

# FLIGHT SUMMARY REPORT

**Flight Number:** 93-029  
**Calendar/Julian Date:** 10 December 1992 • 345  
**Sensor Package:** Wild-Heerbrug RC-10  
 Multispectral Atmospheric Mapping  
 Sensor (MAMS)  
 Large Area Collectors (LACs)  
 Aerosol Particulate Sampler (APS)  
**Area(s) Covered:** Texas

**Investigator(s):** Zolensky, NASA-JSC; Hagenbuck, USFWS; Menzel, U. of Wisconsin  
**Aircraft #:** 708

## SENSOR DATA

<b>Accession #:</b>	04531	-----	-----	-----
<b>Sensor ID #:</b>	026	080	100	024
<b>Sensor Type:</b>	RC-10	MAMS	LACs	APS
<b>Focal Length:</b>	12" 304.97 mm	-----	-----	-----
<b>Film Type:</b>	High Definition Aerochrome IR SO-131	-----	-----	-----
<b>Filtration:</b>	cc.10B	-----	-----	-----
<b>Spectral Band:</b>	510-900 nm	-----	-----	-----
<b>f Stop:</b>	4	-----	-----	-----
<b>Shutter Speed:</b>	1/200	-----	-----	-----
<b># of Frames:</b>	438	-----	-----	-----
<b>% Overlap:</b>	60	-----	-----	-----
<b>Quality:</b>	Excellent	Poor	-----	-----
<b>Remarks:</b>	18.5 sec. offset between camera and 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 sensors and camera system(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:

<u>Daedalus Channel</u>	<u>Wavelength, <math>\mu m</math></u>
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.

**NOTE:** Information on data tape format, logical record format, and scanner calibration data may be obtained from the NASA-Ames Aircraft Data Facility at (415) 604-6252.

### Large Area Collectors

The Large Area Collectors (LACs) are flown on NASA high altitude ER-2s in support of the NASA-Johnson Space Center Cosmic Dust Program. The LACs are used to collect comparatively unaltered cosmic dust from the stratosphere at ER-2 flight altitudes of 65,000 feet or higher. Sufficient quantities of extraterrestrial materials are collected to allow chemical and mineralogical compositions of individual particles to be determined. Study of these materials whose sources may be comets, asteroid collisions, planetary impacts, and meteorite ablation provide valuable information about the origin and history of the solar system.

Additional information regarding the Large Area Collectors may be obtained from Michael E. Zolensky, NASA-Johnson Space Center, SN2, Houston, Texas 77058 -- Telephone (713) 483-5128.

### Aerosol Particulate Sampler

The Aerosol Particulate Sampler (APS) has been developed and is operated by Dr. Guy Ferry of the NASA-Ames Research Experiments Branch. The sampler is a non-imaging sensor designed to gather high altitude dust particles for laboratory research.

### 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).

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).

**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 93-029**

Accession # 04531

Sensor # 026

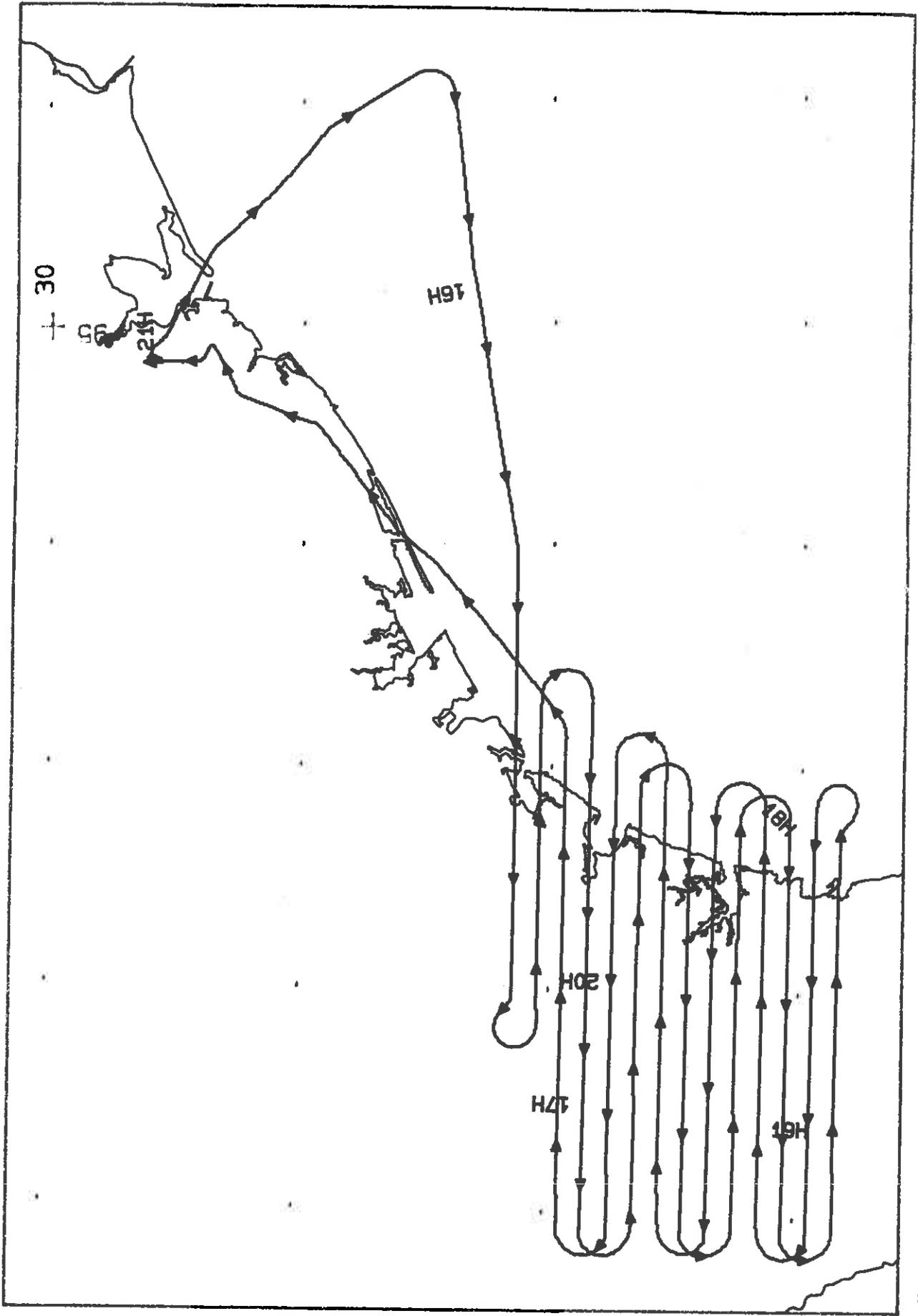
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	6610-6634	16:15:48	16:27:10	65000/19800	Clear
C - D	6635-6656	16:31:50	16:41:45	"	Clear
E - F	6657-6693	16:47:38	17:04:36	"	Clear
G - H	6694-6725	17:08:33	17:22:57	"	Clear
I - J	6726-6758	17:27:18	17:42:07	"	Clear
K - L	6759-6788	17:45:48	17:59:23	"	Clear
L - M	6789-6792	17:59:51	18:01:16	"	Clear; oblique frames in turn
N - O	6793-6823	18:03:14	18:17:18	"	Clear
P - Q	6824-6852	18:21:08	18:34:04	"	Clear
R - S	6853-6883	18:39:22	18:53:24	"	Clear

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Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
T - U	6884-6911	18:57:25	19:10:03	65000/19800	Clear
V - W	6912-6943	19:15:21	19:29:50	"	Clear
X - Y	6944-6974	19:33:28	19:47:29	"	Clear
Z - 1	6975-7010	19:52:55	20:09:15	"	Clear
2 - 3	7011-7047	20:13:17	20:29:36	"	Clear; smoke obstruction (frames 7026-7028)
APS					
X - Y		16:00:00	20:35:00	65000/19800	



RC-10 / MAMS

A/C 708

10 DECEMBER 1992

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