FLIGHT SUMMARY REPORT

Flight #: 92-162

Date: 24 September 1992

Sensor Package: Dual Wild-Heerbrug RC-10
Dual Hycon HR-732
Thematic Mapper Simulator (TMS)

Area(s) Covered: Hawaiian Islands

Investigator(s): Masumoto, State of Hawaii **Aircraft #:** 708

Flight Request: 2XZ2040 **Julian Date:** 268

SENSOR DATA

Accession #:	04475	04476	04477
Sensor ID #:	034	026	038
Sensor Type:	RC-10	RC-10	HR-732
Focal Length:	12" 304.66 mm	12" 304.97 mm	24" 609.6 mm
Film Type:	High Definition Aerochrome IR SO-131	Aerial Color SO-242	High Definition Aerochrome IR SO-131
Filtration:	cc.10B	None	cc.30B
Spectral Band:	510-900 nm	400-700 nm	510-900 nm
f Stop:	4	4	8
Shutter Speed:	1/150	1/200	1/75
# of Frames:	97	68	197
% Overlap:	60	60	60
Quality:	Excellent	Excellent	Excellent

Remarks:

SENSOR DATA continued

Accession #:	04478	-----
Sensor ID #:	039	101
Sensor Type:	HR-732	TMS
Focal Length:	24" 609.6 mm	-----
Film Type:	High Definition Aerial Film 3414	-----
Filtration:	Wratten-12	-----
Spectral Band:	510-700 nm	-----
f Stop:	8	-----
Shutter Speed:	1/75	-----
# of Frames:	198	-----
% Overlap:	60	-----
Quality:	Excellent	Excellent
Remarks:		

Hurricane Iniki

On September 11, 1992 Hurricane Iniki swept through the Hawaiian Islands causing extensive damage to residential and commercial structures, agricultural crops, and natural vegetation. In response to this disaster, NASA deployed a high altitude ER-2 aircraft to Barbers Point NAS on the island of Oahu. From that operational base the ER-2 flew nine missions from September 16 to October 1 for purposes of acquiring high resolution photography and digital imaging of the devastated areas. These disaster assessment flights are summarized in this volume.

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 and camera system(s) used for data collection during this flight.

Thematic Mapper Simulator

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:

Daedalus Channel	TM Band	Wavelength, *μm*
1	A	0.42 - 0.45
2	1	0.45 - 0.52
3	2	0.52 - 0.60
4	B	0.60 - 0.62
5	3	0.63 - 0.69
6	C	0.69 - 0.75
7	4	0.76 - 0.90
8	D	0.91 - 1.05
9	5	1.55 - 1.75
10	7	2.08 - 2.35
11	6	8.5 - 14.0 low gain
12	6	8.5 - 14.0 high gain

Sensor/aircraft parameters are as follows:

IFOV:	1.25 mrad
Ground Resolution:	81 feet (25 meters) at 65,000 feet
Total Scan Angle:	43°
Swath Width:	8.4 nmi (15.6 km) at 65,000 feet
Pixels/Scan Line:	716
Scan Rate:	12.5 scans/second
Ground Speed:	400 kts (206 m/second)

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.

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. 92-162

Accession # 04475

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	6861-6867	19:23:27	19:26:20	60000/18300	10-40% scattered cumulus; smoke obstruction (frames 6863-6865)
B - C	6868-6878	19:34:17	19:39:05	"	10-70% scattered cumulus and strato-cumulus
D - E	6879-6889	19:45:01	19:49:48	"	10-50% scattered cumulus; smoke obstruction (frames 6884-6886)
B - F	6890-6893	19:56:33	19:57:59	"	20-30% cumulus and strato-cumulus (frames 6890-6892)
G - H	6894-6910	20:24:51	20:32:26	61000/18600	10-40% scattered cumulus (frames 6895-6899, 6906-6910)
I - J	6911-6918	20:37:29	20:40:48	60000/18300	Minor-30% scattered cumulus
J - K	6919-6925	20:42:00	20:44:51	"	Minor-30% scattered cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-162

Accession # 04475

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
L - M	6926-6948	20:49:31	20:59:57	61000/18600	10% scattered cumulus (frames 6927-6929); minor-20% scattered cumulus (frames 6931-6934); minor-60% cumulus (frames 6941-6948)
N - O	6949-6957	21:06:31	21:10:17	62000/18900	Minor-30% scattered cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-162

Accession # 04476

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	2185-2191	19:23:00	19:25:55	60000/18300	10-20% cumulus (frames 2185-2191)
B - C	2192-2202	19:33:50	19:38:42	"	20-50% cumulus (frames 2192-2202)
D - E	2203-2213	19:44:32	19:49:22	"	10-30% cumulus (frames 2203-2213)
B - F	2214-2217	19:56:06	19:57:32	"	10-20% cumulus (frames 2214-2216)
G - H	2218-2234	20:24:25	20:31:59	61000/18600	20-30% cumulus (frames 2218-2222); 10-30% cumulus (frames 2231-2234)
I - J	2235-2242	20:37:02	20:40:21	60000/18300	10-20% cumulus (frames 2235-2240)
J - K	2243-2249	20:41:33	20:44:23	"	10-20% cumulus (frames 2243-2245); step-wedge (frames 2248-2249)
L	2250-2252	20:49:05	20:50:01	61000/18600	Stepwedge (frame 2250); emulsion abrasion (frame 2252)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-162

Accession # 04477

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0015	19:23:01	19:26:15	60000/18300	Minor-60% scattered cumulus, strato-cumulus, and smoke
B - C	0016-0038	19:33:50	19:38:54	"	10-70% scattered cumulus and strato-cumulus
D - E	0039-0060	19:44:34	19:49:22	"	10-60% scattered cumulus, strato-cumulus, and smoke
B - F	0061-0068	19:56:06	19:57:42	"	10-30% cumulus (frames 0062-0065)
G - H	0069-0103	20:24:25	20:32:06	61000/18600	10-30% cumulus (frames 0071-0079, 0096-0103)
I - J	0104-0118	20:37:03	20:40:12	60000/18300	10-20% cumulus (frames 0104-0114)
J - K	0119-0132	20:41:34	20:44:30	"	10-30% cumulus (frames 0119-0122, 0130-0131)
L - M	0133-0179	20:49:05	20:59:28	61000/18600	10% cumulus (frames 0145-0150); 20-80% cumulus (frames 0167-0179)
N - O	0180-0197	21:06:02	21:09:52	62000/18900	10-20% scattered cumulus (frames 0180-0196)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-162

Accession # 04478

Sensor # 039

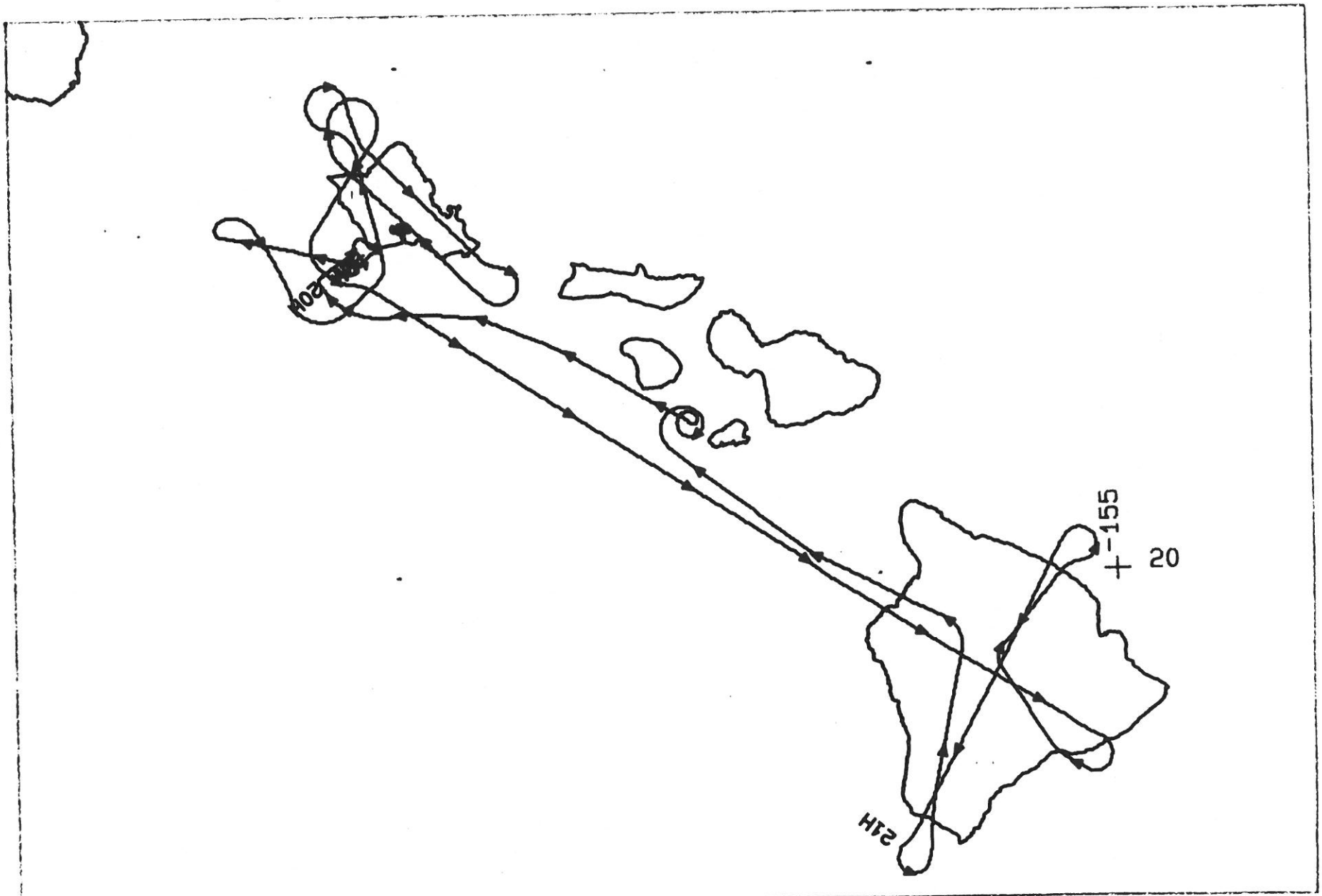
Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
A - B	0001-0015	19:23:04	19:26:18	60000/18300	10-60% cumulus and smoke
B - C	0016-0038	19:33:54	19:38:51	"	10-70% cumulus
D - E	0039-0060	19:44:38	19:49:26	"	10-60% cumulus
B - F	0061-0068	19:56:10	19:57:45	"	10-30% cumulus (frames 0062-0065)
G - H	0069-0103	20:24:28	20:32:09	61000/18600	10-30% cumulus (frames 0071-0079, 0095-0103)
I - J	0104-0118	20:37:06	20:40:16	"	10-20% cumulus (frames 0104-0114)
J - K	0119-0132	20:41:37	20:44:33	"	10-30% cumulus (frames 0119-0122, 0130-0131)
L - M	0133-0179	20:49:08	20:59:31	"	10% cumulus (frames 0145-0150); 20-80% cumulus (frames 0167-0179)
N - O	0180-0198	21:06:06	21:10:09	62000/18900	10-20% cumulus (frames 0180-0196)

TMS SCANNER FLIGHT LINE DATA

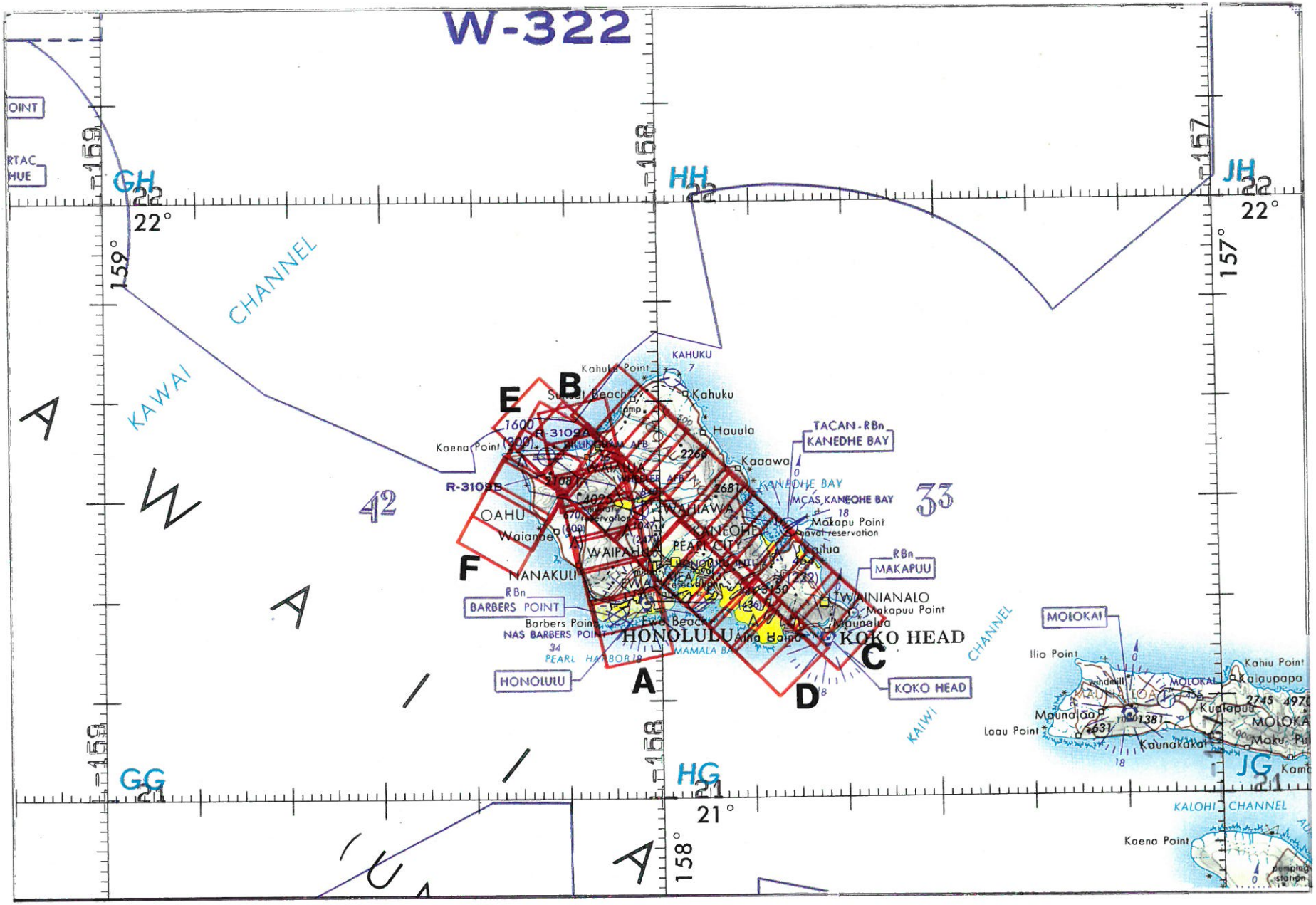
FLIGHT NO. 92-162

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 92-162

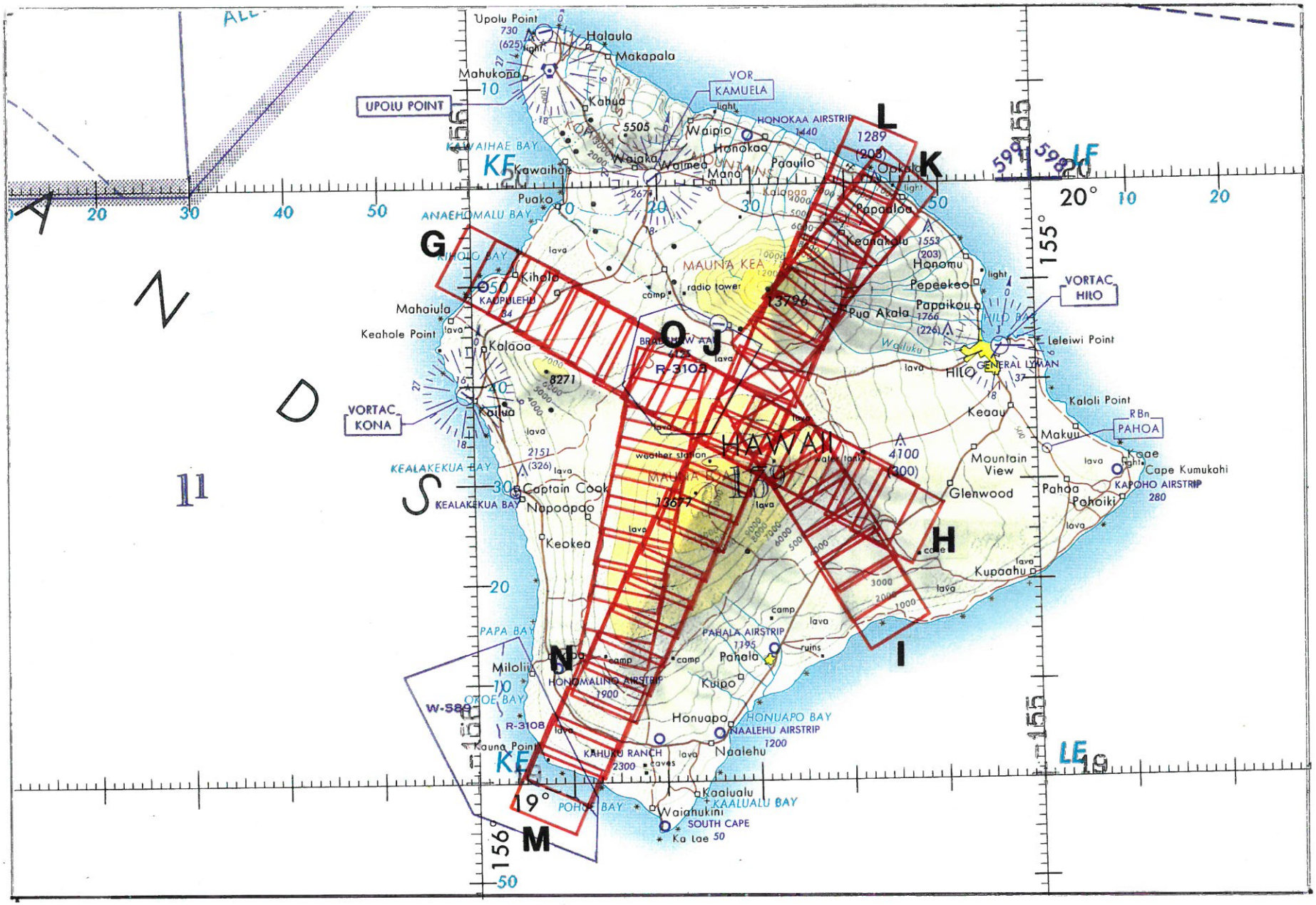
Check Points	Actual time (GMT) begin	Actual time (GMT) end	Actual scanline begin	Actual scanline end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
A-B	19:23: 0.0	19:26:21.0	22319	24842	60000/18288	12.50	2101	0	413
B-C	19:34: 0.0	19:39: 1.0	30570	34329	60000/18288	12.50	3701	0	59
D-E	19:44:35.0	19:47:25.0	38502	42125	60000/18288	12.50	3601	0	23
B-F	19:56: 4.0	19:58:14.0	47117	48741	60000/18288	12.50	1601	0	24
G-H	20:24: 7.0	20:42: 7.0	68152	74143	61000/18592	12.50	5900	0	97
I-J	20:37:43.0	20:40:16.0	78345	80260	60000/18288	12.50	1901	0	15
J-K	20:41:40.0	20:44:48.0	81316	83541	60000/18288	12.50	2201	0	25
L-M	20:49: 5.0	20:59:25.0	86872	94621	61000/18592	12.50	7701	0	49
N-O	21:06: 6.0	21:10:14.0	99637	102734	62000/18897	12.50	3000	1	97



FLIGHT 92-162 22 SEPTEMBER 1992 A/C 708 DUAL HR-732 / DUAL RC-10 / TMS



FLIGHT 92-162 21 SEPTEMBER 1992 A/C 708 DUAL RC-10 / DUAL KR-732 / TMS ONC J-19



FLIGHT 92-162 24 SEPTEMBER 1992 A/C 708 DUAL KC-10 / DUAL KR-732 / TMS ONC J-19