

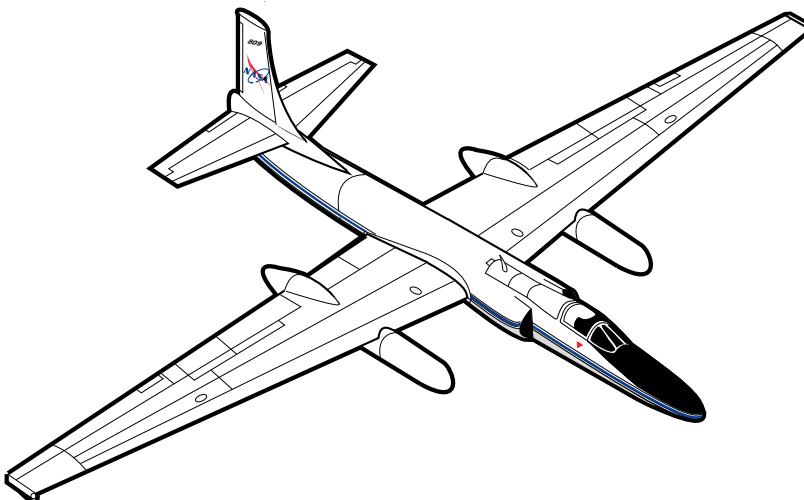
# AIRBORNE SCIENCE PROGRAM

# SAFARI 2000

August 11 to September 27, 2000

## Aerial Photography Flight Summary Report

Volume I



National Aeronautics and  
Space Administration

**Ames Research Center**  
Moffett Field, California 94035-1000

**Dryden Flight Research Center**  
Edwards, California 93523

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## **SAFARI 2000 Aerial Photography**

### **Flight Summary Report 13 August to 25 September 2000**

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## **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.)

### 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

### Cloud Lidar System

The Cloud Lidar System (CLS) is flown on the ER-2 to conduct cloud radiation and severe storm field experiments. Designed to operate at high altitudes in order to obtain measurements above the highest clouds, the instrument provides the true height of cloud boundaries and the

density structure of less dense clouds. The height structure of cirrus, cloud top density and multiple cloud layers may also be profiled. System specifications are as follows:

**Transmitter**

Laser Type:	Nd:YAG I,II
Wavelength:	1064, 532 nm
Pulse Energy:	90, 30 mJ
PRF:	10 Hz
Beamwidth:	1 mrad
Data Acquisition:	Measurements at 20m intervals at 200 m/sec aircraft speed

**Receiver**

Diameter:	0.15 m
Beamwidth:	1.4 mrad
Polarization:	v & h

**Data System**

Range Resolution:	7.5 m
Number of Channels:	4
Samples per Channel:	3310
Record Capacity:	8 hours

For additional information regarding this instrument contact Dr. James Spinhirne, NASA-Goddard Space Flight Center, Code 917, Greenbelt, MD 20771.

### **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<sup>-1</sup>. 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>

### **Airborne Multi-angle Imaging SpectroRadiometer**

The Airborne MISR (AirMISR) is currently flown aboard the ER-2 to facilitate the development and test the capabilities of the satellite MISR before it is launched in orbit in 1999. The spaceborne Multi-angle Imaging SpectroRadiometer (MISR) is a new type of instrument, designed to view the Earth with cameras pointed in nine different directions. MISR is being built for NASA by the Jet Propulsion Laboratory in Pasadena, California. MISR is one of five instruments scheduled to be launched into polar orbit aboard the first Earth Observing System spacecraft (EOS-AM1) in June 1999, as part of NASA's Mission to Planet Earth. The spacecraft will fly in a "sun-synchronous" orbit, designed so that it crosses the equator every

98 minutes, always at 10:30 a.m. local time, as the Earth rotates below. As the instrument flies overhead, each piece of the Earth's surface below is successively imaged by the nine cameras comprising the MISR system, in each of four wavelengths (blue, green, red, and near-infrared).

In addition to improving our understanding of scattering of sunlight in the Earth environment, MISR data can also distinguish different types of clouds, particles, and surfaces. Specifically, MISR will monitor the monthly, seasonal, and long-term trends in:

- The amount and type of atmospheric particles (aerosols), including those formed by natural sources and by human activities
- The amounts, types, and heights of clouds
- The distribution of land surface cover, including vegetation canopy structure

To accomplish its scientific objectives, the MISR instrument will measure the Earth's brightness in four spectral bands, at each of nine look angles spread out in the forward and aft directions along the flight path. Spatial samples are acquired every 275 meters. Over a period of seven minutes, a 360 km wide swath of Earth comes into view at all nine angles. Special attention has been paid to providing highly accurate absolute and relative calibration, using on-board hardware consisting of deployable solar diffuser plates and several types of photodiodes. To complement the on-board calibration effort, a validation program of *in situ* measurements is planned, involving field instruments, one of which is the "PARABOLA III", which automatically scans the sky and ground at many angles. The aircraft camera, AirMISR will continue to operate on the ER-2 also as a complement to the orbiting MISR. Global coverage with the satellite MISR will be acquired about once in nine days at the equator; the nominal mission lifetime is six years.

Further information regarding MISR is available on the following web page: <http://www-misr.jpl.nasa.gov>

### **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. 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 as follows:

### **Flight Documentation and Data Archive Searches**

The following is the web site for flight documentation as 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 650.604.4987).

## SAFARI 2000

The Southern African Regional Science Initiative - SAFARI 2000 - is an international science initiative aimed at developing a better understanding of the southern African earth-atmosphere-human system. Initial plans for SAFARI 2000 were developed in June and July 1998 at workshops involving scientists from southern Africa, the United States and Europe. These plans have been refined at subsequent workshops held in the United States and Southern Africa, in May and July 1999, respectively.

The goal of SAFARI 2000 is to identify and understand the relationships between the physical, chemical, biological and anthropogenic processes that underlie the biogeophysical and biogeochemical systems of southern Africa. Particular emphasis will be placed upon biogenic, pyrogenic and anthropogenic emissions, their characterization and quantification, their transport and transformations in the atmosphere, their influence on regional climate and meteorology, their eventual deposition, and the effects of this deposition on ecosystems. To accomplish this; computational modeling, airborne sampling and ground-based studies;

- link the biological, physical and chemical components of the regional ecosystems by integrating them within the semi-closed atmospheric gyre persistent over the region;
- combine the expertise and knowledge base of regional and international scientists.

SAFARI 2000 builds upon the success of the Southern African Fire-Atmosphere Research Initiative in 1992 (SAFARI-92). SAFARI-92 showed that a) it is feasible to characterize, quantify and validate estimates of regional emissions, and b) critical gaps remain in our understanding of the fate and impacts of the emissions on the functioning of the regional land-atmosphere systems.

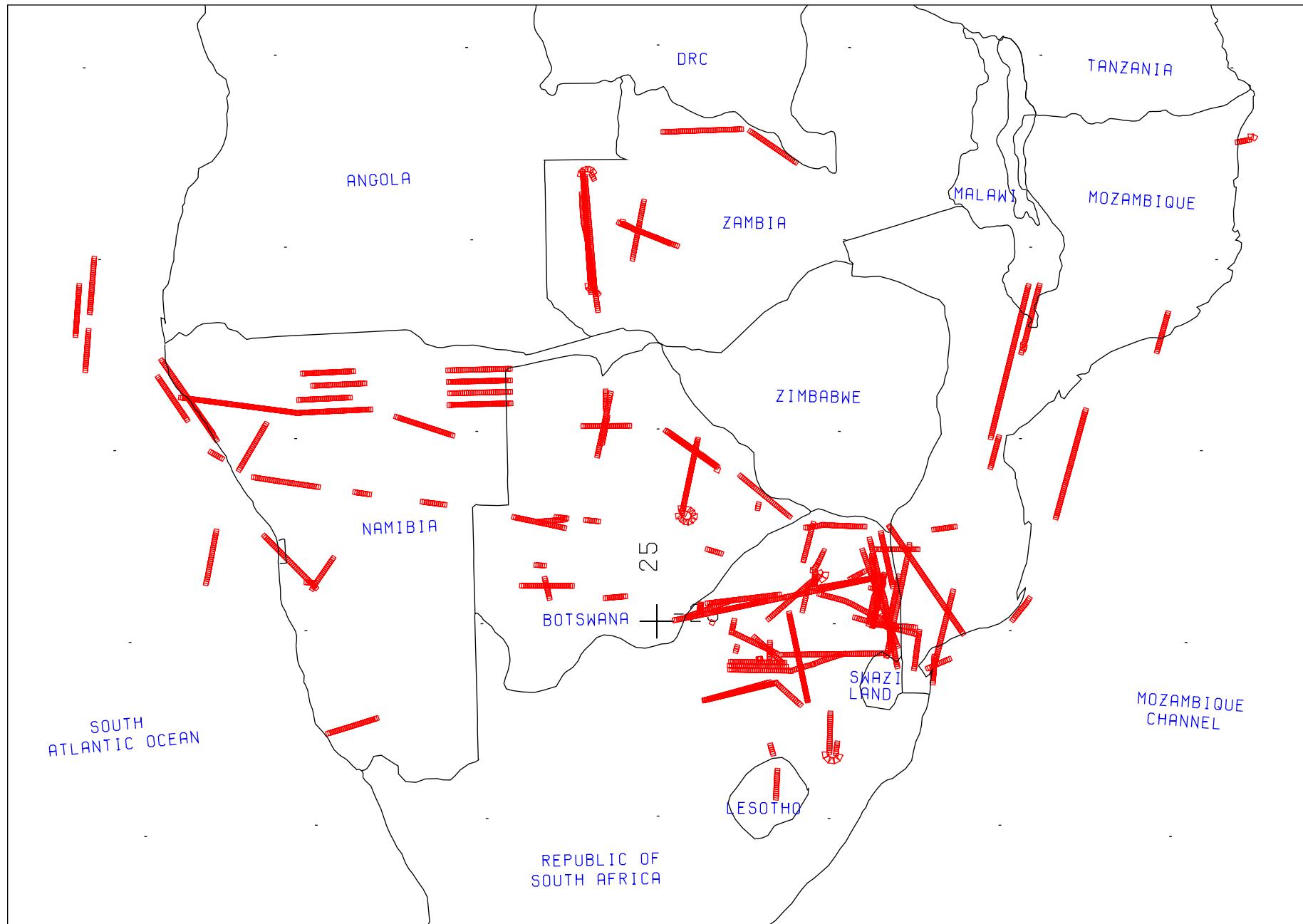
Programmatically, SAFARI 2000 is an organizational umbrella designed to maximize the overall efficiency and effectiveness of a group of various environmental studies occurring between 1999 to 2001. The studies range from those still in their foundational stage to those which are long-term monitoring efforts.

SAFARI 2000 encompasses the following science elements: terrestrial ecology and land processes; land cover and land use change; aerosols; trace gases; clouds and radiation; hydrology; and modeling. These elements will be studied using ground and airborne measurements complemented by remote sensing observations from a new generation of earth observation satellites, including NASA's Terra, Aqua (formerly PM), Earth Observing-1 (EO-1), Vegetation Canopy LIDAR (VCL), Landsat 7 and TRMM platforms, as well as the European ENVISAT and POLDER II satellites. Data from existing sensors, e.g., NOAA polar orbiters (AVHRR) and METEOSAT, will likewise be employed. In turn, ground- and aircraft-based measurements from SAFARI 2000 will help validate the remotely sensed satellite observations.

Each successive campaign is expected to both draw increased international participation and to increase in the scope of scientific questions addressed. The campaigns will allow scientists to leverage their modeling efforts upon existing ground-based and atmospheric monitoring networks, as well as new airborne and remote sensing measurements. Ground-based efforts will be co-ordinated to maximize sampling effectiveness and efficiency, as well as facilitate collaboration and data synthesis. Meteorological and remote sensing

measurements will be collected throughout the initiative. The international science networks supporting efforts in the region (e.g., those of IGBP and START) will help broaden African scientific involvement.

Results from SAFARI 2000 are expected to contribute to the development of improved policies and practices affecting the environment. They should also help local officials gain insight into global change on a regional scale and understand potential impacts from global change international environmental treaties. Regional scientists will benefit through heightened recognition, enhanced capacity, and the transfer of technology. The relevance of the scientific results will be discussed through a series of workshops. One such workshop, the Policy Dialogue Workshop on Ecological Impacts of Trans-boundary Air Pollution in Southern Africa, organized by the Air Pollution Impacts Network for Africa (APINA), has already been held. SAFARI 2000 has an open internal and external data sharing policy. Information will be disseminated regionally and internationally via the internet as well as through the distribution of CD-ROMS and magnetic tapes. We anticipate that a long-term data archive will be developed such that data and models can serve the community well into ~~the 21st century~~. was extracted from the SAFARI 2000 website at the following URL: <http://safari.gecp.virginia.edu/abstract/index.asp>



SAFARI

AUGUST - SEPTEMBER 2000

COLOR INFRARED COVERAGE

SUMMARIZED IN FSR VOLUMES I AND II

## FLIGHT SUMMARY REPORT

**Flight Number:** 00-146  
**Calendar/Julian Date:** 13 August 2000 • 226  
**Sensor Package:** Wild Heerbrugg RC-10  
Scanning High Resolution Interferometer Sounder (S-HIS)  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Airborne Multi-angle Imaging Spectroradiometer (AirMISR)  
Solar Spectral Flux Radiometer (SSFR)  
Leonardo Airborne Simulator (LAS)  
**Area(s) Covered:** Republic of South Africa  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05541	----	----	----	----
<b>Sensor ID #:</b>	034	108	083	113	129
<b>Sensor Type:</b>	RC-10	MAS	S-HIS	CLS	Mopi
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/325	----	----	----	----
<b># of Frames:</b>	11	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent	----	----	----	----
<b>Remarks:</b>					

<b>Accession #:</b>	-----	-----	-----
<b>Sensor ID #:</b>	120	131	130
<b>Sensor Type:</b>	AirMISR	SSFR	LAS
<b>Focal Length:</b>	-----	-----	-----
<b>Film Type:</b>	-----	-----	-----
<b>Filtration:</b>	-----	-----	-----
<b>Spectral Band:</b>	-----	-----	-----
<b>f Stop:</b>	-----	-----	-----
<b>Shutter Speed:</b>	-----	-----	-----
<b># of Frames:</b>	-----	-----	-----
<b>% Overlap:</b>	-----	-----	-----
<b>Quality:</b>	-----	-----	-----
<b>Remarks:</b>			

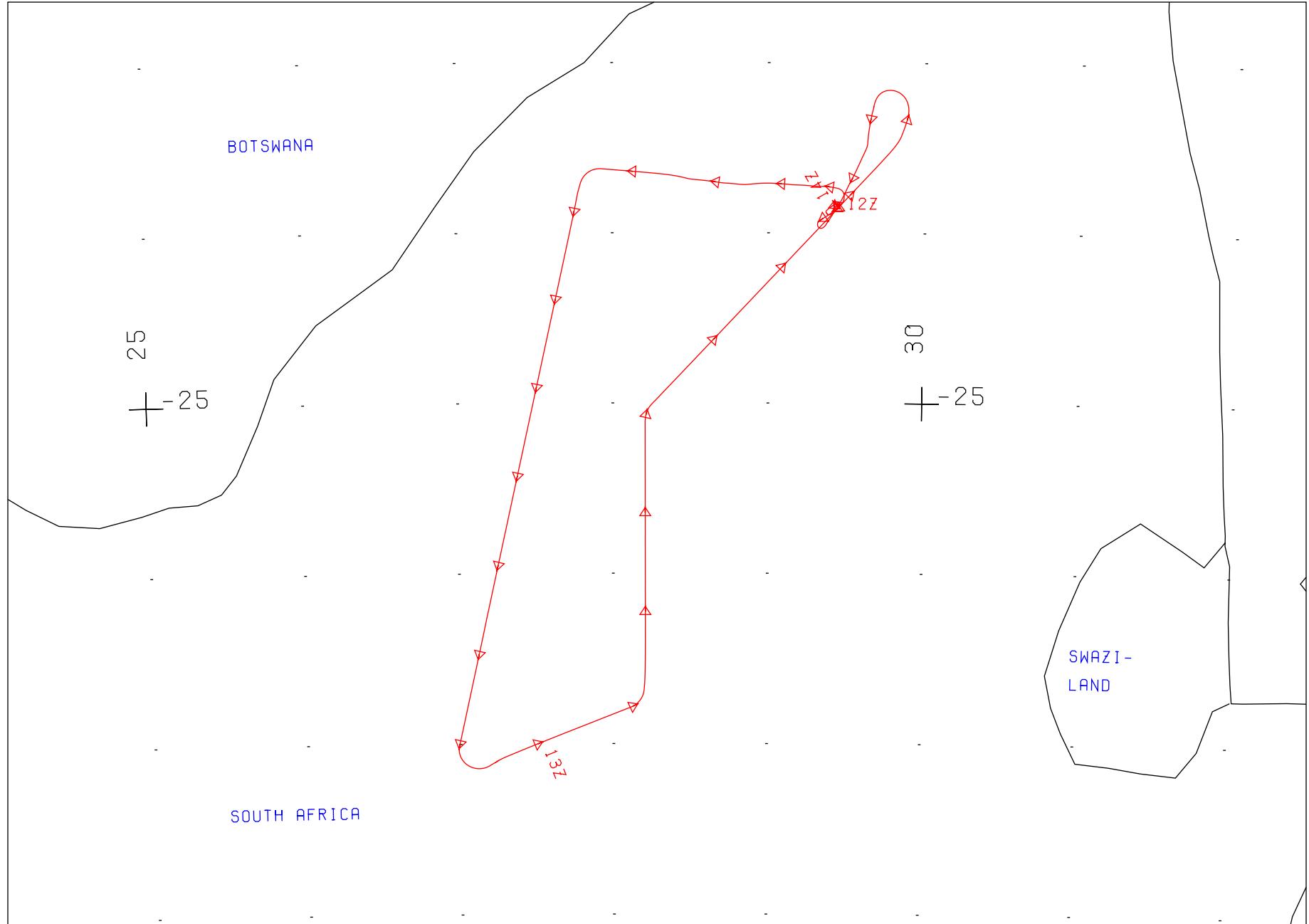
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-146**

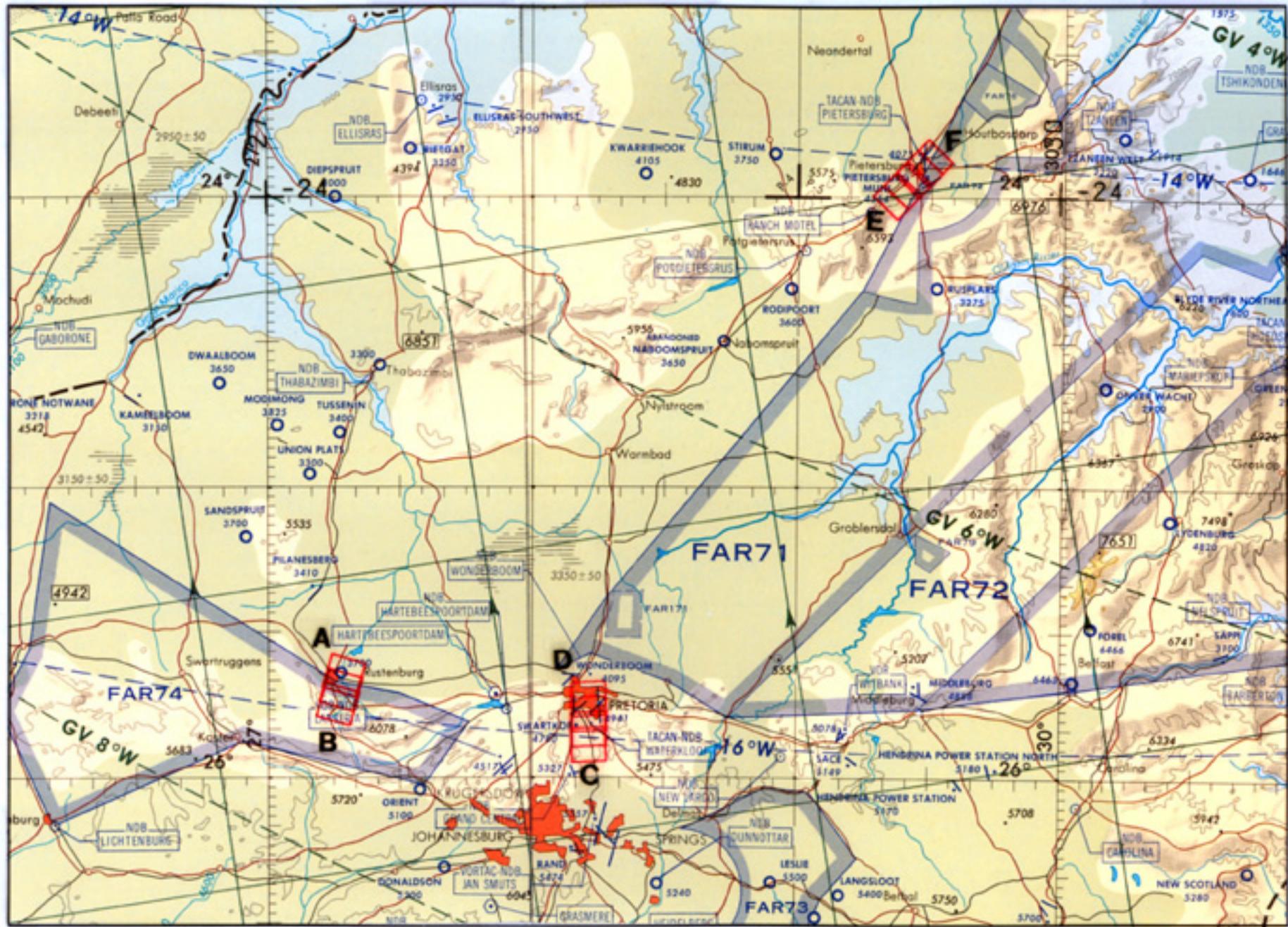
Accession # 05541

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3447-3449	12:42:51	12:43:46	66900/20400	Clear, emulsion damage, frame 3447
C - D	3450-3453	13:12:44	13:14:06	66100/20150	Clear
E - F	3454-3457	13:32:49	13:34:11	66200/20180	10 - 50% cumulus

Subtract 1 second for correct UTC. Date incorrect in camera data block





FLIGHT 00-146

13 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 81

## FLIGHT SUMMARY REPORT

**Flight Number:** 00-147  
**Calendar/Julian Date:** 17 August 2000 • 230  
**Sensor Package:** Wild Heerbrugg RC-10  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)

**Area(s) Covered:** Republic of South Africa  
**Aircraft #:** 809

**SENSOR DATA**

<b>Accession #:</b>	05542	----	----	----	----
<b>Sensor ID #:</b>	034	108	113	129	131
<b>Sensor Type:</b>	RC-10	MAS	CLS	Mopitt	SSFR
<b>Focal Length:</b>	12" 304.66 mm	-----	-----	-----	-----
<b>Film Type:</b>	Aerochrome IR SO-134	-----	-----	-----	-----
<b>Filtration:</b>	Wratten 12	-----	-----	-----	-----
<b>Spectral Band:</b>	510-900nm	-----	-----	-----	-----
<b>f Stop:</b>	11	-----	-----	-----	-----
<b>Shutter Speed:</b>	1/300	-----	-----	-----	-----
<b># of Frames:</b>	84	-----	-----	-----	-----
<b>% Overlap:</b>	60	-----	-----	-----	-----
<b>Quality:</b>	Excellent	-----	-----	-----	-----
<b>Remarks:</b>					

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 17 Aug 2000  
 NASA FLIGHT NUMBER 00-147

START OF FLIGHT LINE						END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR		START	TIME	LAT	LON	SOLAR		SCAN
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	07:23:09	-24.963	31.605	77.5	68.7	123.76	07:48:29	-25.999	34.499	77.5	68.7	9463
2	07:49:32	-26.085	34.577	72.5	65.0	215.04	08:16:19	-28.970	33.822	72.4	65.0	10000
3	08:16:19	-25.495	28.980	68.5	60.1	195.29	08:43:06	-25.498	28.963	68.5	60.0	10000
4	08:43:06	-25.404	26.200	65.2	54.3	196.25	08:51:22	-25.388	26.198	65.2	54.3	3085
5	08:53:08	-32.671	32.588	64.0	52.0	352.66	09:19:55	-29.620	32.201	64.0	52.0	10000
6	09:19:55	-29.620	32.201	57.6	47.8	353.76	09:46:42	-26.604	31.781	57.6	47.8	10000
7	09:46:42	-26.604	31.781	51.3	43.2	356.33	10:01:20	-24.972	31.600	51.3	43.2	5462
8	10:02:09	-24.899	31.547	47.6	40.4	296.90	10:19:24	-24.230	29.549	47.6	40.4	6437
9	10:20:43	-24.120	29.458	44.5	35.6	359.03	10:25:03	-23.630	29.458	44.5	35.6	1620

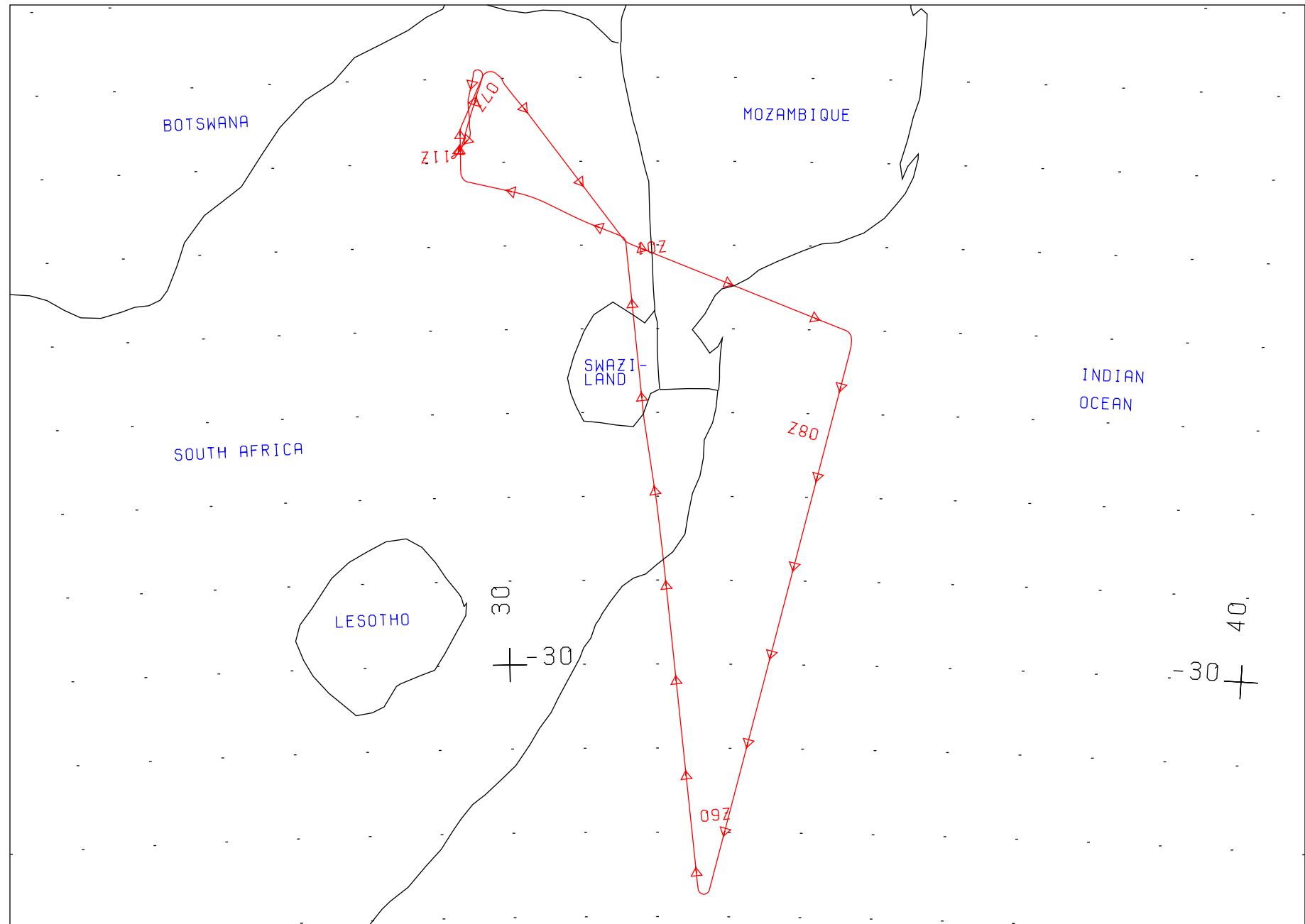
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-147**

Accession # 05542

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3475-3479	7:20:37	7:22:27	66400/20240	Clear
B - C	3480-3484	7:22:55	7:24:45	66500/20270	Clear, frames 3480 -3481 oblique
D - B	3485-3500	9:54:19	10:01:09	67600/20610	Clear
B - E	3501-3536	10:02:58	10:18:59	67700/20640	Clear
E - F	3537-3548	10:20:58	10:25:33	67700/20640	Clear, frames 3547 - 3548 oblique
F - G	3549-3558	10:26:01	10:30:09	62300/18990	Clear

Date and flight number incorrect in camera data block

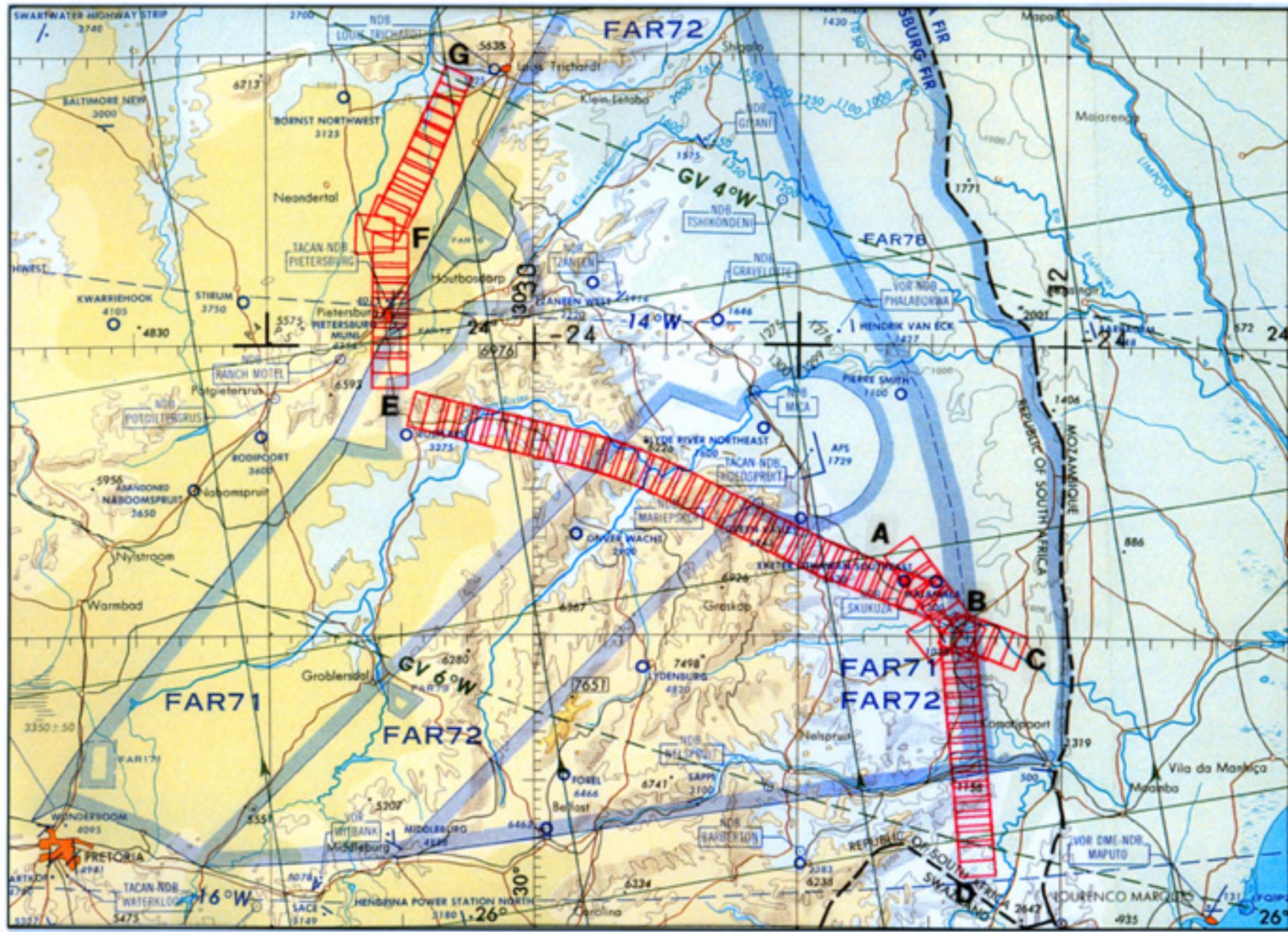


FLIGHT 00-147

17 AUGUST 2000

A/C 809

SAFARI



FLIGHT 00-147

17 AUGUST 2000

R/C 809

RC-10 (CIRI)

JNC 81

## FLIGHT SUMMARY REPORT

**Flight Number:** 00-148  
**Calendar/Julian Date:** 20 August 2000 • 233  
**Sensor Package:** Wild Heerbrugg RC-10  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)  
  
**Area(s) Covered:** Republic of South Africa/Botswana  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05543	----	----	----	----
<b>Sensor ID #:</b>	034	108	113	129	131
<b>Sensor Type:</b>	RC-10	MAS	CLS	Mopitt	SSFR
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----	----
<b># of Frames:</b>	28	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent	----	----	----	----
<b>Remarks:</b>					

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 20 Aug 2000  
 NASA FLIGHT NUMBER 00-148

LINE	START OF FLIGHT LINE						END OF FLIGHT LINE					
	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		START HEADING	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		SCAN LINES
				ZEN	AZIM					ZEN	AZIM	
1	07:22:26	-23.137	30.041	76.6	70.1	126.57	07:31:59	-23.146	30.053	76.5	70.1	3567
2	07:33:24	-23.931	30.913	74.4	68.6	215.04	07:53:44	-23.943	30.903	74.4	68.6	7592
3	07:54:15	-25.495	28.980	70.7	65.4	259.30	08:15:07	-25.498	28.963	70.6	65.4	7797
4	08:16:30	-25.404	26.200	66.2	62.2	352.77	08:25:08	-25.388	26.198	66.1	62.2	3227
5	08:28:19	-24.444	26.506	63.3	60.7	185.99	08:32:31	-24.459	26.504	63.3	60.7	1569
6	08:40:48	-24.948	26.801	61.1	58.5	261.02	08:44:50	-24.950	26.785	61.1	58.5	1505
7	08:46:16	-24.787	26.203	60.0	57.5	16.66	08:48:35	-24.773	26.208	60.0	57.5	870
8	08:48:47	-24.504	26.233	59.4	57.2	16.67	09:11:29	-24.490	26.237	59.4	57.2	8480
9	09:12:21	-21.959	26.853	53.6	54.2	64.02	09:19:00	-21.953	26.866	53.5	54.2	2486
10	09:22:26	-21.784	27.870	51.5	52.4	185.18	09:49:12	-21.798	27.868	51.5	52.4	10000
11	09:49:12	-24.771	27.242	48.8	44.5	190.66	09:55:57	-24.785	27.239	48.8	44.5	2523
12	09:57:02	-25.611	27.124	48.3	42.0	130.48	10:05:35	-25.619	27.136	48.3	41.9	3196
13	10:07:49	-25.998	28.228	47.0	38.9	359.77	10:13:03	-25.983	28.228	46.9	38.9	3196

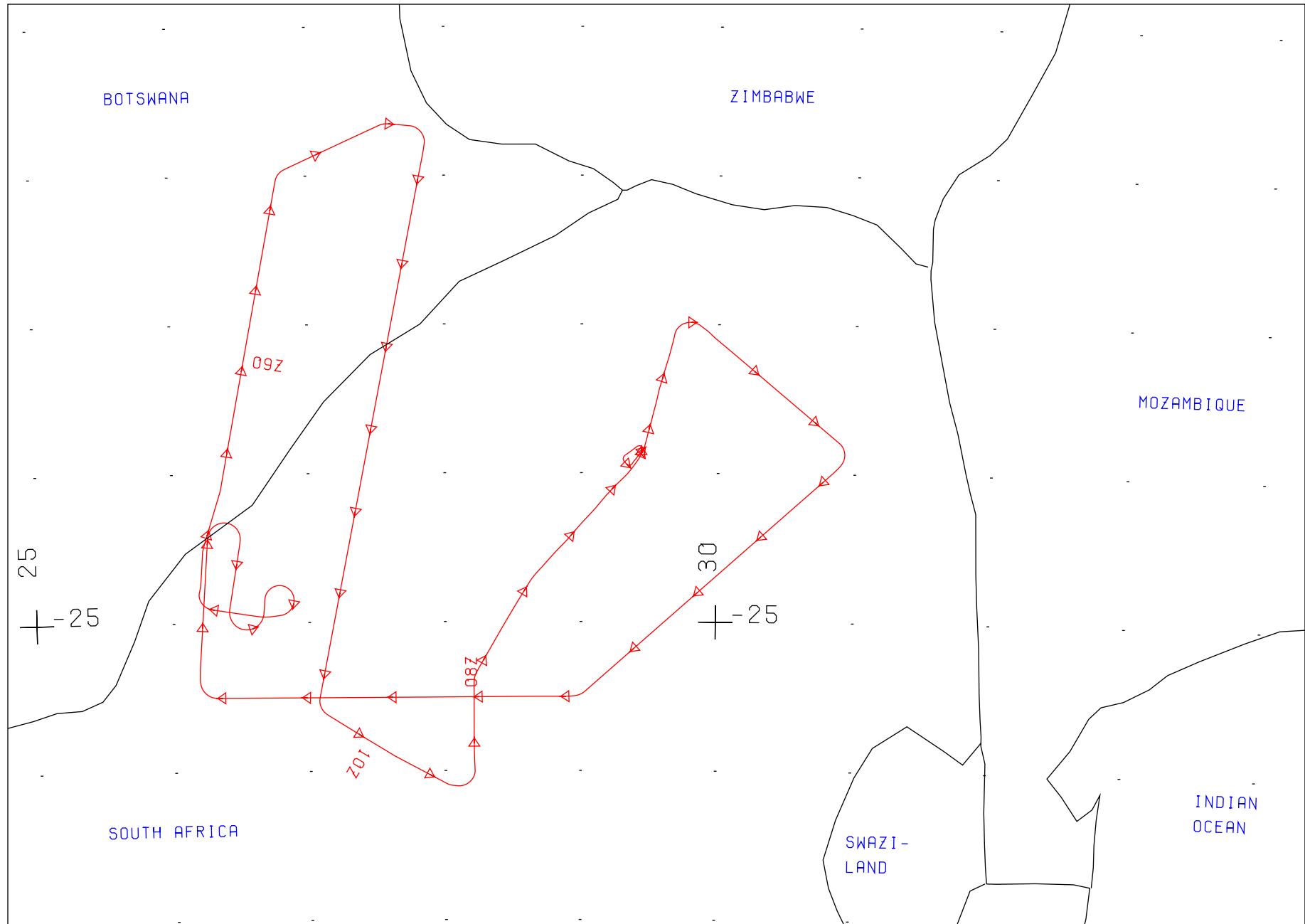
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-148**

Accession # 05543

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3565-3569	8:22:13	8:24:03	65200/19880	50-70% cumulus, frames 3566-3569
A - B	3570-3573	8:46:47	8:48:09	64800/19760	10-30% smoke, frames 3570-3572; 20-50% cumulus, frames 3572-3573
C - D	3574-3576	9:23:51	9:24:46	65500/19970	10-30% scattered cumulus
E - F	3577-3583	9:51:06	9:53:50	66300/20210	Clear
G - H	3584-3592	10:08:22	10:12:01	66100/20150	Clear

Subtract 1 second for correct UTC. Date incorrect in camera data block.



FLIGHT 00-148

20 AUGUST 2000

A/C 809

SAFARI

JNC 81

RC-10 (CIRI)

A/C 809

20 AUGUST 2000

FLIGHT 00-148



## FLIGHT SUMMARY REPORT

**Flight Number:** 00-149

**Calendar/Julian Date:** 22 August 2000 • 235

**Sensor Package:** Wild Heerbrugg RC-10  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)

**Area(s) Covered:** Republic of South Africa/Mozambique

**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05544	----	----	----
<b>Sensor ID #:</b>	034	108	113	129
<b>Sensor Type:</b>	RC-10	MAS	CLS	Mopitt
<b>Focal Length:</b>	12" 304.66 mm	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----
<b>f Stop:</b>	11	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----
<b># of Frames:</b>	289	----	----	----
<b>% Overlap:</b>	60	----	----	----
<b>Quality:</b>	Excellent	----	----	----
<b>Remarks:</b>				

**Accession #:** -----

**Sensor ID #:** 131

**Sensor Type:** SSFR

**Focal Length:** -----

**Film Type:** -----

**Filtration:** -----

**Spectral Band:** -----

**f Stop:** -----

**Shutter Speed:** -----

**# of Frames:** -----

**% Overlap:** -----

**Quality:** -----

**Remarks:**

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 22 Aug 2000  
 NASA FLIGHT NUMBER 00-149

LINE	START OF FLIGHT LINE						END OF FLIGHT LINE					
	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		START HEADING	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		SCAN LINES
				ZEN	AZIM					ZEN	AZIM	
1	07:41:24	-23.016	30.288	72.1	68.4	91.92	07:58:42	-23.017	30.304	72.1	68.4	6463
2	08:00:30	-22.857	32.435	68.0	66.1	332.56	08:02:46	-22.845	32.427	67.9	66.1	845
3	08:07:23	-22.778	32.085	66.5	65.1	176.39	08:34:26	-22.793	32.086	66.5	65.1	10100
4	08:35:01	-25.901	31.516	62.3	59.6	225.54	08:51:00	-25.911	31.504	62.3	59.6	5970
5	08:51:31	-27.212	30.015	59.9	56.1	196.17	09:01:22	-27.226	30.011	59.9	56.0	3678
6	09:03:38	-28.348	30.190	58.4	53.1	5.03	09:26:32	-28.333	30.191	58.4	53.1	8549
7	09:28:03	-25.761	30.362	52.5	49.5	254.17	09:40:44	-25.766	30.347	52.4	49.5	4733
8	09:41:16	-26.240	28.802	50.6	46.2	271.61	09:55:32	-26.240	28.786	50.5	46.2	5323
9	09:58:38	-26.038	27.069	47.9	41.8	88.28	10:11:45	-26.038	27.085	47.9	41.8	4897
10	10:15:18	-26.125	28.804	45.4	37.4	265.27	10:29:05	-26.126	28.787	45.4	37.3	5151
11	10:31:00	-25.995	27.061	43.5	32.6	84.43	10:43:31	-25.993	27.078	43.5	32.6	4672
12	10:47:22	-26.071	28.639	41.5	27.5	308.40	10:57:01	-26.061	28.627	41.5	27.4	3605
13	10:58:24	-25.230	27.749	39.8	24.0	54.85	11:18:24	-25.221	27.762	39.8	23.9	7466

**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-149**

Accession # 05544

Sensor # 034

Page 1/2

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3607-3629	7:48:21	7:58:29	64200/19570	Clear
C - D	3630-3686	8:08:27	8:34:00	65700/20030	Minor- 20% smoke and cumulus, frames 3638-3646; minor smoke, frames 3682-3684
E - F	3687-3706	8:52:25	9:01:05	65900/20090	Smoke, frames 3687-3689; 3693-3695; 3698-3700
F - G	3707-3711	9:01:33	9:03:23	65700/20030	Oblique frames
G - H	3712-3717	9:03:50	9:06:08	65500/19970	Clear
I - J	3718-3747	9:28:17	9:41:04	65500/19970	Smoke, frames 3725-3726; 3744-3747
J - K	3748-3777	9:41:32	9:54:50	65500/19970	Smoke, frames 3748; 3755-3756
L - M	3778-3805	9:59:04	10:11:26	65600/20000	Smoke, frames 3804-3805
N - O	3806-3834	10:16:09	10:28:58	65700/20030	Smoke, frames 3806-3809; emulsion damage frame 3824
P - Q	3835-3837	10:37:52	10:38:19	66200/20180	Minor smoke
M - R	3838-3857	10:47:59	10:56:38	65100/19850	Minor smoke, frames 3838-3840

**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-149**

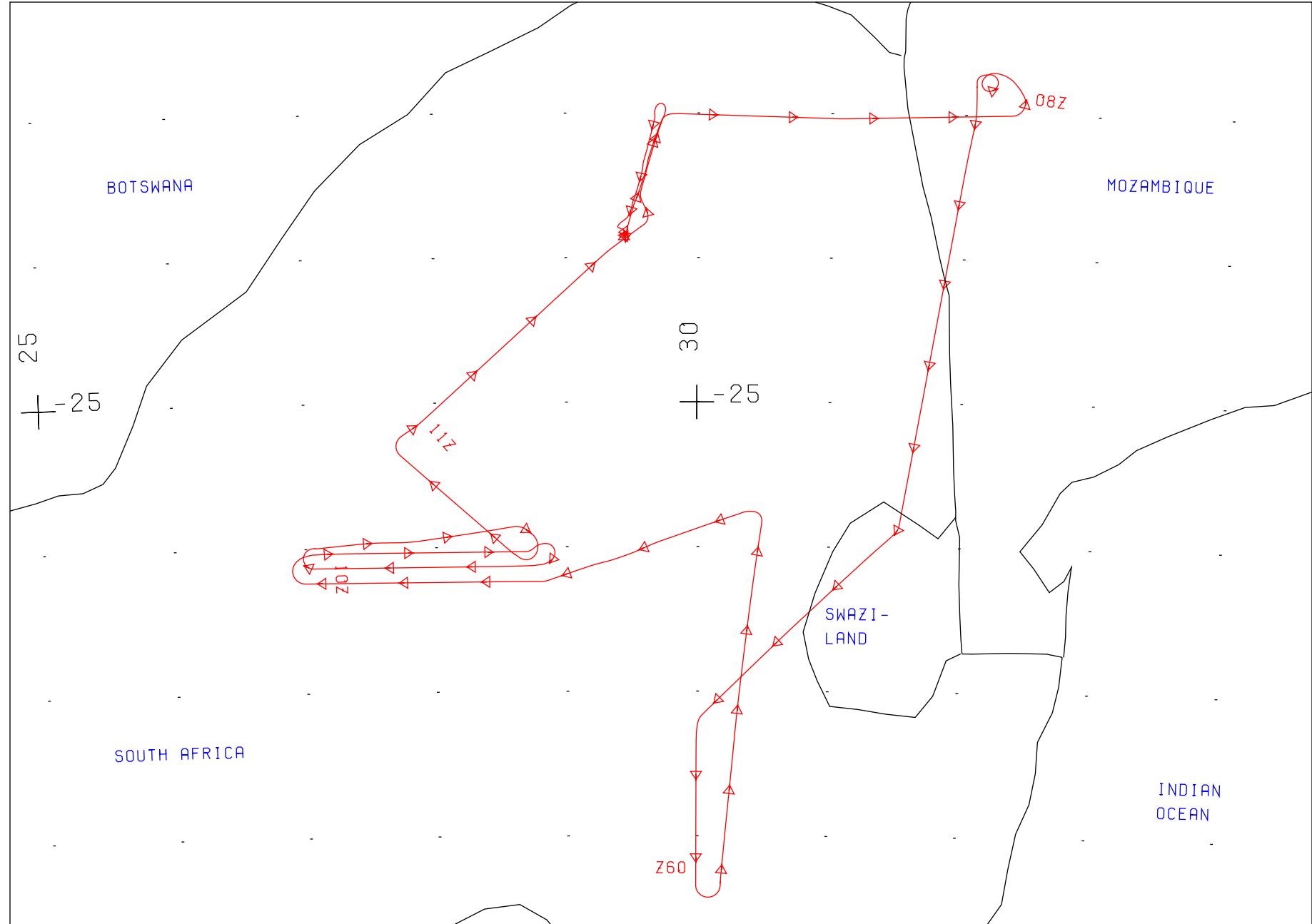
Accession # 05544

Page 2/2

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
S - T	3858-3892	11:02:58	11:18:00	65500/19970	Minor smoke, frames 3858-3859
T	3893-3895	11:18:27	11:19:22	65600/20000	Oblique frames

Date incorrect in camera data block

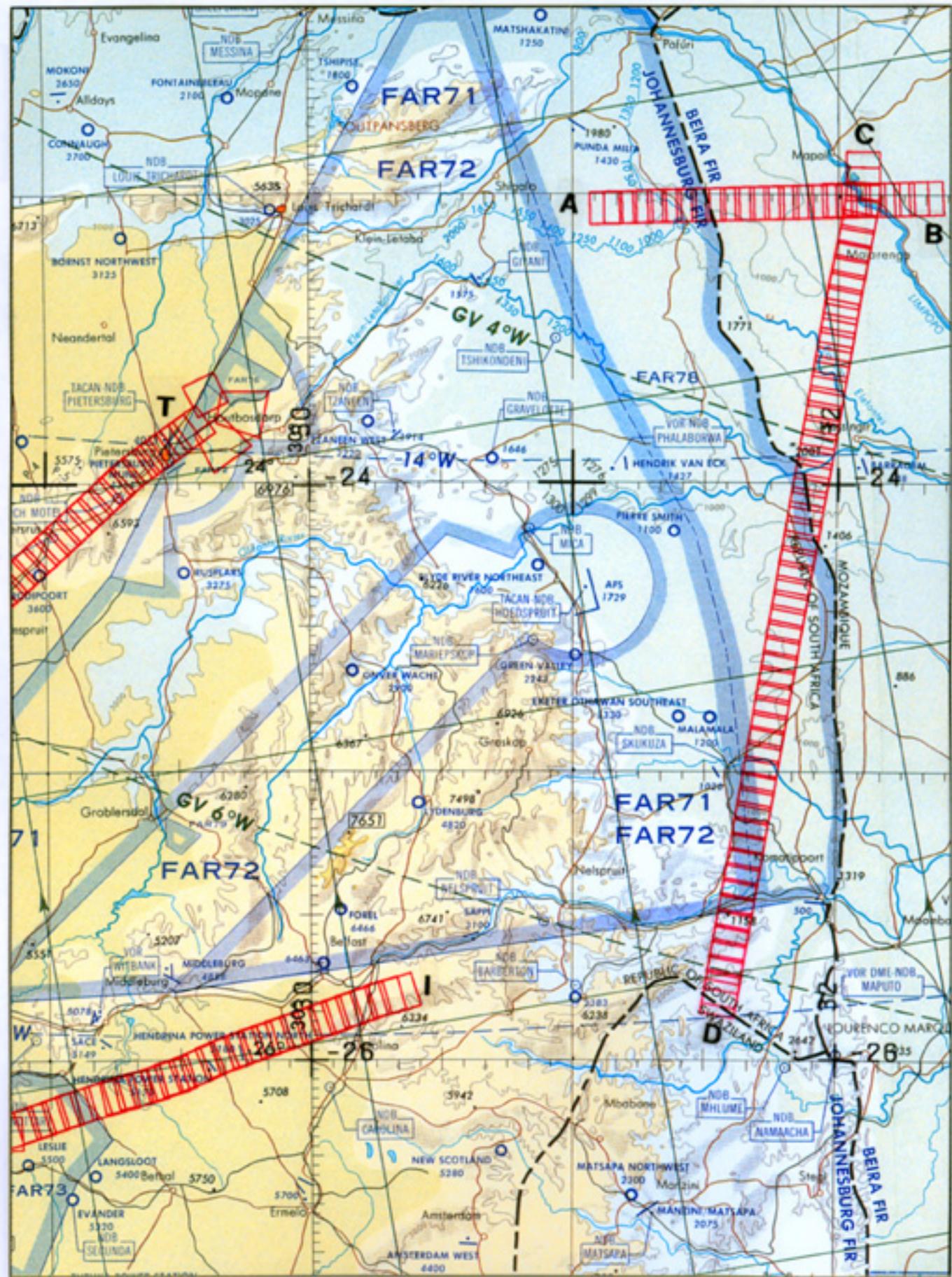


FLIGHT 00-149

22 AUGUST 2000

A/C 809

SAFARI



JNC 81

RC-10 (CIRI)

R/C 809

22 AUGUST 2000

FLIGHT 00-149

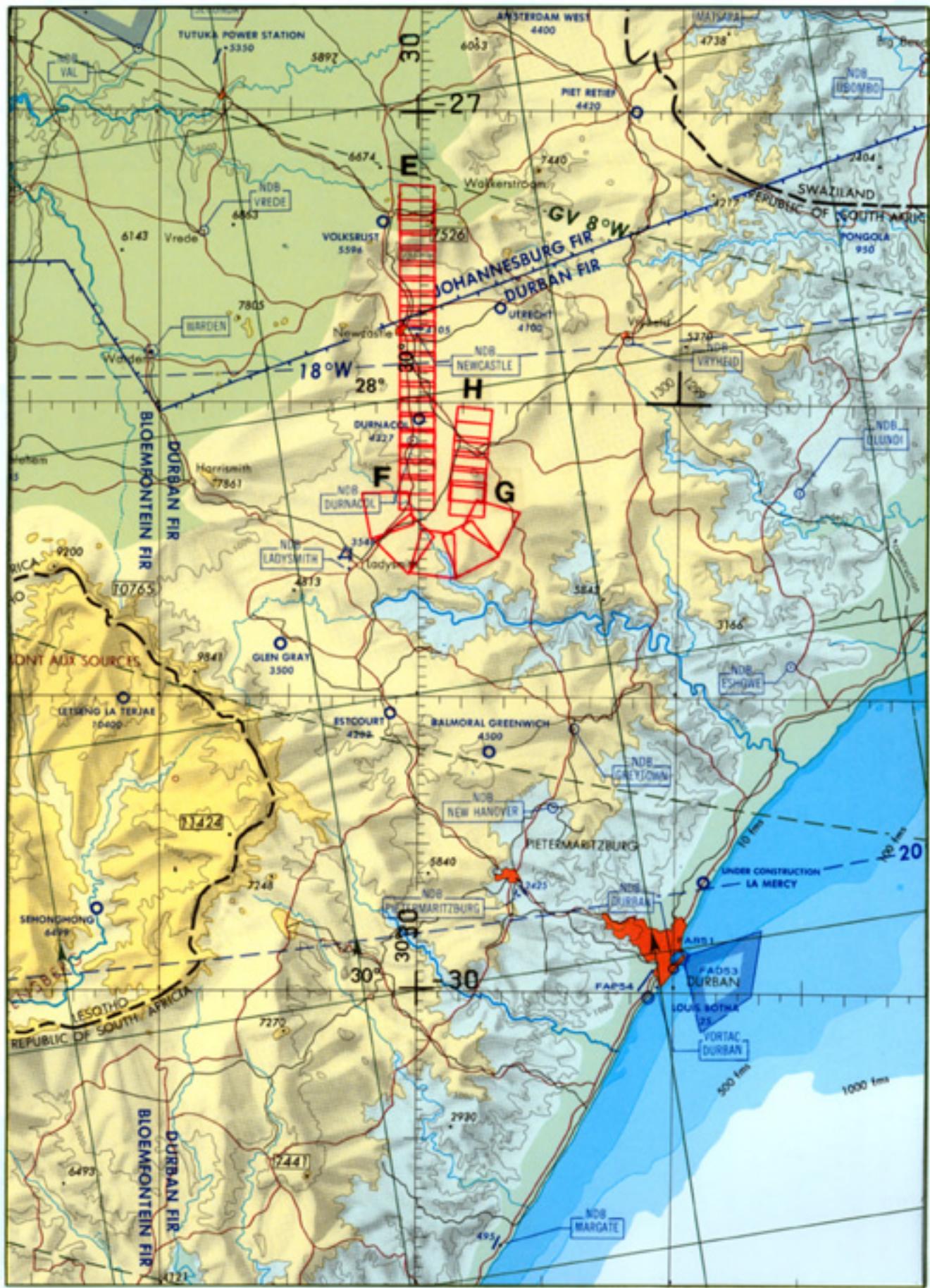
JNC 81

RC-10 (CIR)

A/C 809

22 AUGUST 2000

FLIGHT 00-149



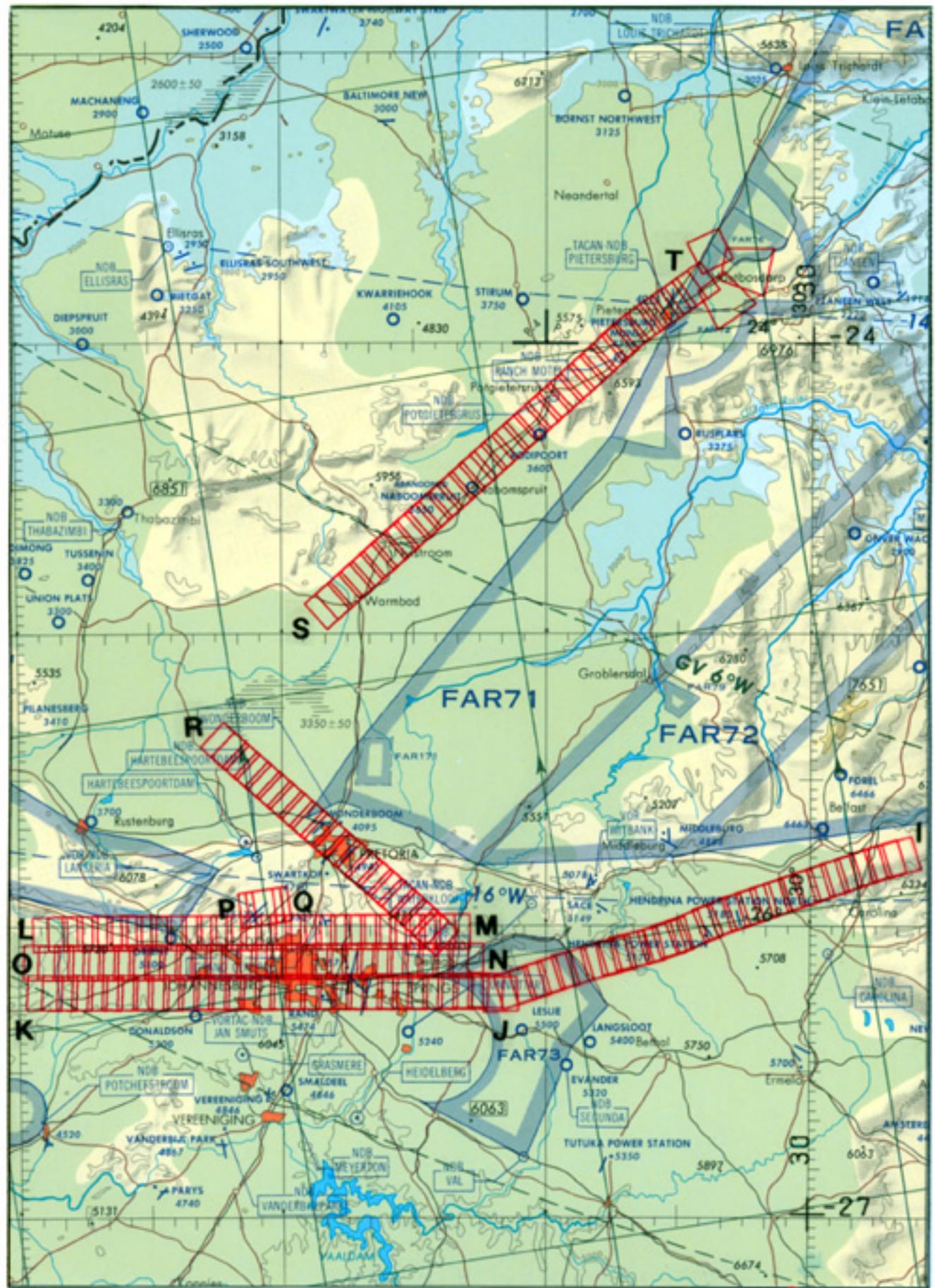
JNC 01

RC-10 (CIRI)

R/C 809

22 AUGUST 2000

FLIGHT 00-149



## FLIGHT SUMMARY REPORT

**Flight Number:** 00-150  
**Calendar/Julian Date:** 24 August 2000 • 237  
**Sensor Package:** Wild Heerbrugg RC-10  
Scanning High Resolution Interferometer Sounder (S-HIS)  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)  
Leonardo Airborne Simulator (LAS)  
**Area(s) Covered:** Republic of South Africa/Mozambique/Malawi  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05545	----	----	----	----
<b>Sensor ID #:</b>	034	108	083	113	129
<b>Sensor Type:</b>	RC-10	MAS	S-HIS	CLS	Mopitt
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----	----
<b># of Frames:</b>	174	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent				
<b>Remarks:</b>					

**Accession #:** -----

**Sensor ID #:** 131      130

**Sensor Type:** SSFR      LAS

**Focal Length:** -----

**Film Type:** -----

**Filtration:** -----

**Spectral Band:** -----

**f Stop:** -----

**Shutter Speed:** -----

**# of Frames:** -----

**% Overlap:** -----

**Quality:** -----

**Remarks:**

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 18-AUG-2000  
 NASA FLIGHT NUMBER 00-150

START OF FLIGHT LINE						END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR		START	TIME	LAT	LON	SOLAR		SCAN
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	09:18:46	-19.658	36.919	32.9	7.7	45.75	09:29:54	-18.746	37.803	31.8	1.1	4158
2	09:29:58	-18.740	37.808	31.8	1.1	45.02	09:38:41	-18.029	38.489	31.1	355.7	3256
3	09:39:34	-17.942	38.530	31.0	355.1	15.62	09:41:01	-17.784	38.563	30.9	354.3	542
4	09:41:33	-17.725	38.575	30.8	354.1	13.63	09:47:52	-17.031	38.722	30.3	350.6	2359
5	09:49:18	-16.873	38.755	30.3	349.8	13.91	09:58:46	-15.826	38.973	29.8	344.5	3541
6	10:00:01	-15.690	39.001	29.7	343.8	13.57	10:02:57	-15.369	39.067	29.7	342.1	1096
7	10:05:22	-15.104	39.122	29.6	340.7	12.99	10:08:59	-14.707	39.203	29.6	338.7	1351
8	10:09:23	-14.663	39.212	29.6	338.4	13.18	10:16:09	-13.924	39.362	29.6	334.6	2528
9	10:16:37	-13.874	39.372	29.6	334.3	13.10	10:19:46	-13.531	39.442	29.7	332.5	1177

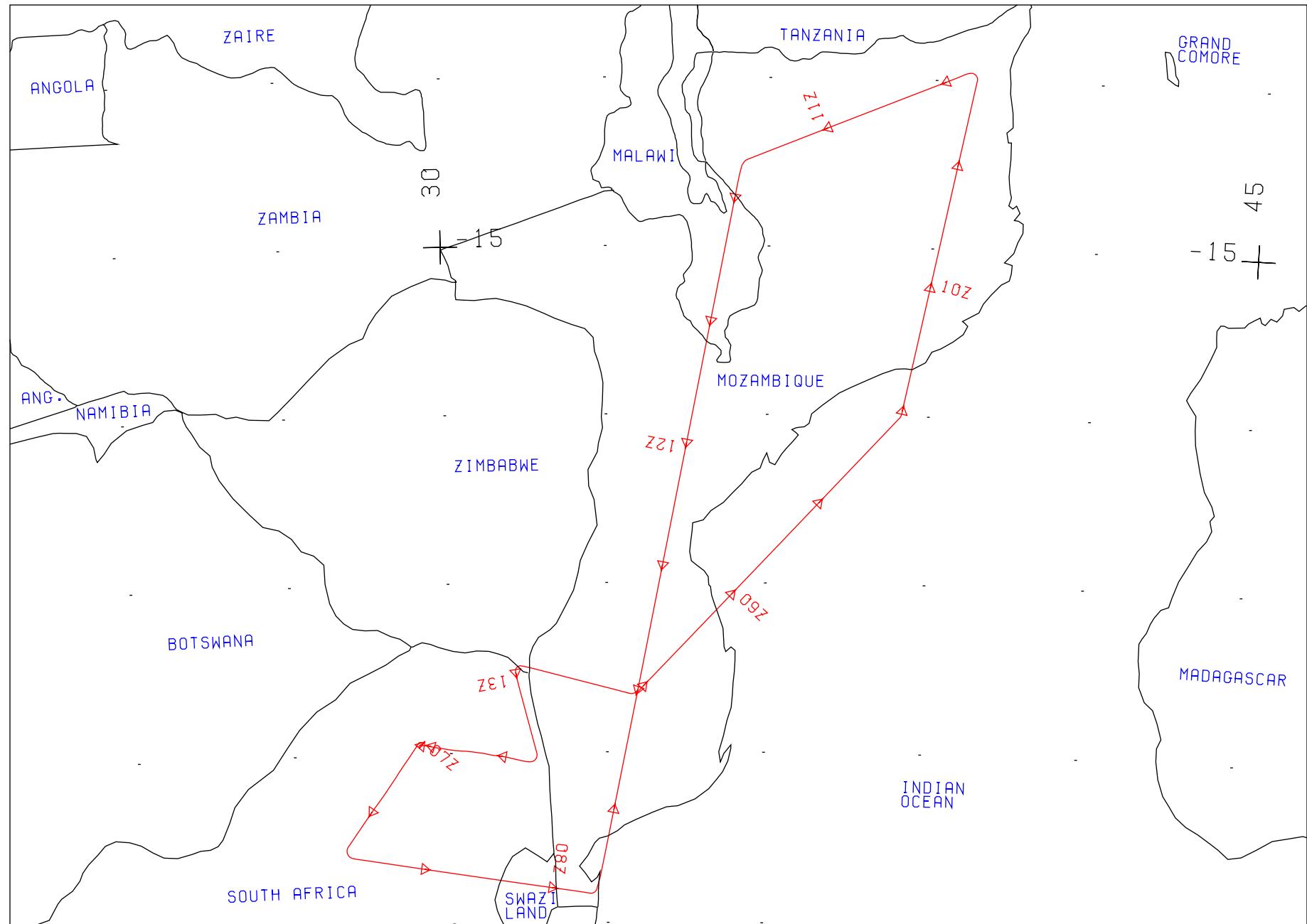
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-150**

Accession # 05545

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	3911-3953	8:09:25	8:28:39	65000/19820	10-30% cumulus, frames 3911-3916; 10-50% cumulus, frames 3926-3953
C - D	3954-3974	9:43:40	9:52:46	65100/19850	10-30% cumulus, frames 3954-3956
E - F	3975-4055	11:36:58	12:13:34	65300/19910	10-80% cumulus
G - H	4056-4084	13:00:04	13:12:51	66100/20150	Minor-30% cumulus, frames 4056-4065 and 4075-4081; minor cumulus, frame 4084

Date incorrect in camera data block



FLIGHT 00-150

24 AUGUST 2000

A/C 809

SAFARI



JNC 81

RC-10 (CIR)

A/C 809

24 AUGUST 2000

FLIGHT 00-150

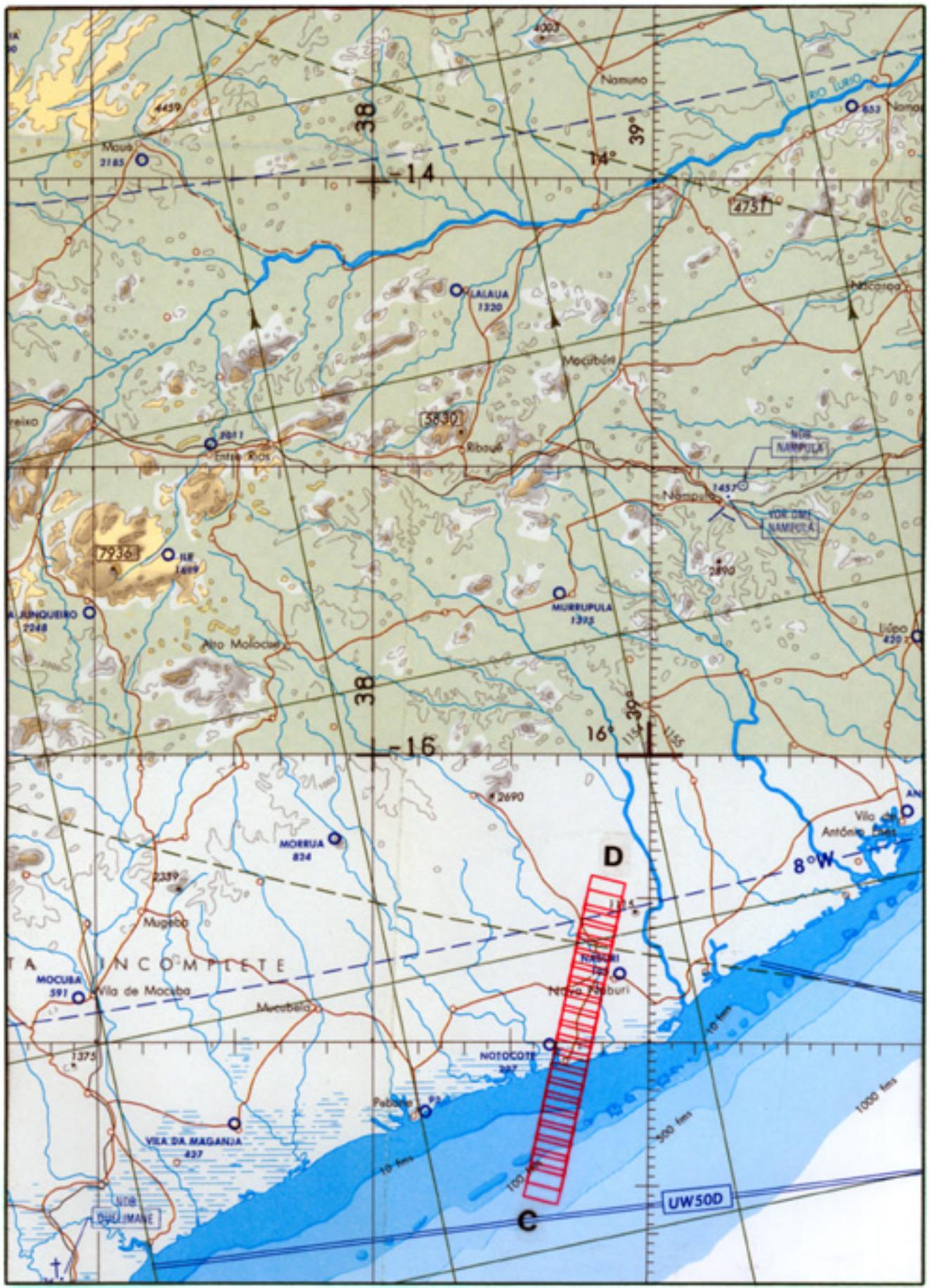
JNC 67

RC-10 (CIR)

A/C 809

24 AUGUST 2000

FLIGHT 00-150



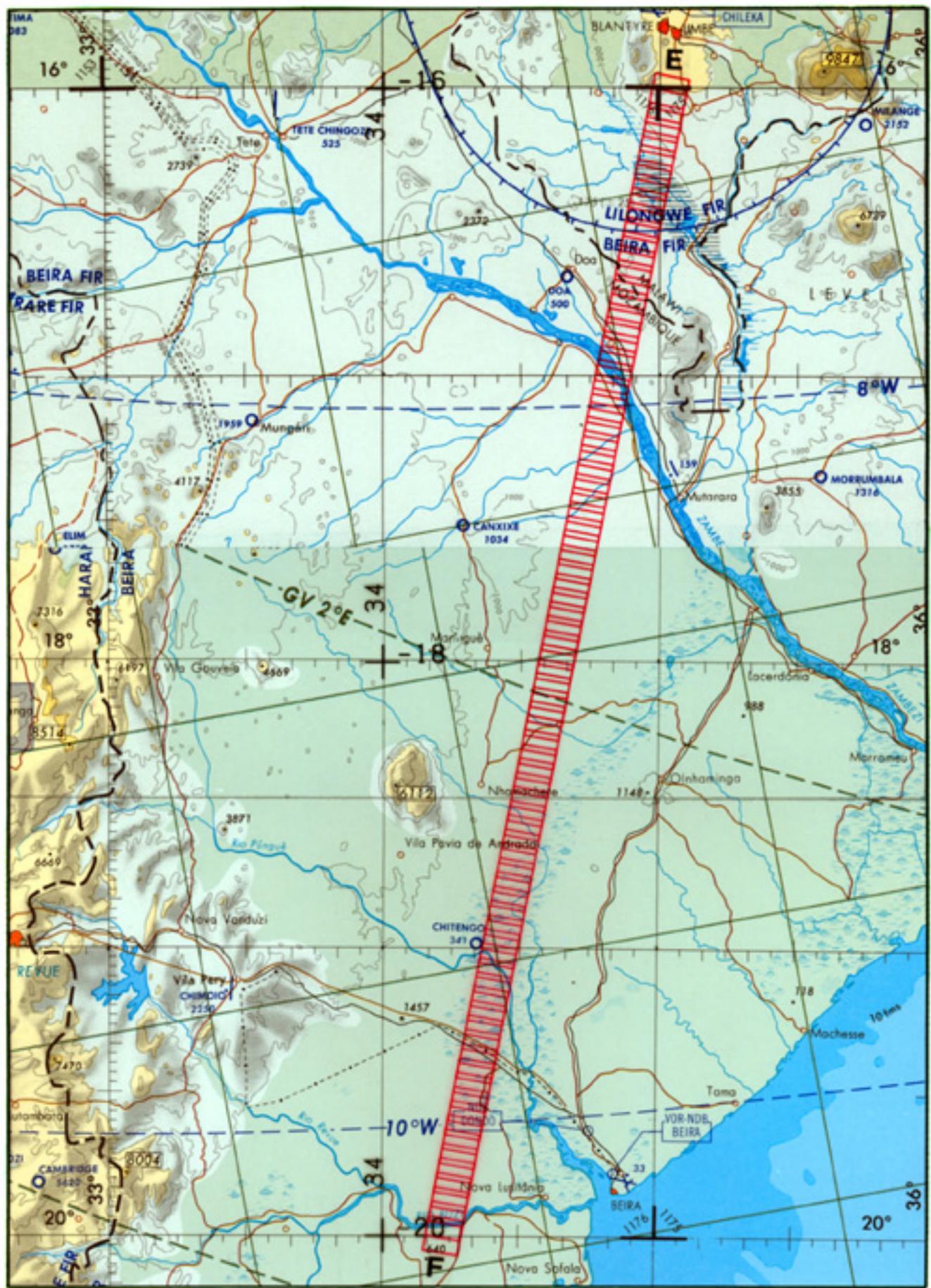
JNC 67 AND 61

RC-10 (CIR)

A/C 809

24 AUGUST 2000

FLIGHT 00-150



## FLIGHT SUMMARY REPORT

**Flight Number:** 00-151  
**Calendar/Julian Date:** 25 August 2000 • 238  
**Sensor Package:** Wild Heerbrugg RC-10  
Scanning High Resolution Interferometer Sounder (S-HIS)  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)  
  
**Area(s) Covered:** Botswana/Zambia  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05546	----	----	----	----
<b>Sensor ID #:</b>	034	108	083	113	129
<b>Sensor Type:</b>	RC-10	MAS	S-HIS	CLS	Mopitt
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----	----
<b># of Frames:</b>	196	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent	----	----	----	----
<b>Remarks:</b>					

**Accession #:** -----

**Sensor ID #:** 131

**Sensor Type:** SSFR

**Focal Length:** -----

**Film Type:** -----

**Filtration:** -----

**Spectral Band:** -----

**f Stop:** -----

**Shutter Speed:** -----

**# of Frames:** -----

**% Overlap:** -----

**Quality:** -----

**Remarks:**

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 25 Aug 2000  
 NASA FLIGHT NUMBER 00-151

LINE	START OF FLIGHT LINE						END OF FLIGHT LINE					
	TIME HH:MM:SS	LAT DEG	LONG DEG	SOLAR		START HEADING	TIME HH:MM:SS	LAT DEG	LONG DEG	SOLAR		SCAN LINES
				ZEN	AZIM					ZEN	AZIM	
1	07:32:22	-21.713	27.754	73.1	70.9	307.26	07:59:08	-21.704	27.741	73.1	70.9	10000
2	07:59:08	-19.973	25.136	66.6	68.4	307.82	08:12:55	-19.964	25.123	66.6	68.3	5149
3	08:13:43	-18.963	23.763	63.1	66.9	357.44	08:40:29	-18.949	23.763	63.1	66.9	10000
4	08:40:29	-16.033	24.258	56.1	64.9	13.33	08:43:44	-16.019	24.261	56.0	64.9	1213
5	08:49:06	-15.590	24.348	54.0	64.0	12.46	09:03:29	-15.575	24.351	54.0	64.0	5371
6	09:04:21	-13.932	24.702	50.0	62.9	11.38	09:18:52	-13.918	24.703	49.9	62.9	5424
7	09:19:56	-12.273	25.062	45.9	61.7	75.86	09:39:45	-12.270	25.076	45.9	61.7	7406
8	09:41:03	-12.205	27.446	41.4	57.9	125.72	09:54:21	-12.214	27.458	41.4	57.9	4972
9	09:56:08	-13.162	28.665	38.7	53.9	275.30	10:22:53	-13.161	28.650	38.7	53.9	10000
10	10:22:53	-13.382	25.587	33.9	46.5	267.35	10:44:46	-13.383	25.571	33.8	46.5	8177
11	10:47:23	-13.787	22.994	30.3	37.4	177.13	11:14:09	-13.802	22.995	30.3	37.3	10000
12	11:14:09	-16.810	23.387	29.6	23.3	171.77	11:20:51	-16.825	23.390	29.6	23.2	2505
13	11:20:55	-17.548	23.576	29.7	19.7	167.98	11:47:40	-17.563	23.579	29.7	19.6	10000
14	11:47:40	-20.533	23.594	31.2	5.9	179.29	11:51:21	-20.547	23.594	31.2	5.8	1373
15	11:52:09	-21.013	23.632	31.7	3.7	132.25	12:18:55	-21.021	23.643	31.7	3.6	10000
16	12:18:55	-22.398	26.376	33.4	351.5	119.12	12:33:51	-22.405	26.389	33.4	351.5	5584

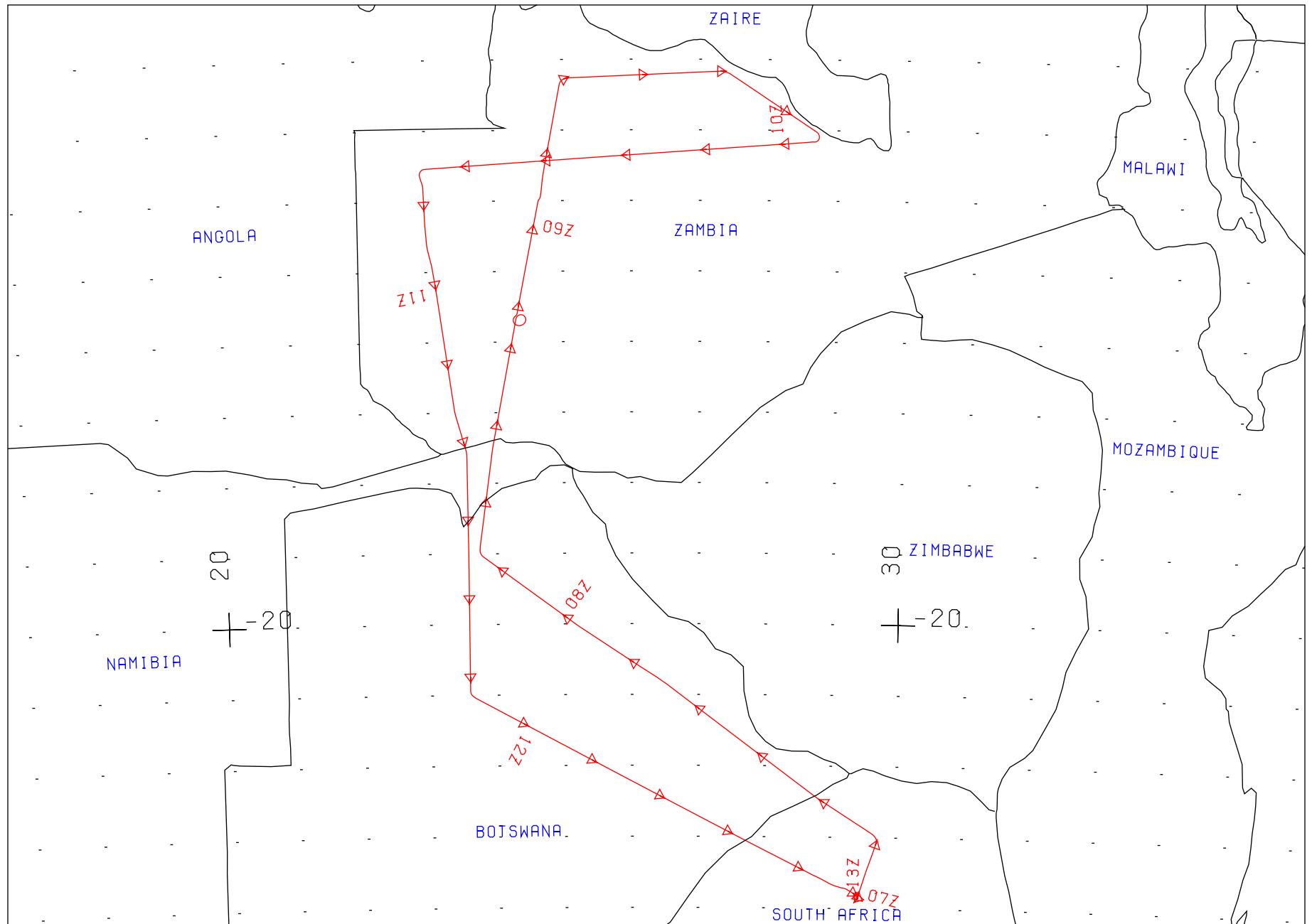
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-151**

Accession # 05546

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	4101-4125	7:46:54	7:57:51	65300/19910	Clear
C - D	4126-4156	8:49:23	9:03:01	65500/19970	Smoke, frames 4141-4143
E - F	4157-4197	9:20:54	9:39:06	65200/19880	Minor cumulus, frames 4166-4175; Smoke, frames 4189-4191 4196-4197
F - G	4198-4226	9:41:26	9:54:13	65600/20000	Smoke, frames 4203-4205
H - I	4227-4286	10:48:05	11:14:57	65800/20060	Smoke, frames 4232-4234, 4246-4249, 4258-4259, 4265-4267, 4283-4286
J - K	4287-4296	11:34:04	11:38:09	65700/20030	Clear

Date incorrect in camera data block



FLIGHT 00-151

25 AUGUST 2000

A/C 809

SAFARI



JNC 8!

RC-10 (CIR)

A/C 809

25 AUGUST 2000

FLIGHT 00-151

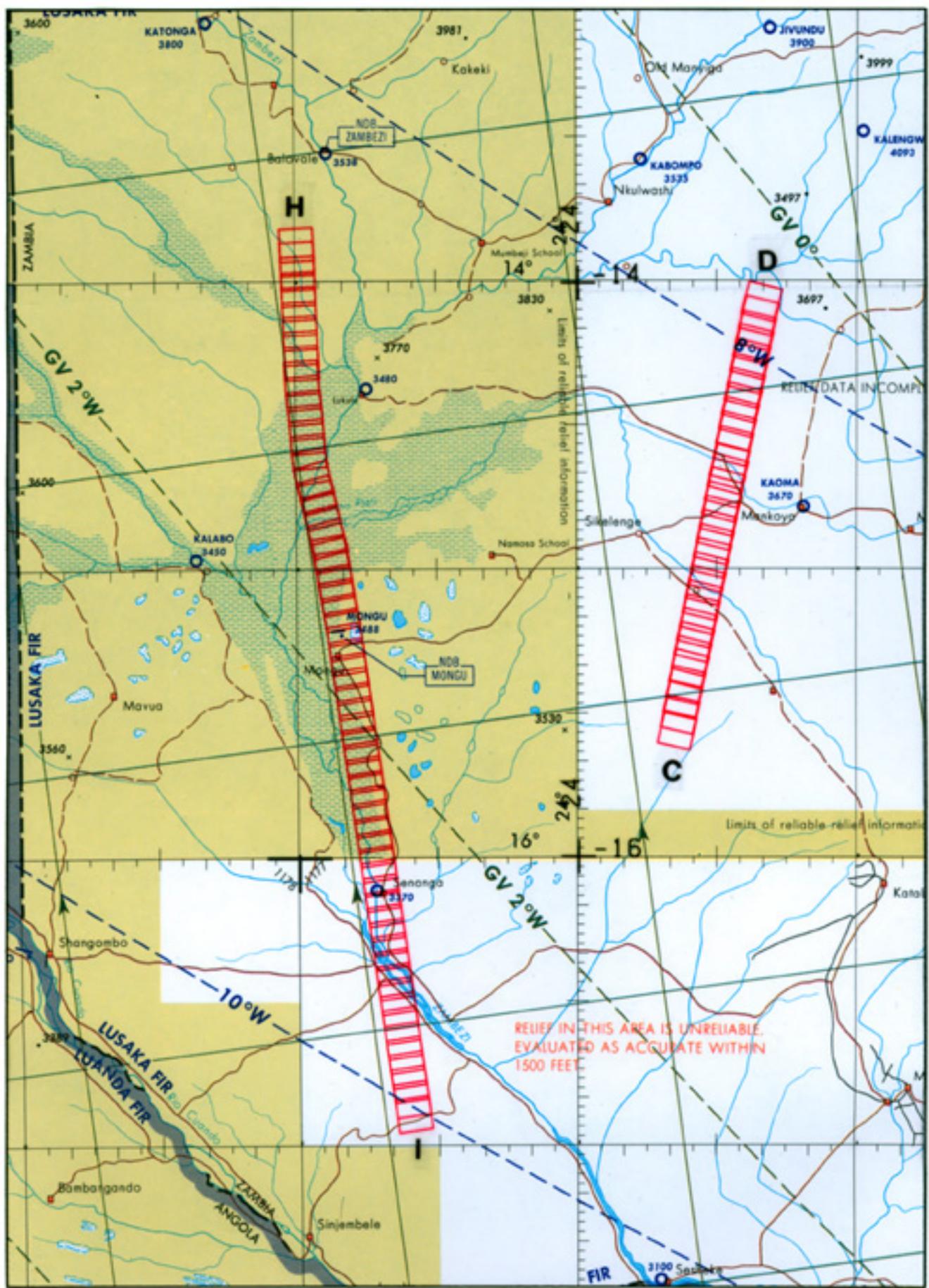
JNC 66

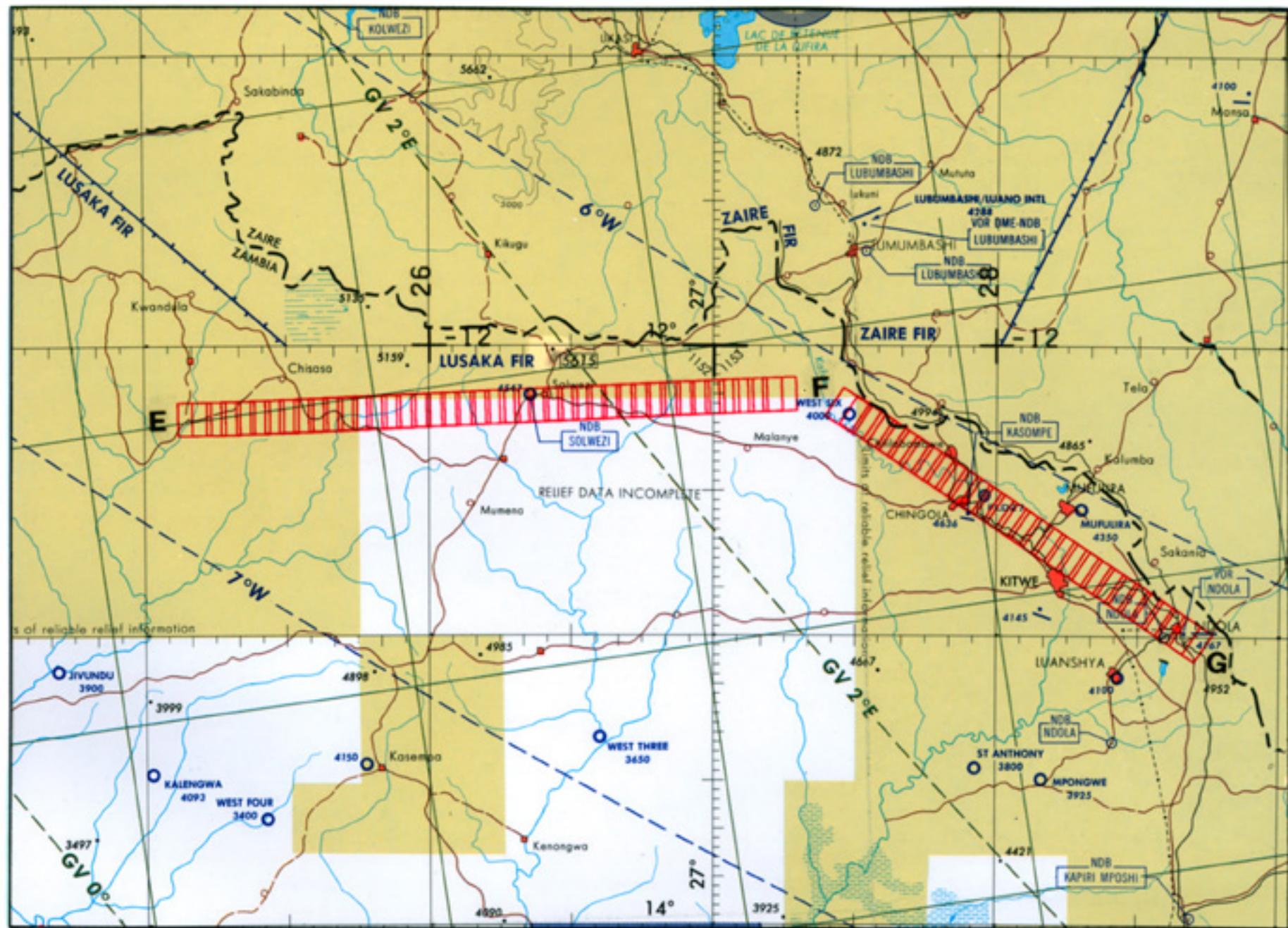
RC-10 (CIR)

A/C 809

25 AUGUST 2000

FLIGHT 00-151





FLIGHT 00-151

25 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 66

## FLIGHT SUMMARY REPORT

**Flight Number:** 00-152  
**Calendar/Julian Date:** 27 August 2000 • 240  
**Sensor Package:** Wild Heerbrugg RC-10  
Scanning High Resolution Interferometer Sounder (S-HIS)  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)  
**Area(s) Covered:** Botswana  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05547	----	----	----	----
<b>Sensor ID #:</b>	034	108	083	113	129
<b>Sensor Type:</b>	RC-10	MAS	S-HIS	CLS	Mopitt
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----	----
<b># of Frames:</b>	169	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent	----	----	----	----
<b>Remarks:</b>					

**Accession #:** -----

**Sensor ID #:** 131      130

**Sensor Type:** SSFR      LAS

**Focal Length:** -----

**Film Type:** -----

**Filtration:** -----

**Spectral Band:** -----

**f Stop:** -----

**Shutter Speed:** -----

**# of Frames:** -----

**% Overlap:** -----

**Quality:** -----

**Remarks:**

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 27 Aug 2000  
 NASA FLIGHT NUMBER 00-152

LINE	START OF FLIGHT LINE						END OF FLIGHT LINE					
	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		START HEADING	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		SCAN LINES
				ZEN	AZIM					ZEN	AZIM	
1	08:13:32	-22.073	28.480	64.0	66.3	308.78	08:37:36	-22.065	28.468	64.0	66.2	8988
2	08:39:49	-20.244	26.139	57.7	63.3	192.07	08:55:49	-20.258	26.136	57.7	63.3	5974
3	09:01:58	-22.214	25.706	54.2	58.4	12.11	09:19:31	-22.199	25.709	54.1	58.4	6553
4	09:21:51	-20.149	25.936	49.0	56.1	269.45	09:48:38	-20.149	25.919	49.0	56.1	10000
5	09:48:38	-19.902	22.703	43.8	50.5	276.22	09:54:03	-19.901	22.688	43.8	50.4	2022
6	09:55:22	-19.746	21.940	42.6	48.8	355.87	10:08:48	-19.731	21.939	42.6	48.8	5018
7	10:09:06	-18.234	22.149	39.2	46.4	23.91	10:11:44	-18.221	22.155	39.2	46.4	986
8	10:13:07	-18.268	22.493	38.5	45.3	189.90	10:31:45	-18.282	22.491	38.5	45.3	6957
9	10:35:54	-20.439	22.363	36.7	36.2	26.59	10:56:53	-20.425	22.369	36.7	36.2	7838
10	11:00:54	-18.188	23.229	31.6	28.7	181.25	11:20:26	-18.203	23.229	31.6	28.6	7292
11	11:24:30	-20.436	23.103	31.6	16.9	25.27	11:47:20	-20.422	23.109	31.5	16.8	8525
12	11:51:06	-18.013	23.982	27.9	4.7	182.56	12:17:52	-18.027	23.981	27.9	4.6	10000
13	12:17:52	-21.014	23.359	31.1	351.5	191.66	12:28:44	-21.029	23.356	31.1	351.4	4056
14	12:29:45	-22.296	23.019	32.8	346.4	253.58	12:41:01	-22.300	23.004	32.8	346.3	4193
15	12:42:32	-22.509	21.531	34.0	341.0	179.46	12:59:54	-22.524	21.532	34.0	341.0	6473
16	13:01:01	-24.487	22.070	37.5	334.8	103.07	13:25:20	-24.489	22.086	37.5	334.8	9067

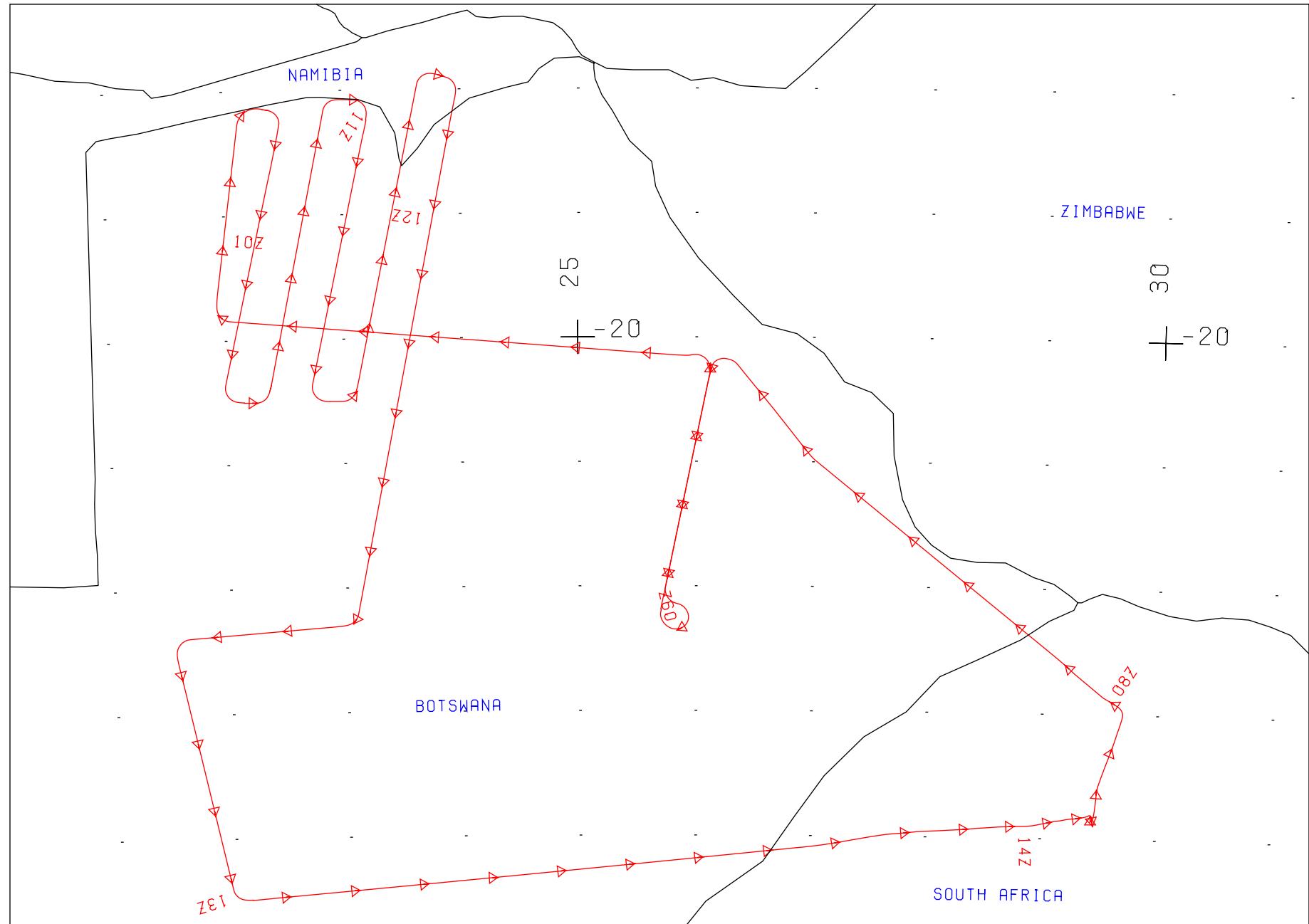
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-152**

Accession # 05547

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	4332-4364	8:10:58	8:25:42	61300/18690	Clear
C - D	4365-4399	8:40:08	8:55:43	65200/19880	Clear
D - D	4400-4412	8:56:11	9:01:42	65200/19880	Clear; oblique frames
D - C	4413-4450	9:02:09	9:19:11	65600/20000	Clear
E - F	4451-4464	12:06:01	12:11:55	66400/20240	Clear
G - H	4465-4478	12:34:37	12:40:32	65800/20060	Smoke, frames 4465-4470
I - J	4479-4489	12:54:58	12:59:31	66200/20180	Minor-20% cumulus
K - L	4490-4500	13:13:17	13:17:50	66500/20270	Clear

Date incorrect in camera data block

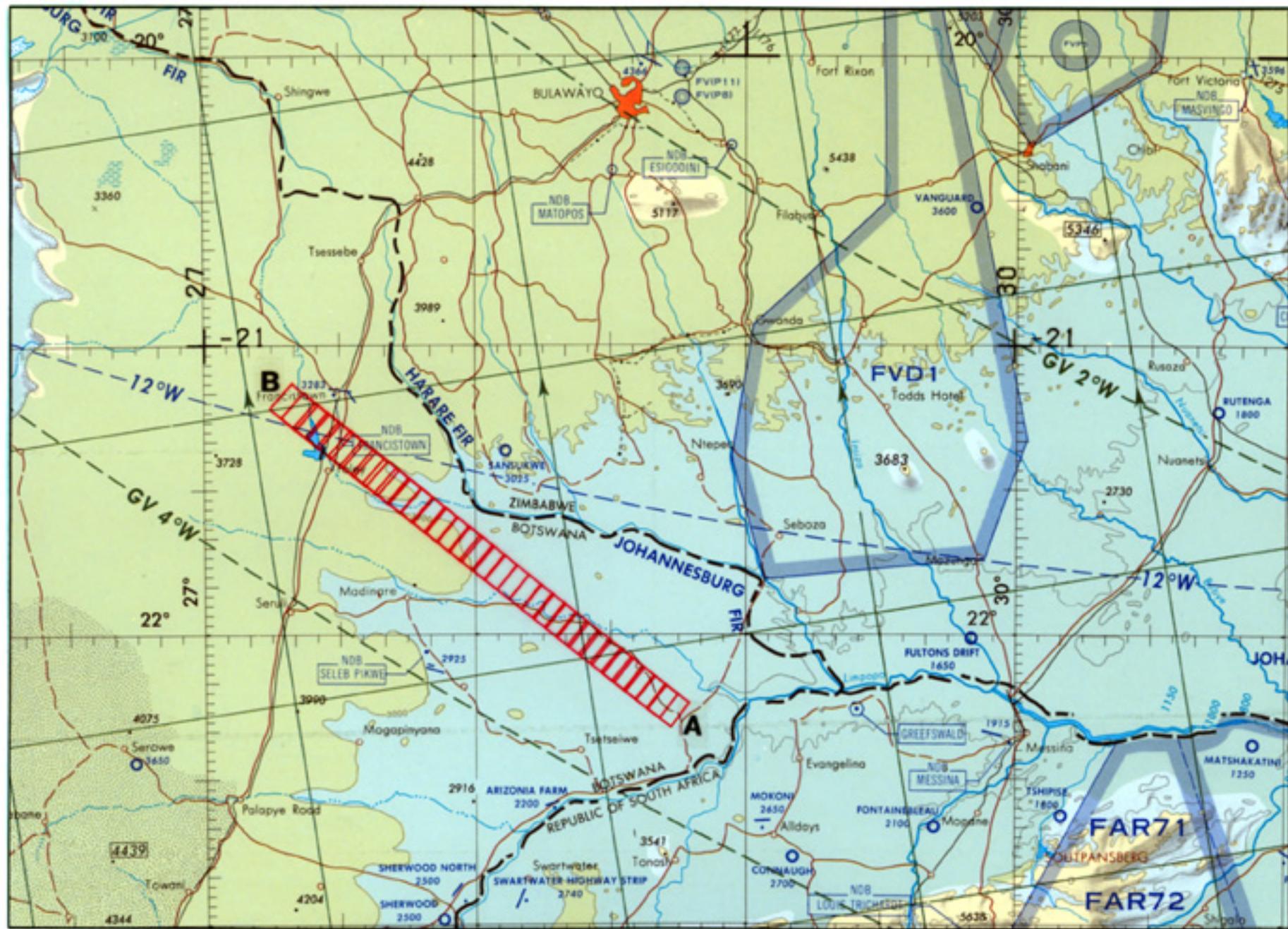


FLIGHT 00-152

27 AUGUST 2000

A/C 809

SAFARI



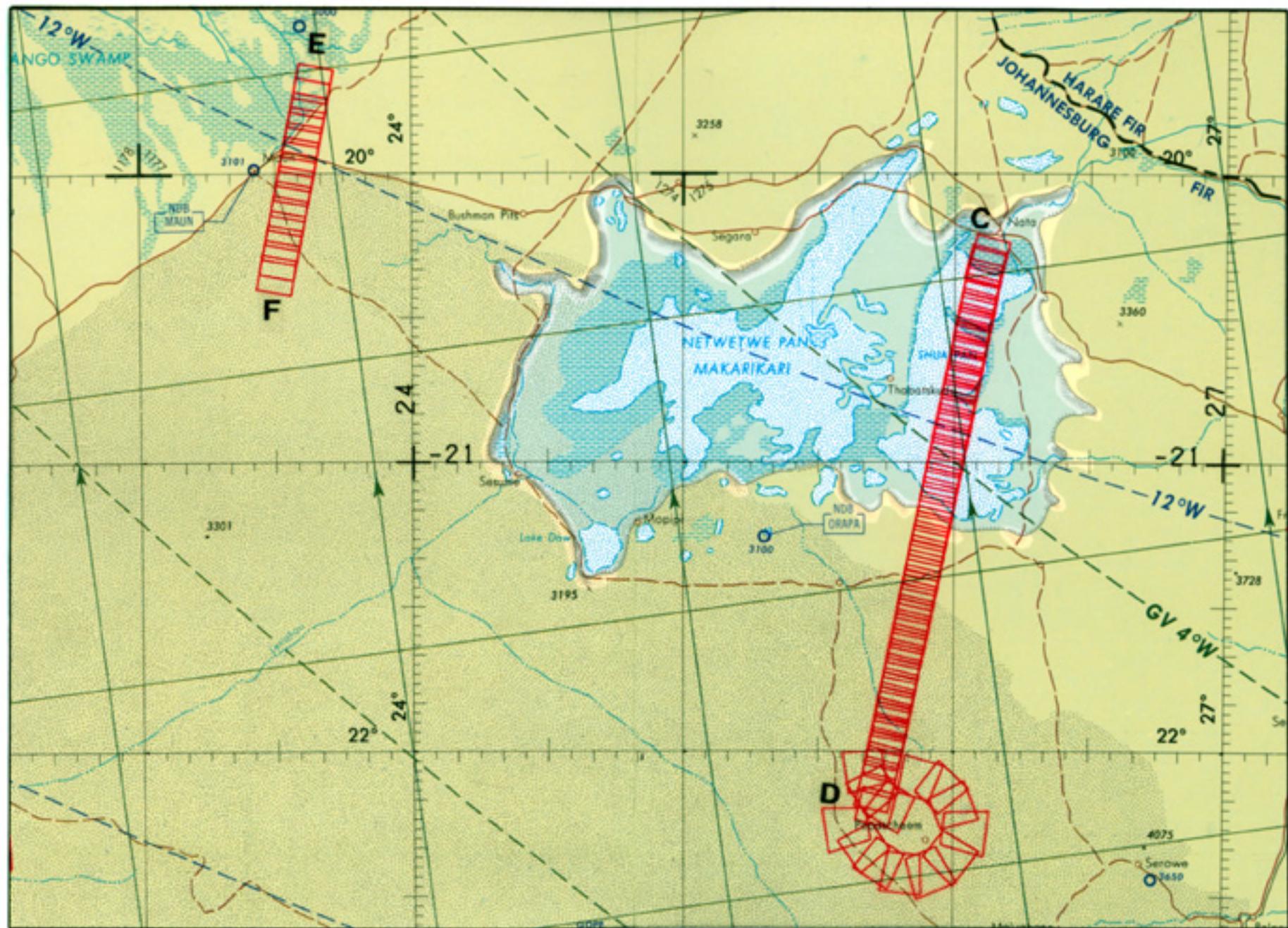
FLIGHT 00-152

27 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 81



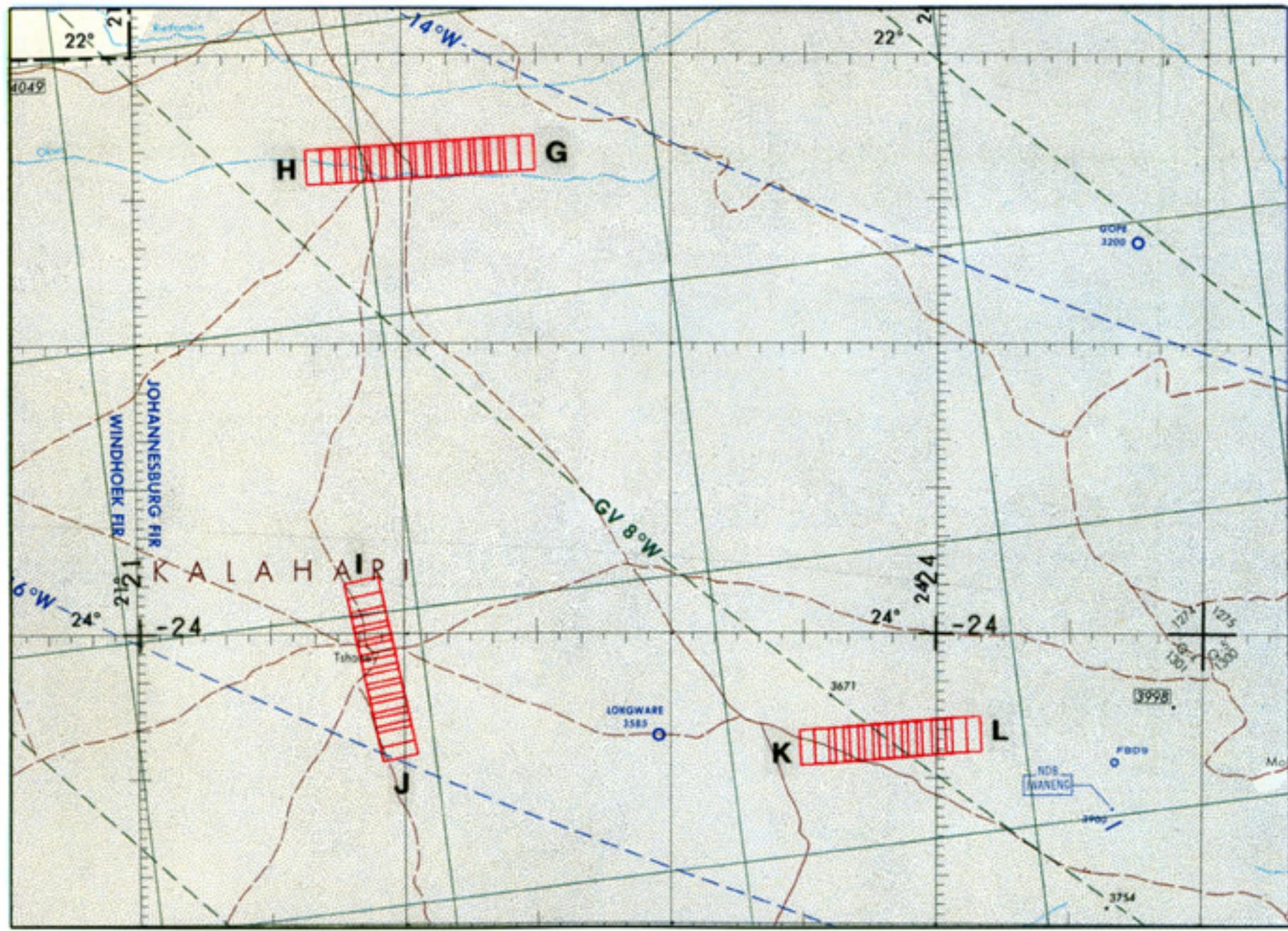
FLIGHT 00-152

27 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 81



FLIGHT 00-152

27 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 81

## FLIGHT SUMMARY REPORT

**Flight Number:** 00-153  
**Calendar/Julian Date:** 29 August 2000 • 242  
**Sensor Package:** Wild Heerbrugg RC-10  
Scanning High Resolution Interferometer Sounder (S-HIS)  
MODIS Airborne Simulator (MAS)  
Cloud Lidar Scanner (CLS)  
Mopitt Airborne Simulator (Mopitt-A)  
Solar Spectral Flux Radiometer (SSFR)  
  
**Area(s) Covered:** Republic of South Africa/Mozambique  
**Aircraft #:** 809

### SENSOR DATA

<b>Accession #:</b>	05548	----	----	----	----
<b>Sensor ID #:</b>	034	108	083	113	129
<b>Sensor Type:</b>	RC-10	MAS	S-HIS	CLS	Mopitt
<b>Focal Length:</b>	12" 304.66 mm	----	----	----	----
<b>Film Type:</b>	Aerochrome IR SO-134	----	----	----	----
<b>Filtration:</b>	Wratten 12	----	----	----	----
<b>Spectral Band:</b>	510-900nm	----	----	----	----
<b>f Stop:</b>	11	----	----	----	----
<b>Shutter Speed:</b>	1/300	----	----	----	----
<b># of Frames:</b>	373	----	----	----	----
<b>% Overlap:</b>	60	----	----	----	----
<b>Quality:</b>	Excellent	----	----	----	----
<b>Remarks:</b>					

**Accession #:** -----

**Sensor ID #:** 131

**Sensor Type:** SSFR

**Focal Length:** -----

**Film Type:** -----

**Filtration:** -----

**Spectral Band:** -----

**f Stop:** -----

**Shutter Speed:** -----

**# of Frames:** -----

**% Overlap:** -----

**Quality:** -----

**Remarks:**

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 29 Aug 2000  
 NASA FLIGHT NUMBER 00-153

LINE	START OF FLIGHT LINE						END OF FLIGHT LINE					
	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		START HEADING	TIME HH:MM:SS	LAT DEG	LON DEG	SOLAR		SCAN LINES
				ZEN	AZIM					ZEN	AZIM	
1	08:15:23	-22.713	29.667	63.5	66.4	339.65	08:18:35	-22.700	29.663	63.5	66.3	1195
2	08:28:35	-22.367	29.387	60.6	64.6	197.64	08:38:08	-22.381	29.383	60.6	64.6	3564
3	08:39:59	-23.379	28.977	58.7	62.3	0.65	08:46:32	-23.364	28.977	58.7	62.2	2448
4	08:47:50	-22.536	29.026	56.8	61.3	75.90	09:04:30	-22.533	29.041	56.8	61.3	6230
5	09:08:05	-22.737	30.967	52.8	57.7	169.33	09:34:51	-22.751	30.970	52.8	57.6	10000
6	09:34:52	-25.626	31.764	49.6	50.1	166.96	10:01:38	-25.640	31.768	49.6	50.1	10000
7	10:01:38	-28.556	32.544	47.3	41.5	168.46	10:05:45	-28.570	32.548	47.3	41.5	1537
8	10:08:14	-29.001	32.902	46.7	39.5	355.52	10:35:00	-28.986	32.901	46.7	39.5	10000
9	10:35:00	-25.974	32.917	40.7	33.3	1.62	10:37:04	-25.960	32.917	40.7	33.2	770
10	10:38:09	-25.660	32.995	40.2	32.3	78.94	10:44:50	-25.657	33.011	40.2	32.3	2500
11	10:46:35	-25.342	33.873	38.8	29.8	333.93	10:56:58	-25.329	33.865	38.7	29.7	3878
12	11:06:24	-23.570	32.419	35.1	23.4	323.66	11:19:17	-23.558	32.410	35.1	23.4	4814
13	11:22:35	-22.566	31.240	32.9	17.2	290.03	11:26:16	-22.562	31.225	32.8	17.1	1377
14	11:29:12	-22.671	30.608	32.7	14.2	159.63	11:55:18	-22.685	30.614	32.7	14.1	9753
15	12:07:28	-25.761	30.638	34.8	356.8	268.34	12:22:08	-25.762	30.622	34.8	356.7	5482

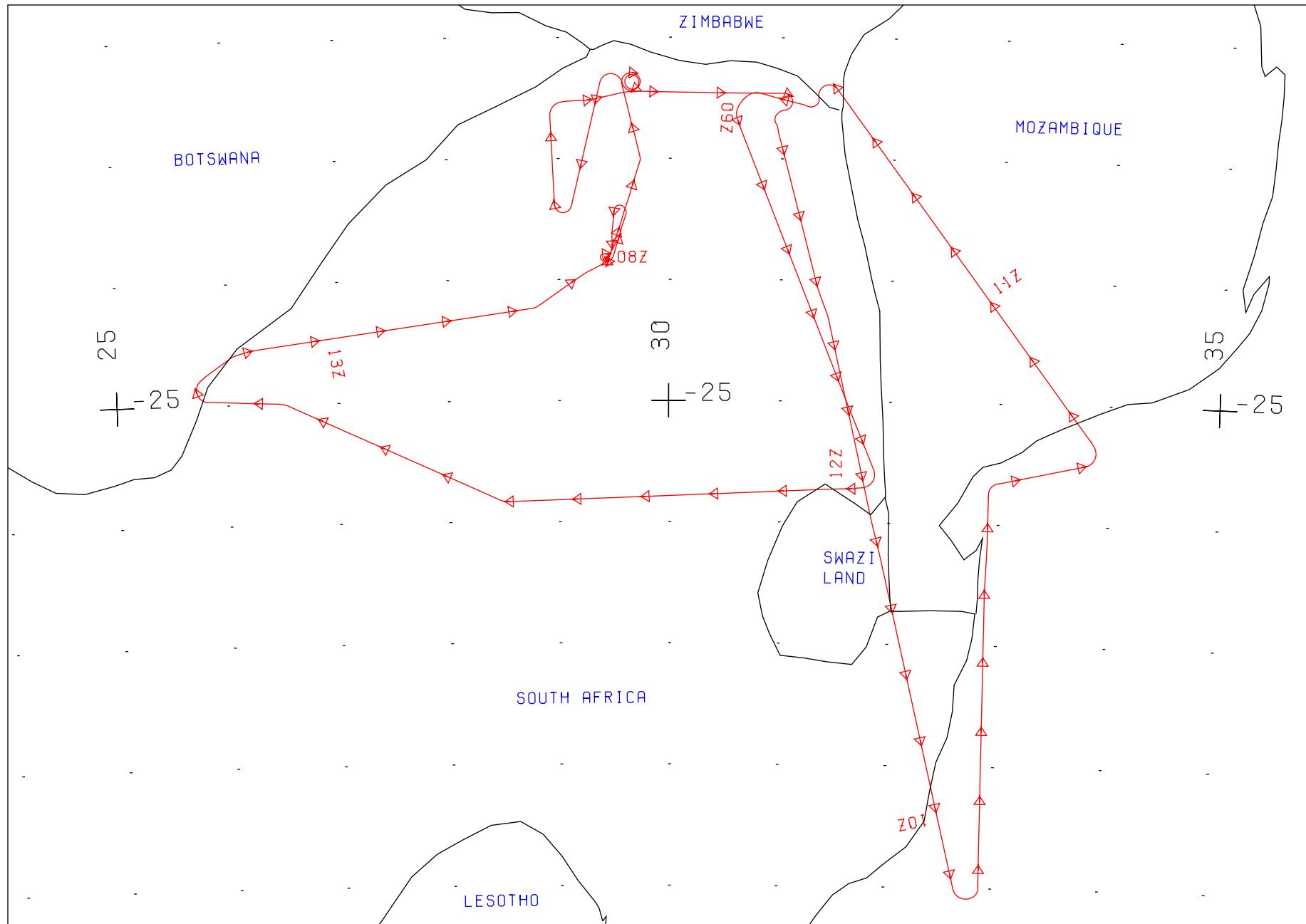
**CAMERA FLIGHT LINE DATA**  
**FLIGHT NO. 00-153**

Accession # 05548

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	4517-4537	8:29:03	8:37:59	62100/18930	Clear
C - D	4538-4568	8:49:04	9:02:47	65300/19910	Clear
E - F	4569-4635	9:08:30	9:38:43	65800/20060	Clear
G - H	4636-4650	10:30:53	10:36:54	65900/20090	Clear
I - J	4651-4718	10:49:01	11:19:01	65700/20030	Smoke, frames 4667-4674, 4700-4703, 4713-4715
K - L	4719-4770	11:33:04	11:56:17	65600/20000	Clear
M - N	4771-4824	11:59:57	12:24:09	65800/20060	Minor-20% cumulus, frames 4788-4811
N - O	4825-4850	12:25:14	12:36:40	65500/19970	Smoke, frames 4842-4847; light leak, frame 4848
P	4861-4861	12:41:42	12:41:42	65600/20000	Light strike, frame 4861
Q - R	4862-4899	12:56:02	13:12:53	66000/20120	10-40% cumulus, frames 4881-4899; emulsion damage, frame 4884; processing damage throughout roll

Date incorrect in camera data block. Add 1 second for correct UTC. Frames 4851-4860 destroyed during processing.

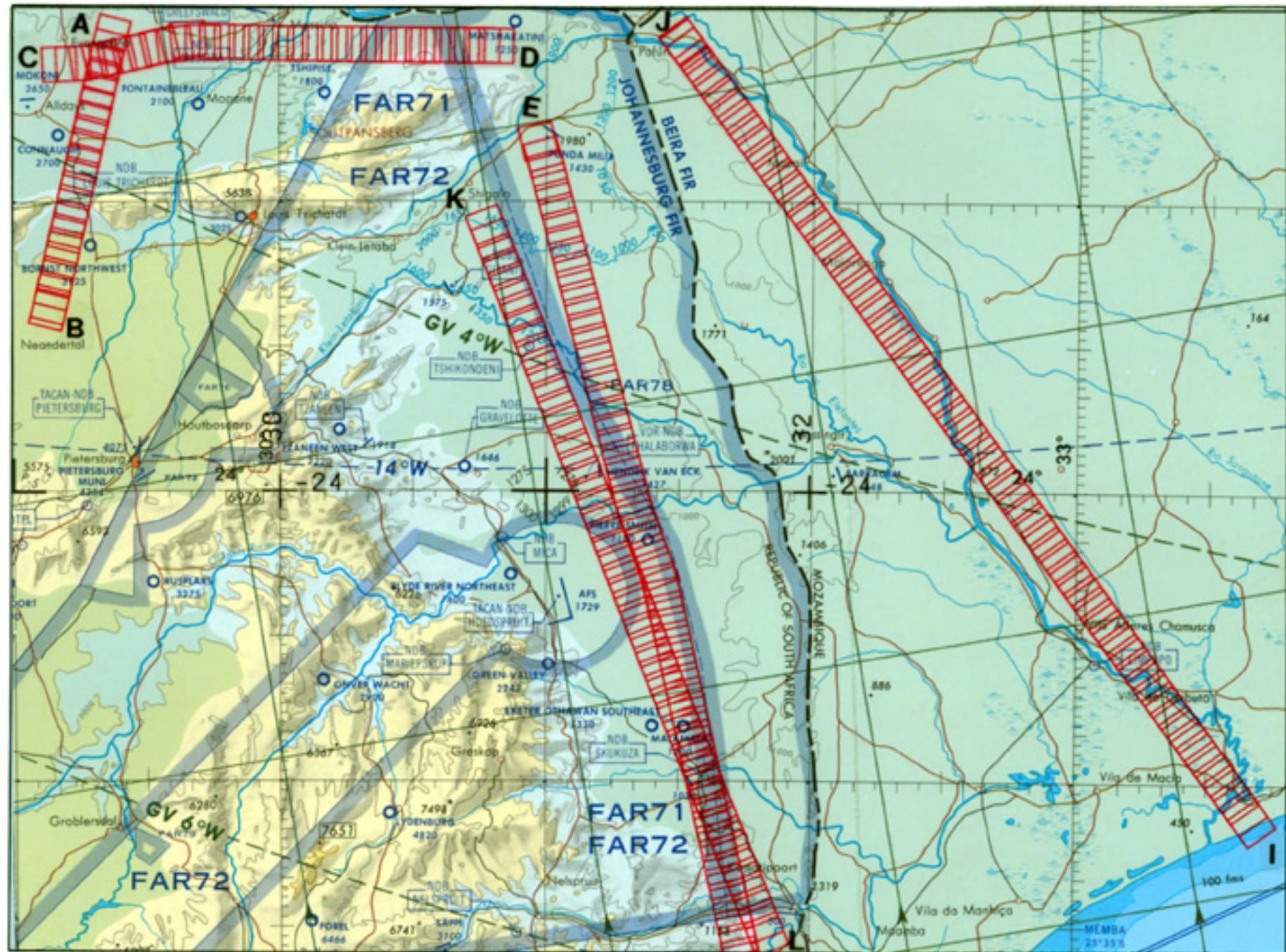


FLIGHT 00-153

29 AUGUST 2000

A/C 809

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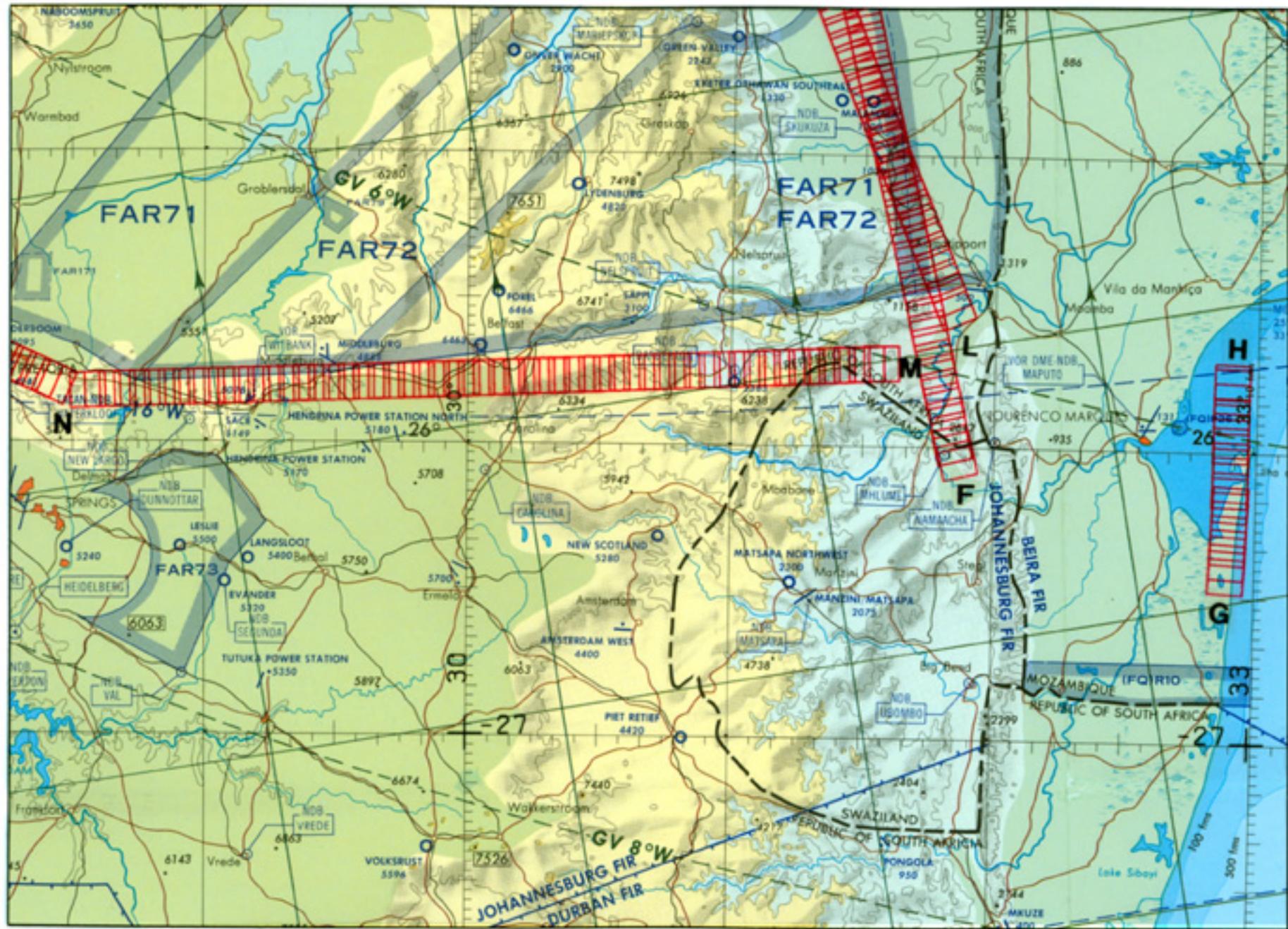
FLIGHT 00-153

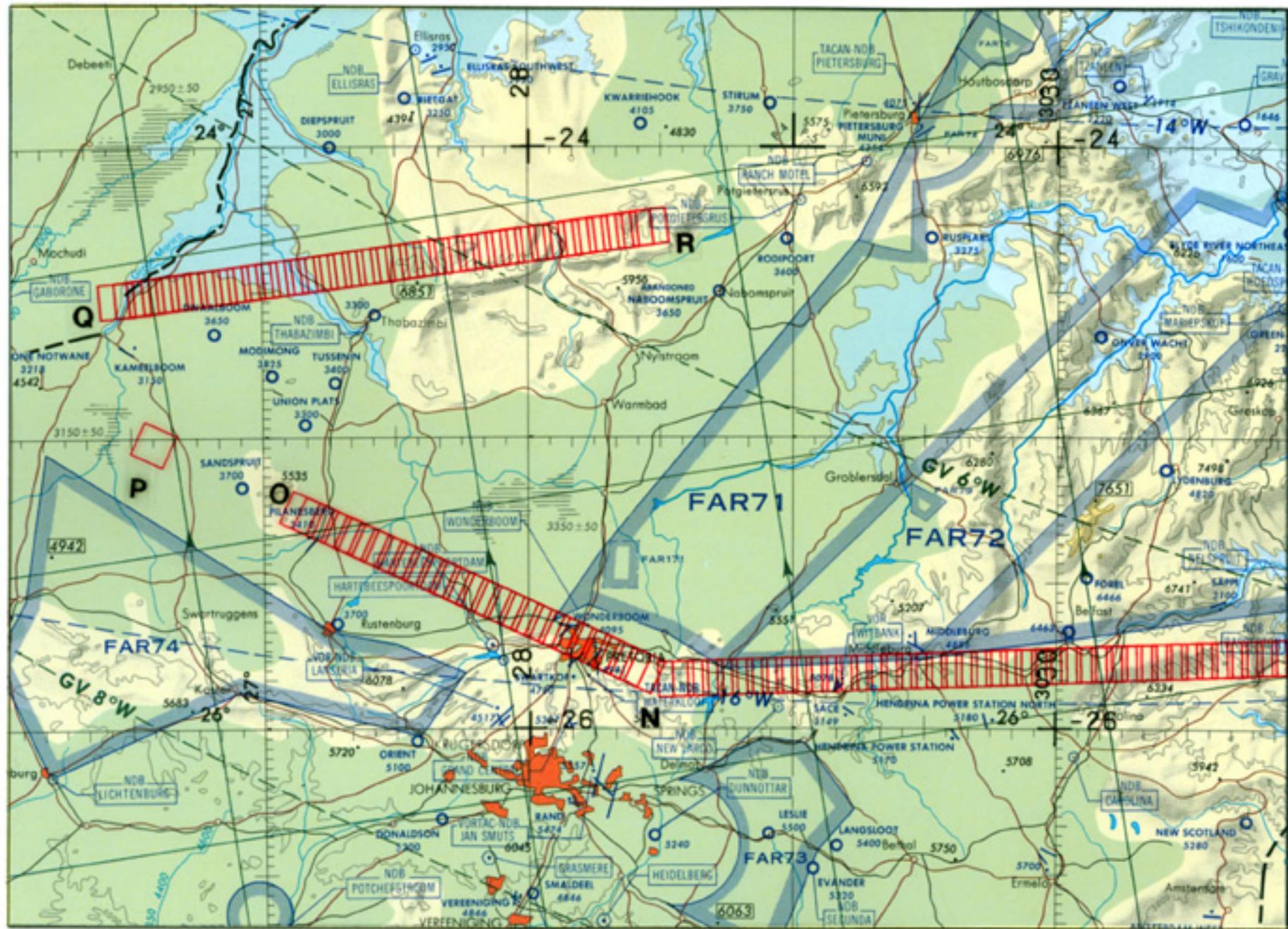
29 AUGUST 2000

A/C 809

BC-10 (CIR)

-INC 81





FLIGHT 00-153

29 AUGUST 2000

A/C 809

RC-10 (CIR)

JNC 81