FLIGHT SUMMARY REPORT

Flight Number: 95-194

Calendar/Julian Date: 21 September 1995 • 264

Sensor Package: Wild Heerbrugg RC-10
Modis Airborne Simulator (MAS)
Lidar Atmospheric Sensing Experiment (LASE)
Millimeter-Wave Imaging Radiometer (MIR)

Area(s) Covered: Ferry flight Wallops to Moffett Field

Investigator(s): Browell, NASA-GSFC
Spencer, NASA-MSFC

Aircraft #: 706

SENSOR DATA

Accession #:	05009	-----	-----	-----
Sensor ID #:	034	102	119	114
Sensor Type:	RC-10	MAMS	LASE	MIR
Focal Length:	12" 304.66 mm	-----	-----	-----
Film Type:	Panatomic X Acrographic II 2412	-----	-----	-----
Filtration:	Wratten 12	-----	-----	-----
Spectral Band:	510-700 nm	-----	-----	-----
f Stop:	11	-----	-----	-----
Shutter Speed:	1/150	-----	-----	-----
# of Frames:	332	-----	-----	-----
% Overlap:	60%	-----	-----	-----
Quality:	Excellent	-----	-----	-----
Remarks:		See spread sheet		

CAMERA FLIGHT LINE DATA
FLIGHT NO. 95-194

Accession # 05009

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
A - B	8969-8987	17:55:28	18:04:03	62000/18900	10-90% cumulus (frames 8969-8978); 10% cumulus (frames 8980-8982 and 8986-8987); oblique (frames 8985-8987)
B - C	8988-9103	18:04:31	18:59:09	"	10% cumulus (frames 9005-9007); 10-40% cumulus (frames 9015-9021 and 9024-9028); 10% cumulus (frames 9033-9038); 10-40% cumulus (frames 9048-9062 and 9065-9103)
C	9104-9144	18:59:38	19:18:31	"	Oblique frames; 10-40% cumulus (frames 9104-9111 and 9114-9125); 10-20% cumulus (frames 9128-9138); 10% cumulus (frame 9144)
C - B	9145-9267	19:18:59	20:16:19	"	10-50% cumulus (frames 9145-9201); 10-20% cumulus (frames 9209-9221); 10% cumulus (frames 9240-9241); 10-20% cumulus (frames 9250-9252); 10-100% cumulus (frames 9255-9267); oblique (frames 9265-9267)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 95-194

Accession # 05009

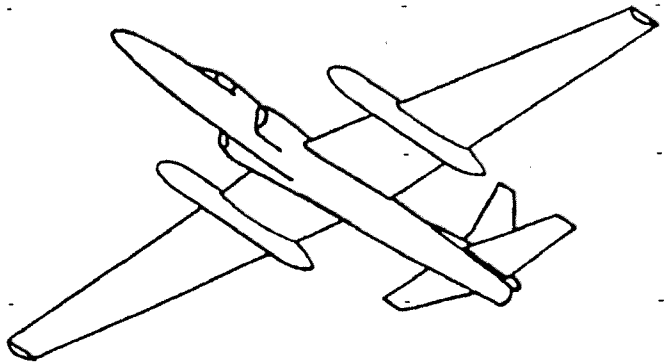
Sensor # 034

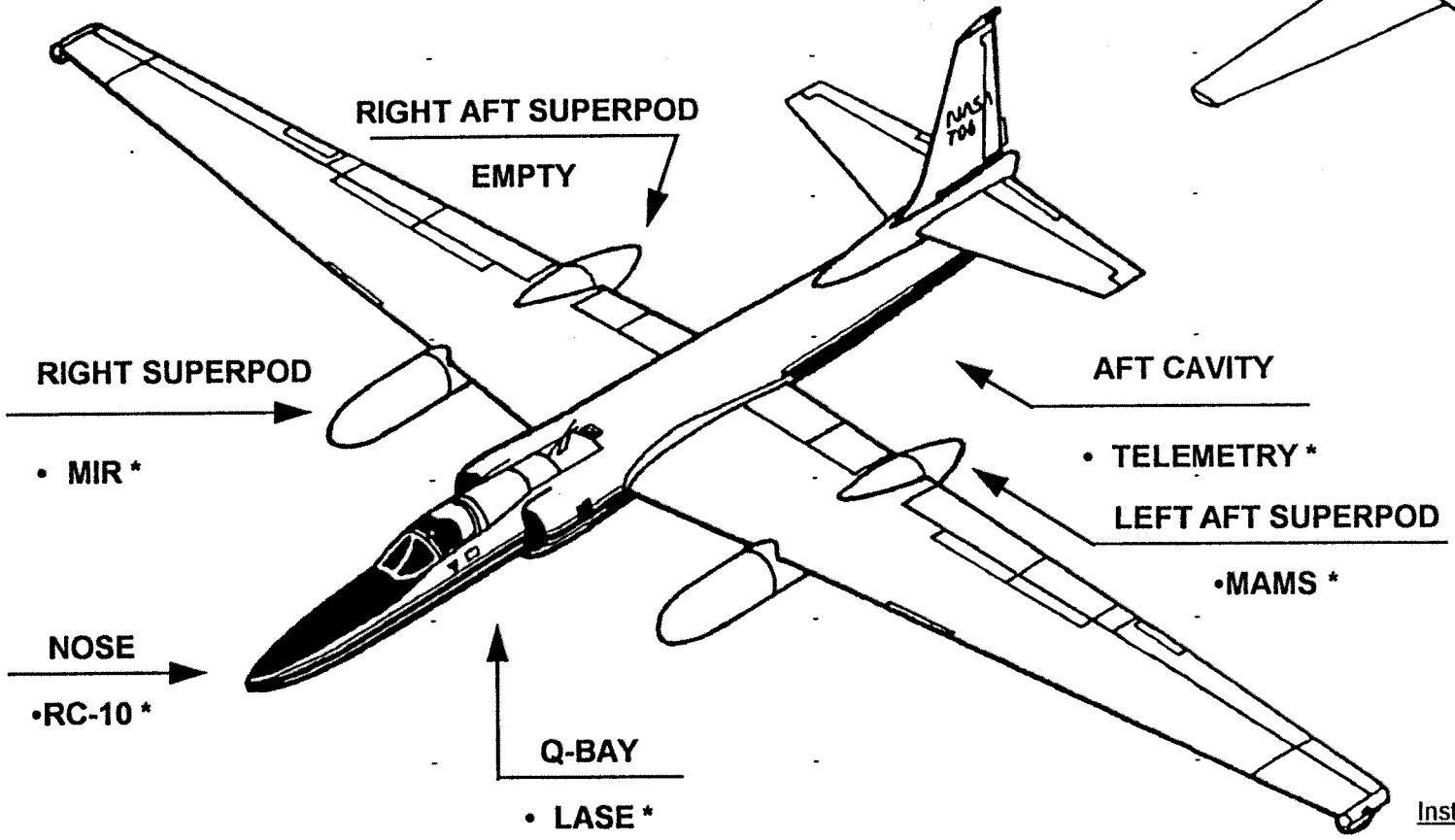
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
B - D	9268-9300	20:16:47	20:31:47	62000/18900	10-100% cumulus (frames 9268-9276); 10% cumulus (frames 9279-9286); 20-80% cumulus (frames 9287-9300)

GVEX

PROJECT MANAGER: JOHN ARVESEN

AIRCRAFT 706





Instrument Status

†† New Instument (FRR)
† Repackage Instrrument (FRR)
** Recertify Instrument
* Current Instrument

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.

Multispectral Atmospheric Mapping Sensor

The Multispectral Atmospheric Mapping Sensor (MAMS) is a modified Daedalus Scanner flown aboard the ER-2 aircraft. It is designed to study weather related phenomena including storm system structure, cloud-top temperatures, and upper atmosphere water vapor. The scanner retains the eight silicon-detector channels in the visible/near-infrared region found on the Daedalus Thematic Mapper Simulator, with the addition of four channels in the thermal infrared relating to specific water vapor features. The specific bands are as follows:

Daedalus Channel	Wavelength, *μm*
1	LSBs for Channels 9-12
2	0.45 - 0.52
3	0.52 - 0.60
4	0.57 - 0.67
5	0.60 - 0.73
6	0.65 - 0.83
7	0.72 - 0.99
8	0.83 - 1.05
9	3.55 - 3.93 low range
10	3.55 - 3.93 high range
11	10.3 - 12.1
12	12.5 - 12.8

Sensor specifications are as follows:

IFOV:	5.0 mrad
Ground Resolution:	325 feet (99 meters) at 65,000 feet
Total Scan Angle:	86°
Swath Width:	20 nmi (37 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 2-8
	10-bit channels 9-12

The data will not be archived at EROS Data Center because this is an experimental system with low spatial resolution and unique spectral characteristics. As all scenes will be primarily cloud-covered there would be little terrestrial application for the data. Further information concerning the data can be obtained from principal investigator, Gregory S. Wilson, Atmospheric Effects Branch, George C. Marshall Space Flight Center, National Aeronautics and Space Administration, Marshall Space Flight Center, Alabama 35812-5001.

LIDAR Atmospheric Sensing Experiment

The Lidar Atmospheric Sensing Experiment (LASE) program is based on tunable Ti:Sapphire laser transmitter. LASE is part of an overall NASA effort to develop and demonstrate an autonomous tunable Differential Absorption Lidar (DIAL) laser instrument for airborne and spaceborne experiments. Performance criteria of a DIAL instrument to measure water vapor and aerosol vertical profiles in the atmosphere have been defined through extensive development of mathematical simulations. One of the objectives of the LASE program is to verify and validate these mathematical simulations and conduct scientific investigations of tropospheric water vapor and aerosols on a broad spatial scale.

The LASE system will permit the measurement of tropospheric water vapor profiles and column content in many important areas of the atmospheric sciences, including studies of mesoscale meteorology, the atmospheric radiation budget, climate change and the hydrologic cycle. The simultaneous measurement of aerosol and cloud distributions can provide important information on atmospheric structure and transport, and many meteorological parameters also can be inferred from these data. In addition the impact of subvisible and visible aerosol /cloud layers on passive satellite measurements and radiation budgets can be assessed.

For additional information regarding the LASE Program contact E.V. Browell, NASA Langley Research Center, LASE Project Office, MS 486, Hampton, VA 23681. Telephone: (804)864-1731.

Millimeter-Wave Imaging Radiometer

The Millimeter-Wave Imaging Radiometer (MIR) is a nine channel radiometer developed for atmospheric research. Three dual pass band channels are centered about the strongly opaque 183 GHz water absorption line and a fourth channel is located at 150 GHz. These four channels have varying degrees of opacity from which the water vapor profile can inferred. There are two additional channels located at 89 GHz and 220 GHz. The design includes three additional channels centered about 325 GHz which are supplied by the Georgia Institute of Technology.

Frequencies and polarization were chosen to match those of the Advanced Microwave Sounding Unit-B (AMSU-B) planned for NOAA operational polar weather satellites and the Earth Observing System (EOS). Frequencies also match closely with those of the Special Sensor Microwave Temperature Sounder-2 (SSMT-2) now aboard the DMSP satellite.

Information regarding this instrument may obtained from Paul Racette, NASA-Goddard Space Flight Center, Code 975, Greenbelt, MD 20771.

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:

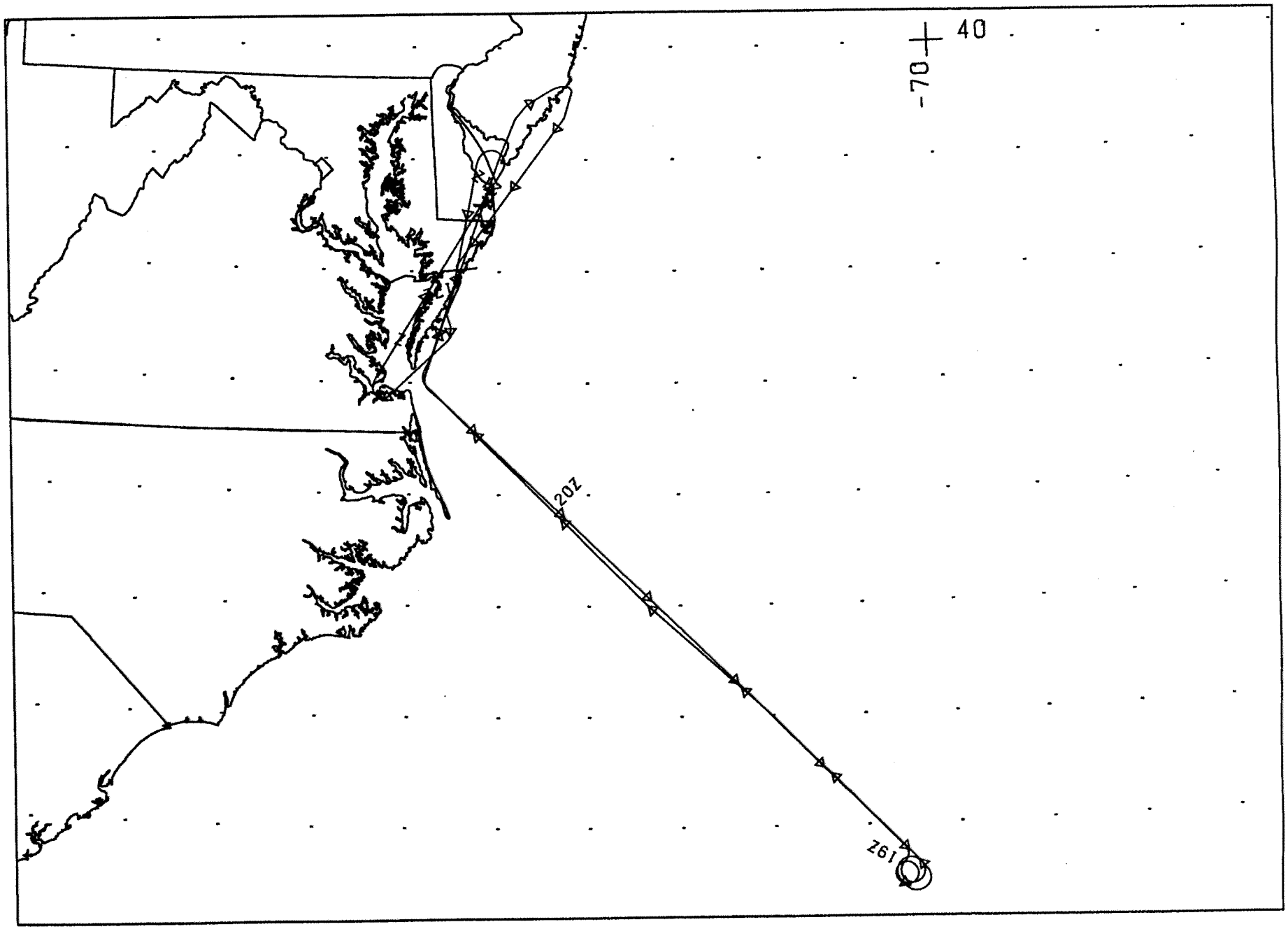
- Wild-Heerbrugg RC-10 metric mapping camera
  - 9 x 9 inch film format
  - 6 inch focal length lens provides area coverage of 16 x 16 nautical miles from 65,000 feet
  - 12 inch focal length lens provides area coverage of 8 x 8 nautical miles from 65,000 feet

- 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).

Additional 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, 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).



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