

FLIGHT SUMMARY REPORT

Flight Number: 99-022
Calendar/Julian Date: 21 December 1998 • 355
Sensor Package: Modis Airborne Simulator (MAS)
Advanced Microwave Precipitation Radiometer (AMPR)
Scanning High-Resolution Interferometer Sounder (HIS)
Area(s) Covered: Pacific Ocean (NOAA-15 Underflight)

Investigator(s): Moeller, University of Wisconsin

Aircraft #: 806

SENSOR DATA

Accession #:	----	----	----
Sensor ID #:	108	105	083
Sensor Type:	MAS 50	AMPR	S-HIS
Focal Length:	----	----	----
Film Type:	----	----	----
Filtration:	----	----	----
Spectral Band:	----	----	----
f Stop:	----	----	----
Shutter Speed:	----	----	----
# of Frames:	----	----	----
% Overlap:	----	----	----
Quality:	----	----	----
Remarks:			

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.

MODIS Airborne Simulator

The MODIS Airborne Simulator (MAS) is a modified Daedalus multispectral scanner configured to replicate the capabilities of the Moderate-Resolution Imaging Spectrometer (MODIS), an instrument to be orbited on an EOS platform. MODIS is designed for the measurement of biological and physical processes and atmospheric temperature sounding. The MODIS Airborne Simulator records fifty 16-bit channels of multispectral data and is configured as follows:

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
1	0.4649	0.0397	0.4451-0.4848
2	0.5494	0.0417	0.5285-0.5703
3	0.6550	0.0511	0.6294-0.6805
4	0.7024	0.0415	0.6816-0.7231
5	0.7431	0.0420	0.7221-0.7641
6	0.8248	0.0427	0.8034-0.8461
7	0.8667	0.0414	0.8460-0.8874
8	0.9072	0.0409	0.8867-0.9276
9	0.9476	0.0397	0.9277-0.9674
10	1.6422	0.0519	1.6163-1.6682
11	1.6975	0.0505	1.6722-1.7228
12	1.7499	0.0506	1.7245-1.7752
13	1.8014	0.0491	1.7768-1.8259
14	1.8548	0.0489	1.8303-1.8792
15	1.9044	0.0487	1.8801-1.9288
16	1.9553	0.0483	1.9312-1.9794
17	2.0048	0.0487	1.9804-2.0291
18	2.0551	0.0484	2.0309-2.0793
19	2.1037	0.0486	2.0794-2.1280

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
26	3.1192	0.1616	3.0384-3.2000
27	3.2809	0.1486	3.2066-3.3552
28	3.4330	0.1617	3.3521-3.5138
29	3.5940	0.1539	3.5170-3.6709
30	3.7449	0.1449	3.6724-3.8174
31	3.9069	0.1602	3.8267-3.9870
32	4.0707	0.1554	3.9929-4.1484
33	4.1699	0.0669	4.1365-4.2034
34	4.4029	0.1255	4.3401-4.4656
35	4.5404	0.1512	4.4648-4.6160
36	4.6979	0.1591	4.6184-4.7775
37	4.8536	0.1516	4.7778-4.9294
38	5.0033	0.1468	4.9298-5.0767
39	5.1588	0.1400	5.0888-5.2288
40	5.3075	0.1327	5.2412-5.3738
41	5.3977	0.0755	5.3590-5.4365
42	8.5366	0.3950	8.3391-8.7341
43	9.7224	0.5365	9.4541-9.9906
44	10.5071	0.4579	10.278-10.736

20	2.1532	0.0483	2.1291-2.1774
21	2.2019	0.0481	2.1779-2.2259
22	2.2522	0.0486	2.2278-2.2675
23	2.3021	0.0487	2.2777-2.3265
24	2.3512	0.0476	2.3274-2.3750
25	2.4005	0.0483	2.3764-2.4246

45	11.0119	0.4710	10.776-11.247
46	11.9863	0.4196	11.776-12.196
47	12.9013	0.3763	12.713-13.089
48	13.2702	0.4584	13.041-13.500
49	13.8075	0.5347	13.540-14.075
50	14.2395	0.3775	14.051-14.428

NOTE: Bandpass centers approximate

Sensor/Aircraft Parameters:

Spectral Bands: 50 (digitized to 16-bit resolution)
IFOV: 2.5 mrad
Ground Resolution: 163 feet (50 meter at 65,000 feet)
Swath Width: 22.9 mi/19.9 nmi (36 km)
Total Scan Angle: 85.92°
Pixels/Scan Line: 716
Scan Rate: 6.25 scans/second
Ground Speed: 400 kts (206 m/second)
Roll Correction: Plus or minus 3.5 degrees (approx.)

Advanced Microwave Precipitation Radiometer

The Advanced Microwave Precipitation Radiometer (AMPR) is a scanning passive microwave radiometer operating at frequencies of 10, 19, 37, and 85 GHz. The AMPR is configured to fit into the Q-bay of the ER-2 and scans cross-track +/- 45° to the left and right of nadir. The instrument's principle use is for gathering microwave image data of cloud water and precipitation primarily over the ocean. Some data collected also will be used for studies of vegetation, ground moisture, sea surface state, and snow cover. The AMPR is sponsored by Dr. Roy W. Spencer, NASA/MSFC, ES43, Huntsville, Alabama 35812.

Scanning High-Resolution Interferometer Sounder

The Scanning High-Resolution Interferometer Sounder (S-HIS) is a scanning MWIR to LWIR interferometer obtaining 2 km resolution with 36 kilometer swath width. S-HIS measures upwelling infrared spectral radiance at the aircraft altitude with high absolute accuracy using a passive Michelson interferometer and precision onboard blackbody calibration sources. The instrument has a single nadir staring field of view with observed spectra obtained every six seconds. The spectra cover the range 16.6 microns to 3.3 microns with a spectral resolution of 0.3 to 0.5 cm-1. The primary use of the instrument is as an atmospheric sounder of temperature and water vapor. The spectra also contain important information on trace gases and surface properties. The S-HIS was developed by the University of Wisconsin at Madison and is a prototype instrument for advanced infrared satellite sounders. For information on the Scanning HIS and HIS instruments refer to these web pages:

<http://cimss.ssec.wisc.edu/wintex/instruments.html>
<http://cimss.ssec.wisc.edu/his/hishome.html>

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 and 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 (address provided in following paragraph).

Flight Documentation and Data Archive Searches

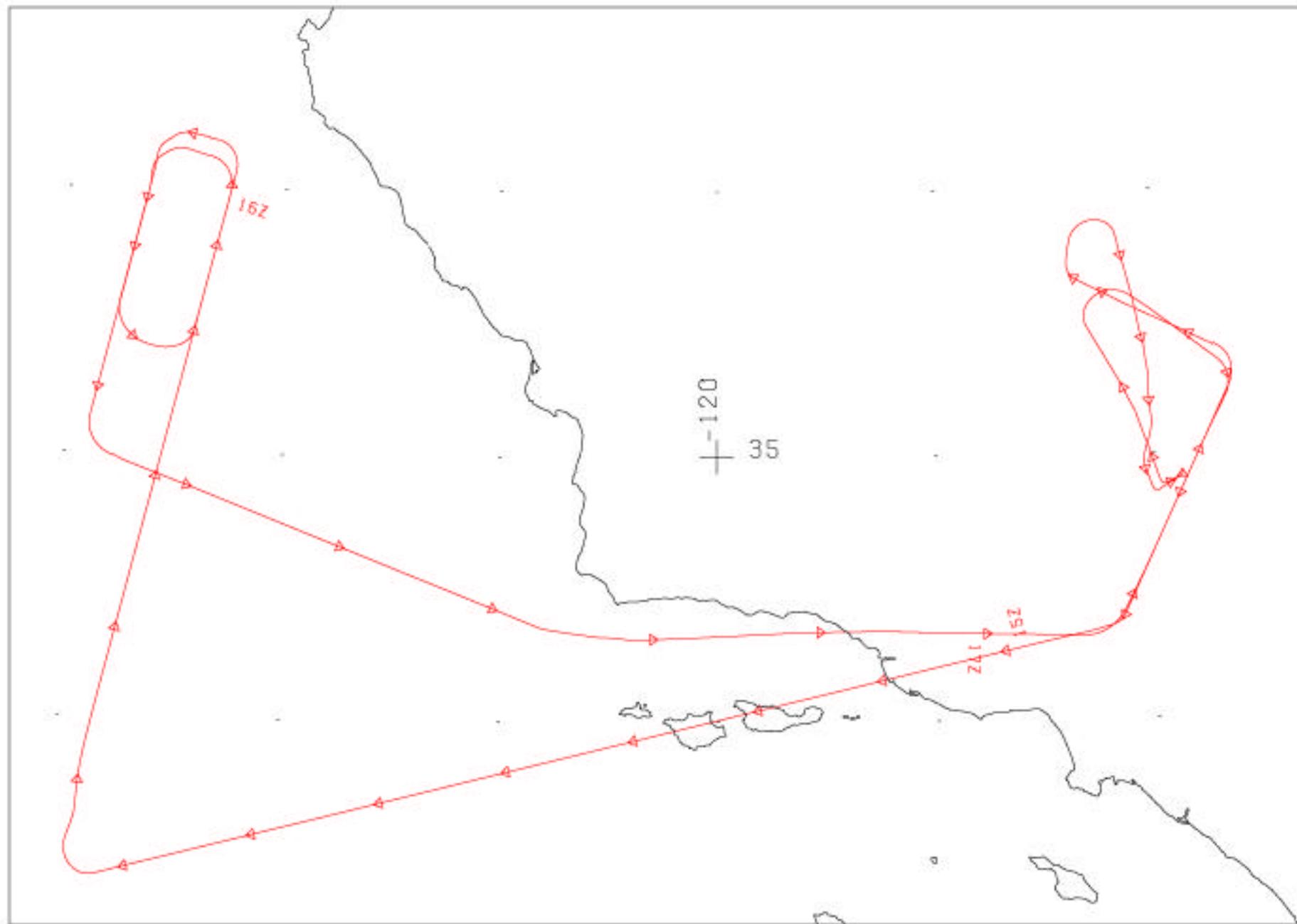
The following is the web site for flight documentation published by the Airborne Sensor Facility at NASA Ames Research Center: <http://asapdata.arc.nasa.gov/er-2fsr.html>

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 AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 21-DEC-1998 FLIGHT 99-022

START OF FLIGHT LINE							END OF FLIGHT LINE					
LINE	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR ZEN AZIM		START HEADING	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR ZEN AZIM		SCAN LINES
1	14:48:45	35.046	-117.763	92.1	117.4	213.32	14:55:48	34.401	-118.134	90.8	118.2	2637
2	14:57:19	34.339	-118.279	90.6	118.4	258.34	15:17:07	33.903	-120.523	88.4	119.9	7415
3	15:17:08	33.901	-120.530	88.4	119.9	255.57	15:36:54	33.411	-122.809	86.3	121.4	7405
4	15:40:03	33.674	-122.927	85.7	121.9	4.29	15:50:05	34.843	-122.600	84.4	123.7	3766
5	15:50:09	34.848	-122.594	84.4	123.7	6.88	16:00:24	35.978	-122.255	83.1	125.7	3843
6	16:05:25	35.992	-122.631	82.8	126.0	201.20	16:09:19	35.579	-122.753	82.0	126.5	1468
7	16:13:06	35.500	-122.400	80.8	127.6	7.11	16:18:07	36.058	-122.230	80.2	128.6	1881
8	16:22:41	36.088	-122.602	80.0	128.9	200.41	16:31:35	35.142	-122.879	78.2	130.1	3343
9	16:33:46	34.961	-122.689	77.4	130.6	112.10	16:42:48	34.554	-121.409	75.0	133.0	3387
10	16:42:52	34.550	-121.400	75.0	133.0	113.66	16:47:01	34.359	-120.820	73.9	134.2	1557
11	16:50:11	34.310	-120.347	73.1	135.1	89.91	16:54:47	34.335	-119.644	72.0	136.5	1726
12	16:54:55	34.337	-119.623	72.0	136.6	91.95	16:57:20	34.339	-119.255	71.4	137.3	907
13	16:57:25	34.338	-119.242	71.4	137.3	94.10	17:03:23	34.315	-118.330	70.1	139.2	2243
14	17:05:01	34.419	-118.127	69.8	139.9	20.81	17:12:34	35.235	-117.651	69.2	142.0	2836

NUMBER OF FILES FOR THIS FLIGHT = 14
 TOTAL NUMBER OF SCAN LINES = 44414
 DATE THESE FILES WERE PROCESSED = 18-Mar-99
 DATE THIS LIST WAS CREATED = 18-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-022

21 DECEMBER 1998

A/C 806

NRSSO / SCANNING HIS / AMPR