

FLIGHT SUMMARY REPORT

Flight Number: 93-146
Calendar/Julian Date: 03 August 1993 • 215
Sensor Package: Wild-Heerbrug RC-10
Hycon HR-732
Modis Airborne Simulator (MAS)
Area(s) Covered: Colorado, Rio Grande National Forest

Investigator(s): Weber, USFS

Aircraft #: 708

SENSOR DATA

Accession #:	04607	4608	-----
Sensor ID #:	026	038	108
Sensor Type:	RC-10	HR-732	MAS
Focal Length:	12" 304.97 mm	24" 609.6 mm	-----
Film Type:	High Definition Aerochrome IR SO-131	High Definition Aerochrome IR SO-131	-----
Filtration:	cc.10B	cc.10B	-----
Spectral Band:	510-900 nm	510-900 nm	-----
f Stop:	4	8	-----
Shutter Speed:	1/175	1/75	-----
# of Frames:	59	110	-----
% Overlap:	60	60	-----
Quality:	Excellent	Excellent	Good
Remarks:	Camera clock offset 1.33 minutes from navigation data	No offset between camera clock and navigation data (.10 seconds)	

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.

Modis Airborne Simulator

The Modis Airborne Simulator (MAS) is a modified Daedalus multispectral scanner. It records up to twelve 8-bit channels, which can be selected from an array of fifty available spectral bands. The band selection is made prior to flight and the instrument is hard-wired to that configuration. The following MAS band combination (configuration BOREAS) was used on this flight for BOREAS experiments:

<u>Data System Channel</u>	<u>MAS Channel</u>	<u>Band edges μm</u>
1	1	0.529 - 0.572
2	2	0.635 - 0.688
3	4	0.729 - 0.769
4	5	0.770 - 0.810
5	6	0.810 - 0.852
6	7	0.852 - 0.893
7	9	0.926 - 0.969
8	10	1.595 - 1.652
9	20	2.126 - 2.173
10	33	3.975 - 4.125
11	45	10.791 - 11.239
12	46	11.799 - 12.246

Sensor/Aircraft Parameters:

Spectral Channels:	50
Output Channels:	Twelve 8-bit
IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters at 65,000 feet)
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.)

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. 93-146**

Accession # 04607

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	5657-5684	17:25:27	17:37:39	65000/19800	10-30% scattered cumulus
C - D	5685-5710	17:41:48	17:53:59	"	10-30% scattered cumulus; emulsion defects (frames 5705-5706)
E - F	5711-5715	17:59:48	18:01:44	"	10-20% scattered cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-146

Accession # 04608

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0051	17:24:18	17:36:28	65000/19800	10-20% scattered cumulus; 20-40% cumulus (frames 0037-0039)
C - D	0052-0102	17:40:36	17:52:45	"	Clear-40% scattered cumulus; 10-90% thin strato-cumulus (frames 0087-0090)
E - F	0103-0110	17:58:35	18:00:17	"	Clear-40% cumulus

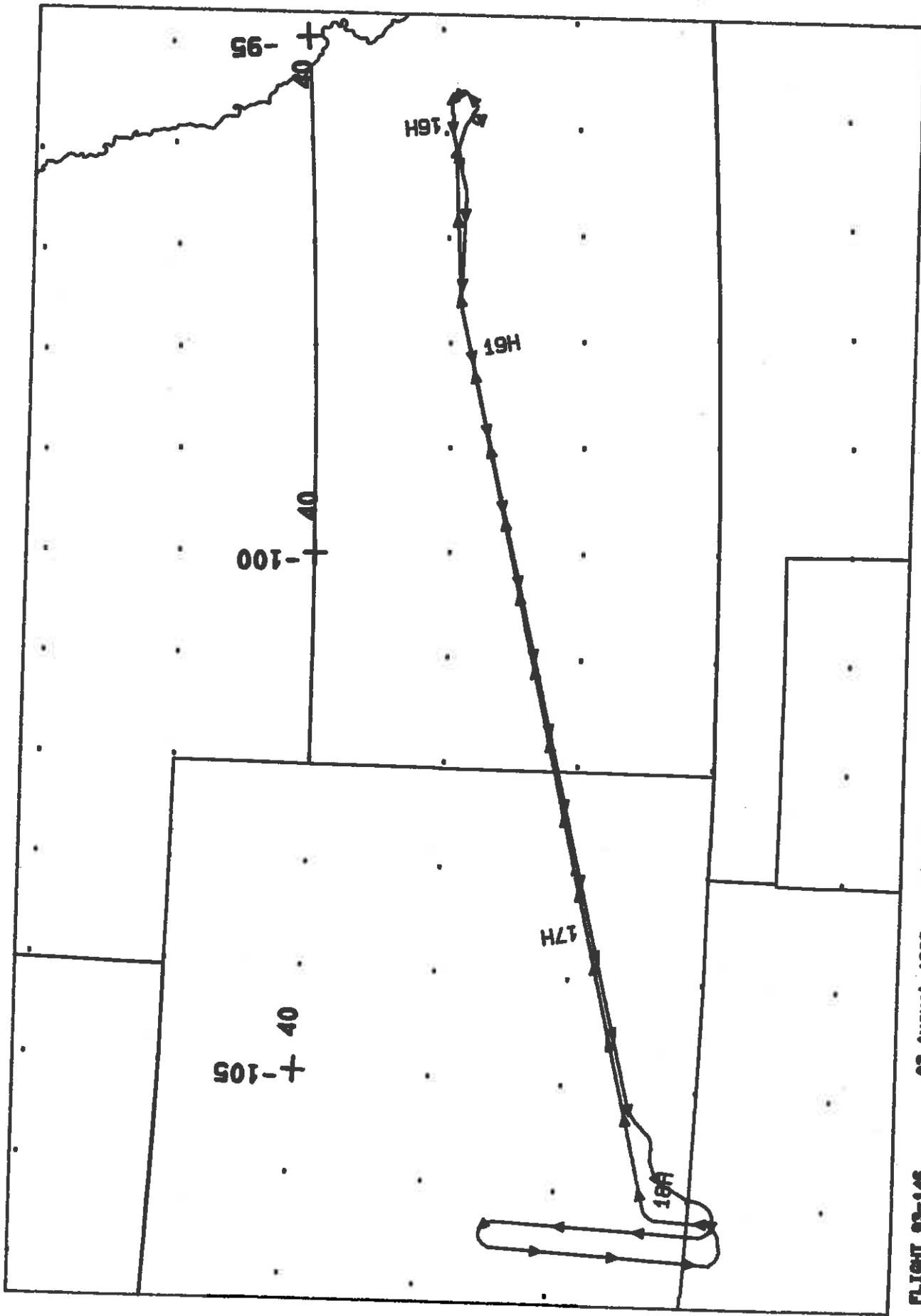
MAS SCANNER FLIGHT LINE DATA

FLIGHT NO. 93-146

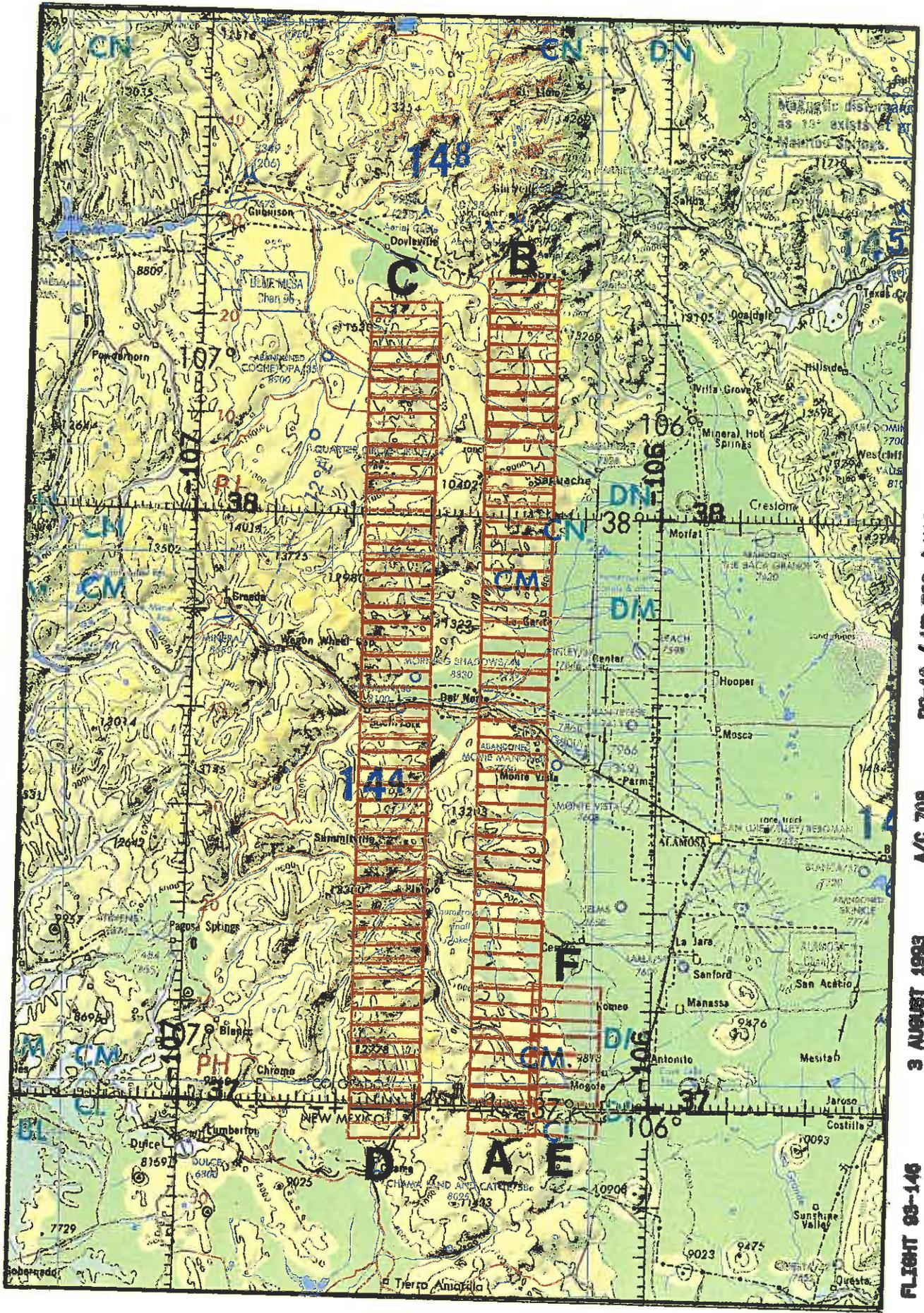
DAVIDALUS FLIGHT DATA
 FLIGHT NUMBER: 93-146

Check Points	Actual Time (GMT)		Actual Scanline		Altitude feet/meter	Scan Speed (rps)	Total		total Repeats scanlines
	begin	end	begin	end			Good scanlines	Interpolated scanlines	
A-0	17:24:38.0	17:36:51.0	55564	40516	65000/19812	6.20	4753	0	0
C-D	17:40:18.0	17:53:34.0	41603	46353	65000/19812	6.20	4951	0	0
E-F	17:58:44.0	18:00:27.0	48236	49127	65000/19812	6.20	892	0	0

NOTE: Scan Speed (rps) is 6.25 NOT 6.20



FLIGHT 93-146 03 August 1993 A/C 700 RC10/W728



Magnetic disturbance
as 15° exists at
Montezuma Springs

FLIGHT 88-146 3 AUGUST 1993 A/C 709 RC-10 / HF-732 / MAS ONC 8-19