

# FLIGHT SUMMARY REPORT

**Flight #:** 92-020  
**Date:** 21 November 1991  
**Sensor Package:** Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)  
Thematic Mapper Simulator (TMS)  
Thermal Infrared Multispectral Scanner (TIMS)

**Area(s) Covered:** Central California/Pacific Ocean

**Investigator(s):** Functional Sensor Flight

**Aircraft #:** 706

**Flight Request:** 92X003

**Julian Date:** 325

## SENSOR DATA

<b>Accession #:</b>	----	----	----
<b>Sensor ID #:</b>	099	074	086
<b>Sensor Type:</b>	AVIRIS	TMS	TIMS
<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>	----	Good	Good
<b>Remarks:</b>			

## 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 used for data collection during this flight.

## Airborne Visible and Infrared Imaging Spectrometer

The Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) is the second in the series of imaging spectrometer instruments developed at the Jet Propulsion Laboratory (JPL) for earth remote sensing. This instrument uses scanning optics and four spectrometers to image a 614 pixel swath simultaneously in 224 contiguous spectral bands (0.4-2.4  $\mu\text{m}$ ).

AVIRIS parameters are as follows:

IFOV:	1 mrad
Ground Resolution:	66 feet (20 meters) at 65,000 feet
Total Scan Angle:	30°
Swath Width:	5.7 nmi (10.6 km) at 65,000 feet
Spectral Coverage:	0.41-2.45 $\mu\text{m}$
Pixels/Scan Line:	614
Number of Spectral Bands:	224
Digitization:	10-bits
Data Rate:	17 MBPS

<u>Spectrometer</u>	<u>Wavelength Range</u>	<u>Number of Bands</u>	<u>Sampling Interval</u>
1	0.41 - 0.70 $\mu\text{m}$	31	9.4 nm
2	0.68 - 1.27 $\mu\text{m}$	63	9.4 nm
3	1.25 - 1.86 $\mu\text{m}$	63	9.7 nm
4	1.84 - 2.45 $\mu\text{m}$	63	9.7 nm

All AVIRIS data is decommutated and archived at JPL and not currently available for public distribution. For further information contact Rob Green at Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, California 91109-8099.

### Thermal Infrared Multispectral Scanner

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2  $\mu\text{m}$  to 12.2  $\mu\text{m}$  region.

<u>Channel</u>	<u>Wavelength, <math>\mu\text{m}</math></u>	<u>NET</u>
1	8.2 - 8.6	< 0.3° C
2	8.6 - 9.0	< 0.3° C
3	9.0 - 9.4	< 0.3° C
4	9.4 - 10.2	< 0.3° C
5	10.2 - 11.2	< 0.3° C
6	11.2 - 12.2	< 0.3° C

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56°
Swath Width:	16.9 nmi (31.3 km) at 65,000 feet
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

### Thematic Mapper Simulator (Wide Angle Mode)

The Daedalus Thematic Mapper Simulator (TMS) is a multispectral scanner flown aboard the ER-2 aircraft which simulates spatial and spectral characteristics of the seven Landsat-D Thematic Mapper bands. The specific bands are as follows:

<u>Daedalus Channel</u>	<u>TM Band</u>	<u>Wavelength, <math>\mu\text{m}</math></u>
2	1	0.45 - 0.52
3	2	0.52 - 0.60
5	3	0.63 - 0.69
7	4	0.76 - 0.90
9	5	1.55 - 1.75
10	7	2.08 - 2.35

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	162 feet (50 meters) at 65,000 feet
Total Scan Angle:	85.92°
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)

**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 or FTS 464-6252.

# TMS SCANNER FLIGHT LINE DATA

FLIGHT NO. 92-020

## DAEDALUS FLIGHT DATA FLIGHT NUMBER: 92-020

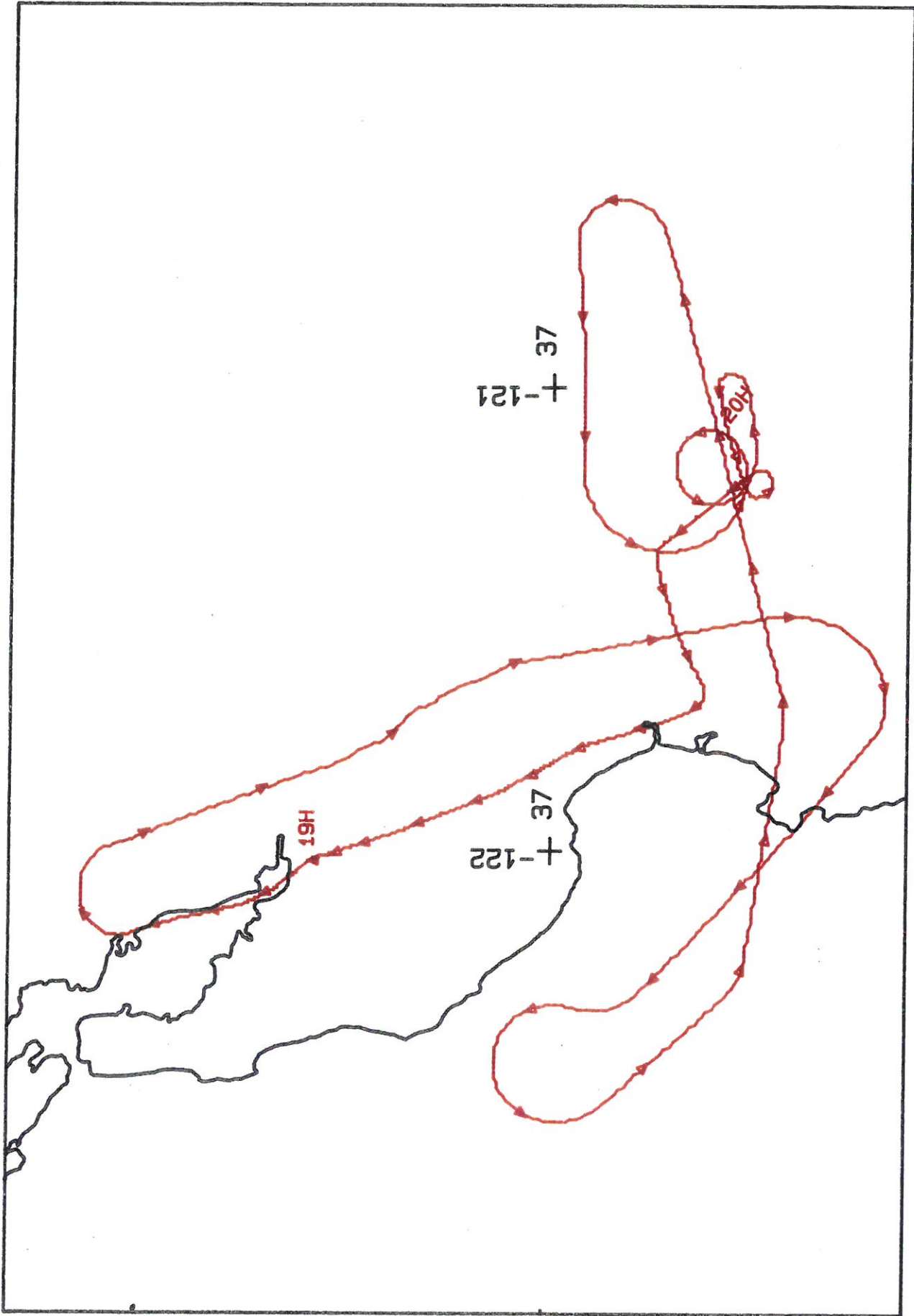
Check Points	A c t u a l t i m e b e g i n	A c t u a l e n d	A c t u a l s c a n l i n e b e g i n	A c t u a l e n d	A l t i t u d e f e e t / m e t e r	Scan S p e e d (rps)	t o t a l G o o d s c a n l i n e s	t o t a l I n t e r p o l a t e d s c a n l i n e s	t o t a l R e p e a t e d s c a n l i n e s
A-B	19:25: 8.0	19:29:56.0	13363	15163	65000/19812	6.25	1801	0	0
C-D	19:35:48.0	19:37:24.0	17365	17965	65000/19812	6.25	601	0	0
D-E	19:38:28.0	19:41: 8.0	18367	19367	65000/19812	6.25	1001	0	0

# TIMS SCANNER FLIGHT LINE DATA

FLIGHT NO. 92-020

TIMS FLIGHT DATA  
FLIGHT NUMBER: 92-020

Check Points	Actual time begin	Actual scanline begin	Altitude feet/Meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
A-B	19:25: 6.0 19:29:53.0	15487 17587	63000/19202	7.30	2101	0	0
C-D	19:35:48.0 19:37:24.0	20177 20878	65000/19812	7.30	675	0	7
D-E	19:38:34.0 19:41: 5.0	21394 22494	65000/19812	7.30	1101	0	0

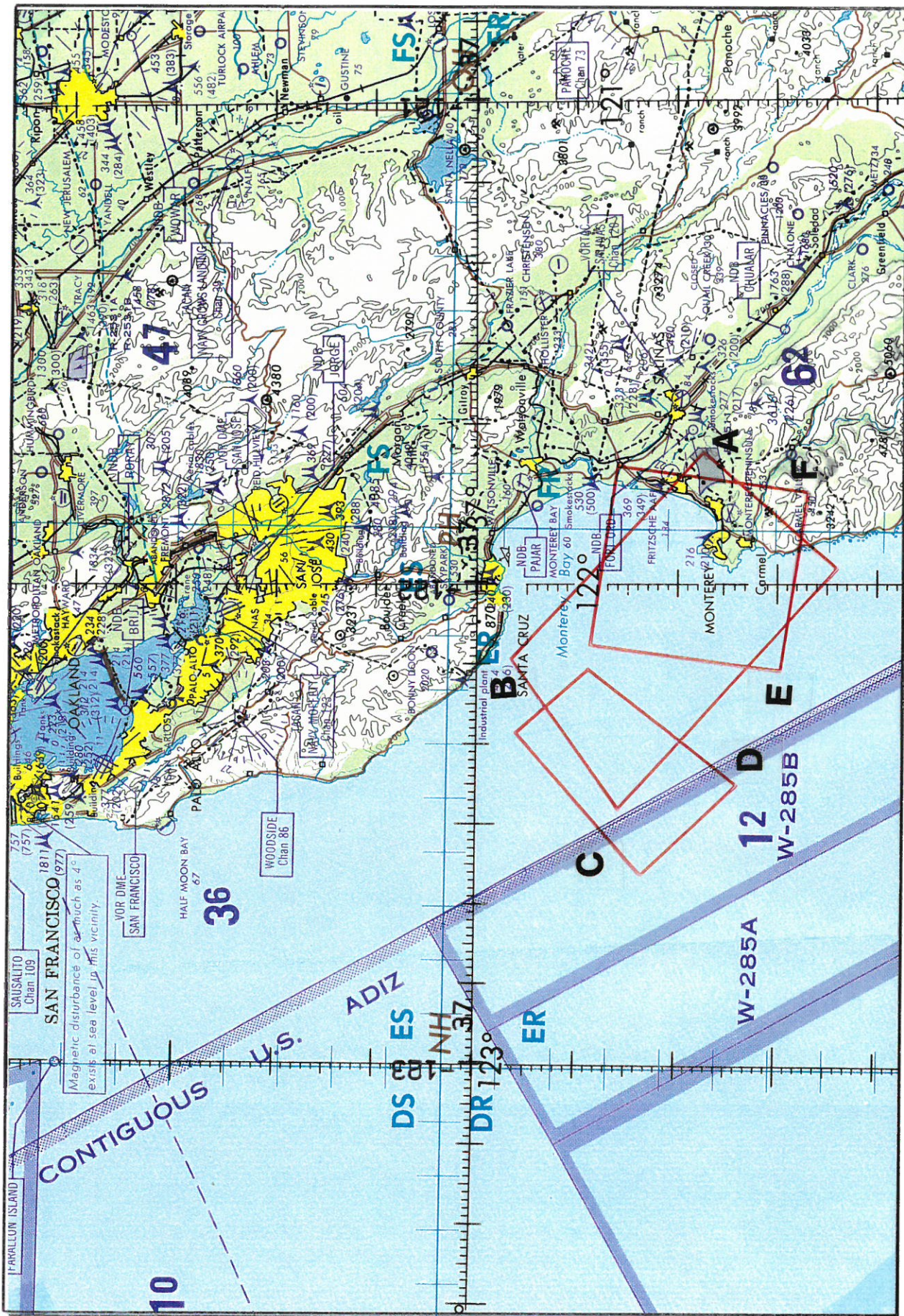


FLIGHT 92-020

21 November 1991

A/C 706

Functional Check Flight



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CONTIGUOUS U.S. ADIZ

SAN FRANCISCO

OAKLAND

MONTEREY

SANTA CRUZ

W-285A

W-285B

12 D E

36

47

62

1220

123°

DR 123°

DS ES

NH

37

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

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Magnetic disturbance of as much as 4° exists at sea level in this vicinity.