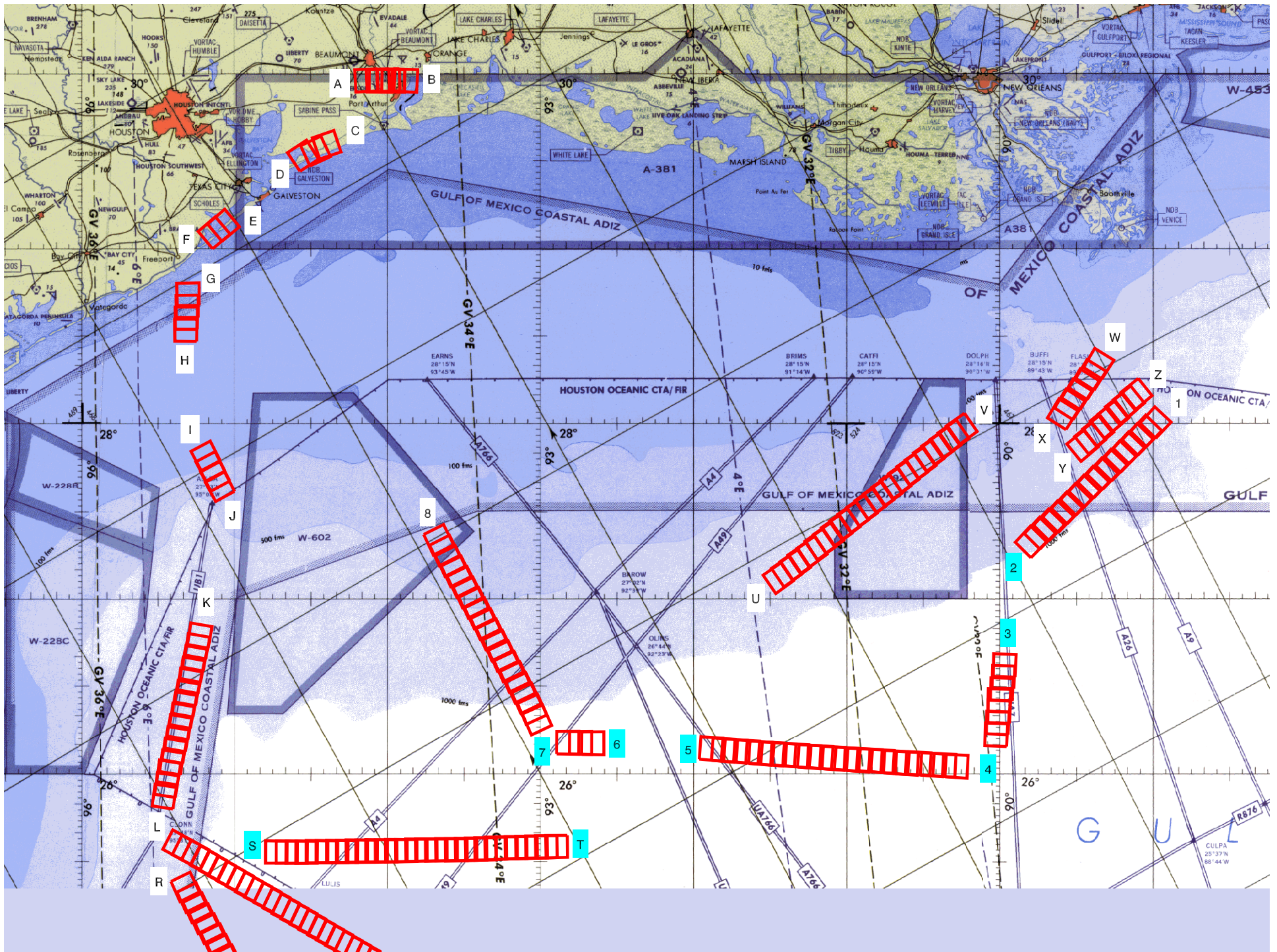
FLIGHT NO. 10-943

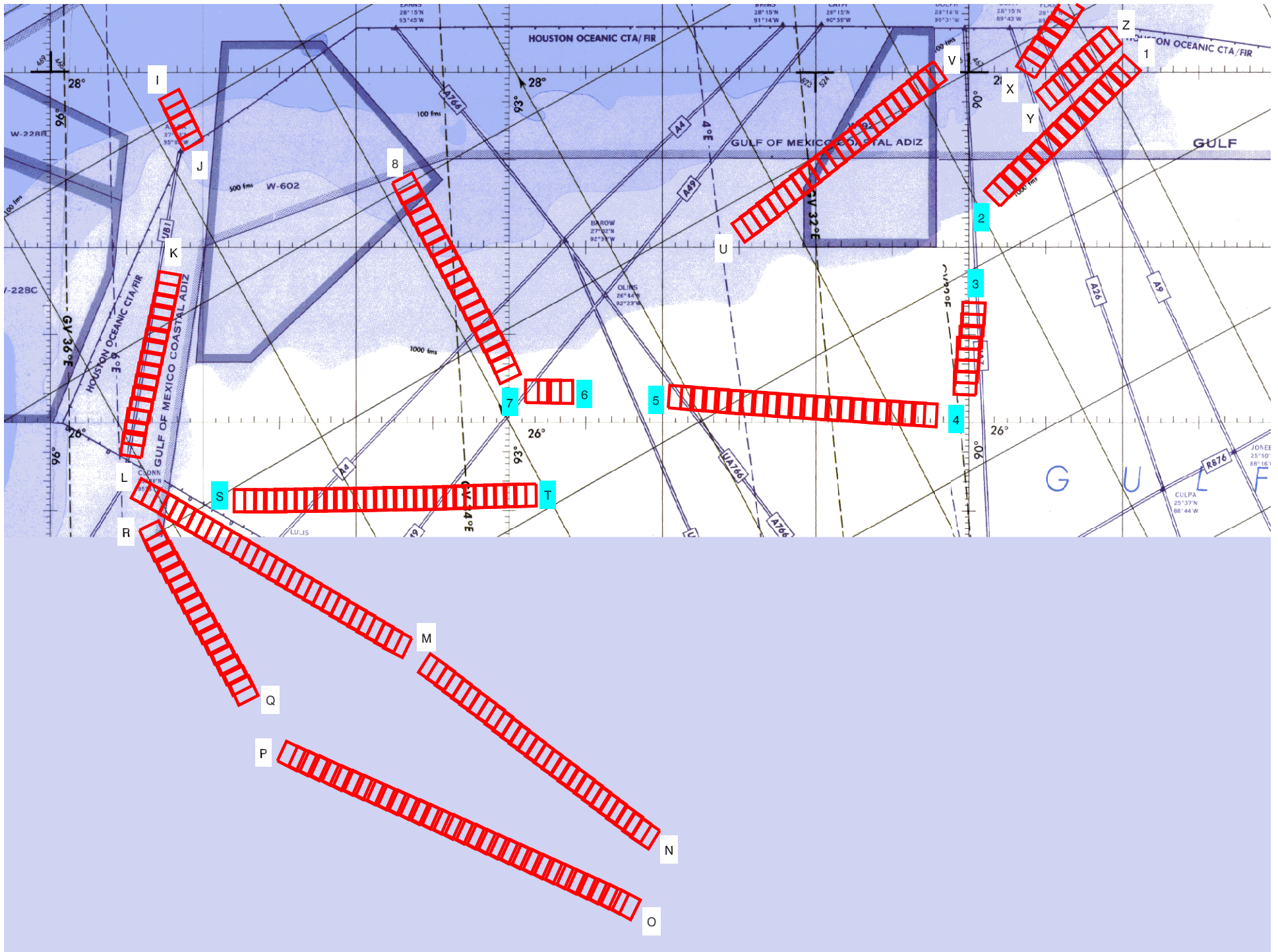
Accession # 05966

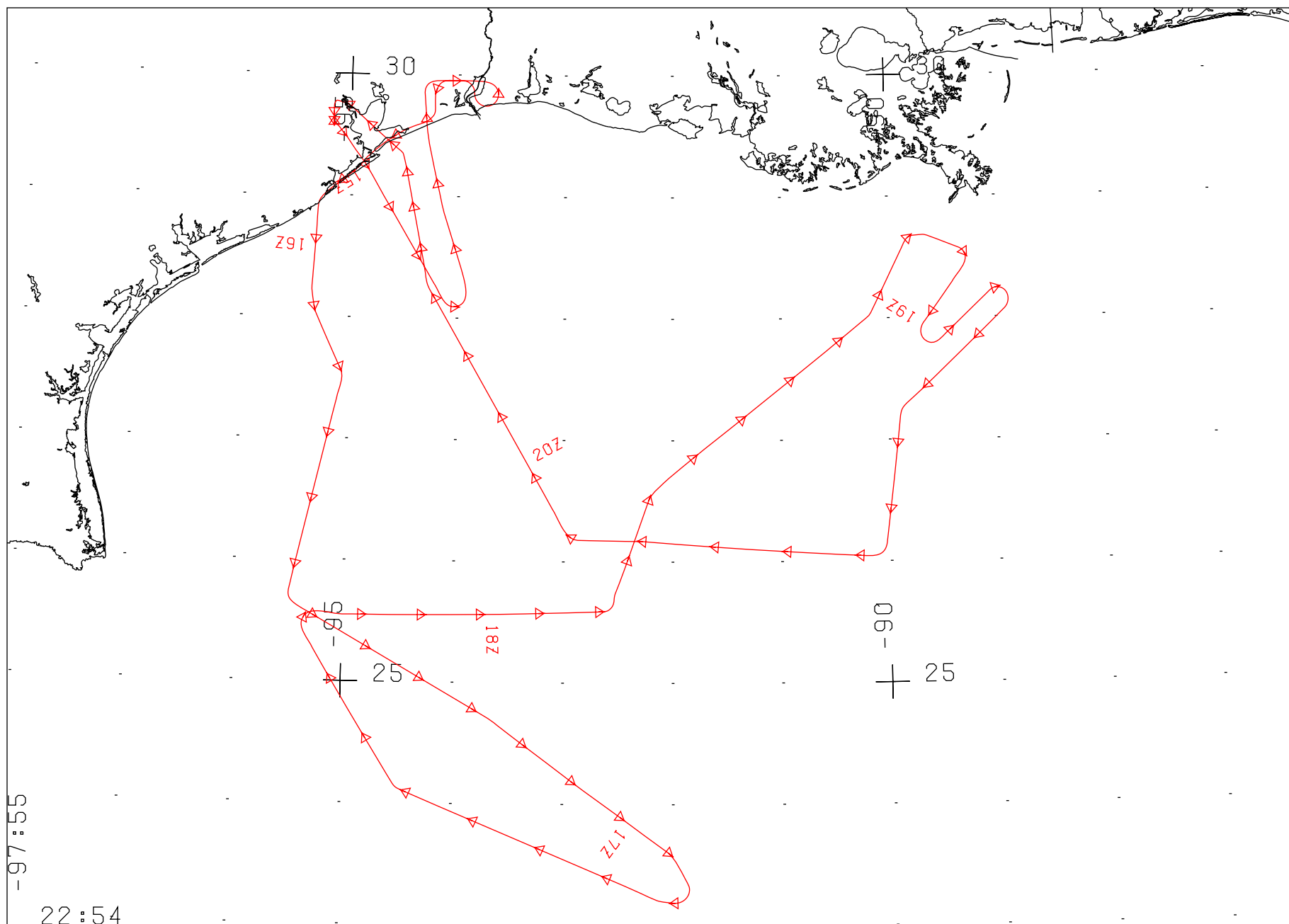
Sensor # 167

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Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	True Heading / Line ID
		START	END		
W - X	7724-7729	18:56:15	18:59:16	63600/19390	212° / Gulf of Mexico
Y - Z	7730-7737	19:03:52	19:08:05	63700/19420	51° / Gulf of Mexico
1 - 2	7738-7752	19:12:18	19:20:45	63800/19450	223° / Gulf of Mexico
3 - 4	7753-7759	19:27:30	19:31:07	64600/19700	182° / Gulf of Mexico
4 - 5	7760-7780	19:34:10	19:46:13	64700/19730	274° / Gulf of Mexico
6 - 7	7781-7783	19:52:03	19:53:16	64900/19790	270° / Gulf of Mexico
7 - 8	7784-7801	19:55:15	20:05:30	65000/19820	335° / Gulf of Mexico







FLIGHT 10-943 29 AUGUST 2010 A/C 809 AVIRIS / MASTER / DCS
 LAMBERT CONFORMAL PROJECTION: SP1 = 22.1 SP2 = 28.8 CM = -92.2 ROTATED BY 0.0
 14:50:00 TO 20:55:00 UT SCALE 1:4.88E+06 TIME TICK EVERY 5.00 MINUTES