FLIGHT SUMMARY REPORT

Flight #: 92-165

Date: 25 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:** 269

SENSOR DATA

Accession #:	04479	04480	04481
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:	69	40	135
% Overlap:	60	60	60
Quality:	Excellent	Good	Excellent

Remarks:

SENSOR DATA continued

Accession #:	4482	-----
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:	129	-----
% 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. 92-165

Accession # 04479

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	6967-6970	19:29:26	19:30:52	60000/18300	30-50% scattered cumulus
C - D	6971-6972	19:32:36	19:33:04	"	50% scattered cumulus and strato-cumulus
E - F	6973-6975	19:37:41	19:38:38	61000/18600	20-30% scattered cumulus
G - H	6976-6977	19:42:28	19:42:57	"	10-30% cumulus
I - J	6978-6982	19:48:17	19:50:11	60000/18300	30-60% cumulus
K - N	6983-7001	20:00:11	20:08:45	59000/18000	Minor-50% scattered cumulus
N - O	7002-7017	20:19:31	20:26:38	"	Minor-30% scattered cumulus and cirrus
P - Q	7018-7024	20:30:06	20:32:57		10-30% scattered cumulus (frames 7021-7024)
R - S	7025-7031	20:40:30	20:43:20	"	20-50% scattered cumulus
T - U	7032-7035	20:51:21	20:52:46	60000/18300	20-60% scattered cumulus and strato-cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-165

Accession # 04480

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
C - D	2298-2299	19:32:10	19:32:39	60000/18300	40% scattered cumulus
E - F	2300-2302	19:37:14	19:38:12	61000/18600	30% scattered cumulus
G - H	2303-2304	19:42:04	19:42:33	"	10-30% cumulus
I	2305-2306	19:47:51	19:48:20	60000/18300	40% cumulus
K - L	2312-2319	20:00:42	20:04:02	59000/18000	10-20% scattered cumulus (frames 2312-2314); 10-30% scattered cumulus (frame 2316)
N - O	2329-2344	20:19:01	20:26:11	"	Minor-20% scattered cumulus; emulsion abrasions (frames 2331-2332, 2342-2343)
P - Q	2345-2351	20:29:40	20:32:30	"	10-30% scattered cumulus (frames 2348-2351); emulsion abrasions (frame 2345)

NOTE: FRAMES 2307-2311 AND 2320-2328 DAMAGED DURING PROCESSING AND DISCARDED.

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-165

Accession # 04481

Sensor # 038

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	0001-0007	19:29:01	19:30:24	60000/18300	30-40% cumulus
C - D	0008-0010	19:32:10	19:32:38	"	30% cumulus
E - F	0011-0017	19:37:15	19:38:37	61000/18600	10-30% cumulus
G - H	0018-0021	19:42:04	19:42:45	"	Minor-10% cumulus
I - J	0022-0030	19:47:52	19:49:41	60000/18300	10-30% cumulus
K - N	0031-0068	19:59:46	20:08:09	59000/18000	Minor-20% cumulus (frames 0031-0040); minor-50% cumulus (frames 0043-0068)
N - O	0069-0100	20:19:06	20:26:05	"	Minor-20% cumulus
P - Q	0101-0115	20:29:41	20:32:50	"	10-30% cumulus (frames 0107-0115)
R - S	0116-0128	20:40:06	20:42:47	"	20-40% cumulus
T - U	0129-0135	20:50:55	20:52:16	60000/18300	10-30% cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-165

Accession # 04482

Sensor # 039

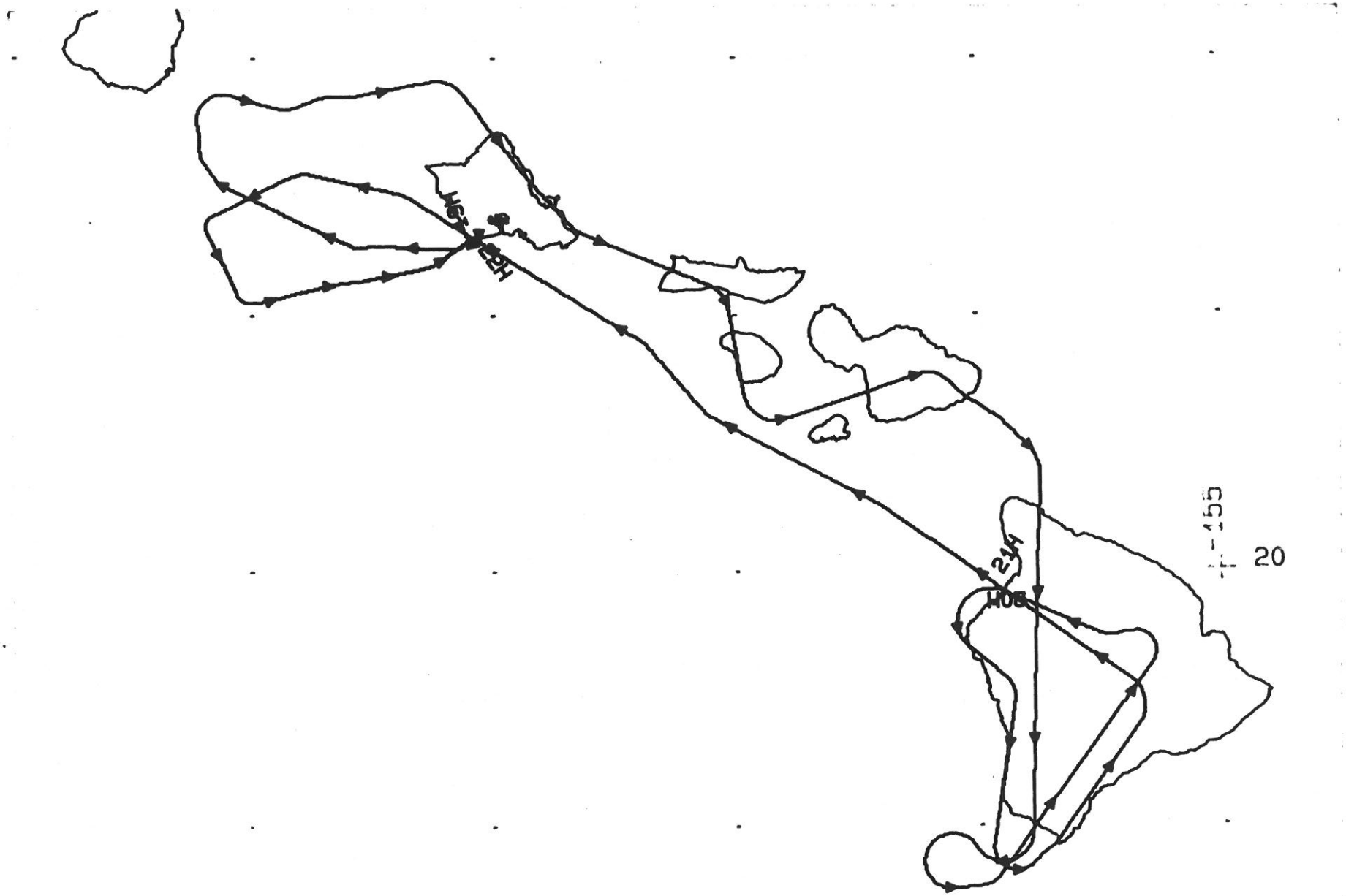
Check Points	Frame Numbers	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
A - B	0001-0007	19:29:05	19:30:28	60000/18300	30-40% cumulus
C - D	0008-0010	19:32:14	19:32:42	"	30% cumulus
E - F	0011-0017	19:37:19	19:38:41	61000/18600	10-30% cumulus
G - H	0018-0021	19:42:08	19:42:49	"	Minor-10% cumulus
I - J	0022-0030	19:47:55	19:49:45	60000/18300	10-30% cumulus
K - M	0031-0060	19:59:50	20:06:24	59000/18000	10-20% cumulus (frames 0031-0040); minor-40% cumulus (frames 0043-0060)
N	0061-0062	20:07:58	20:08:13	"	Minor-20% cumulus
N - O	0063-0094	20:19:10	20:26:08	"	Minor-20% cumulus
P - Q	0095-0109	20:29:49	20:32:54	"	10-20% cumulus (frames 0101-0109)
R - S	0110-0122	20:40:10	20:42:51	"	20-30% cumulus
T - U	0123-0129	20:50:59	20:52:20	60000/18300	10-30% cumulus

TMS SCANNER FLIGHT LINE DATA

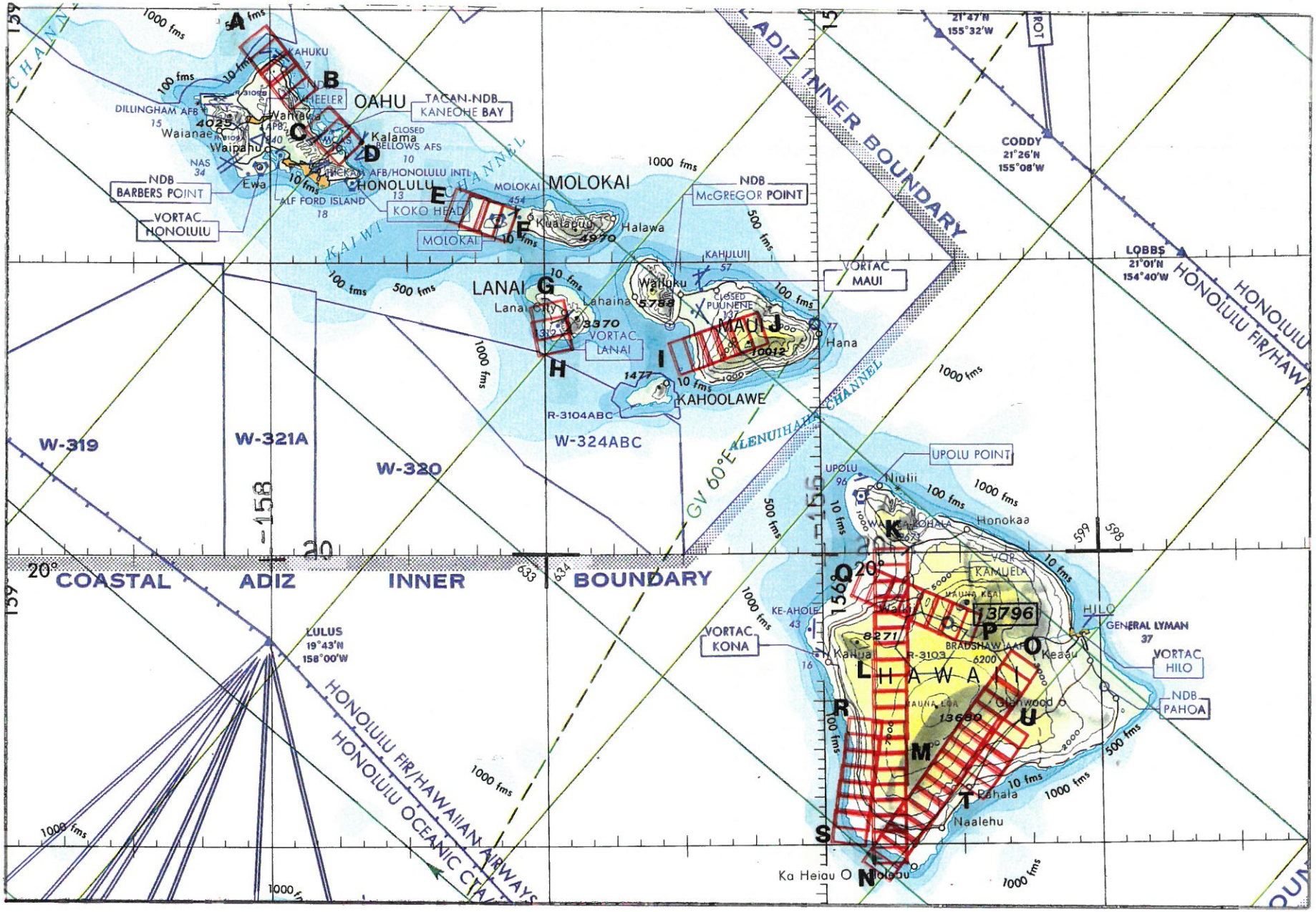
FLIGHT NO. 92-165

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 92-165

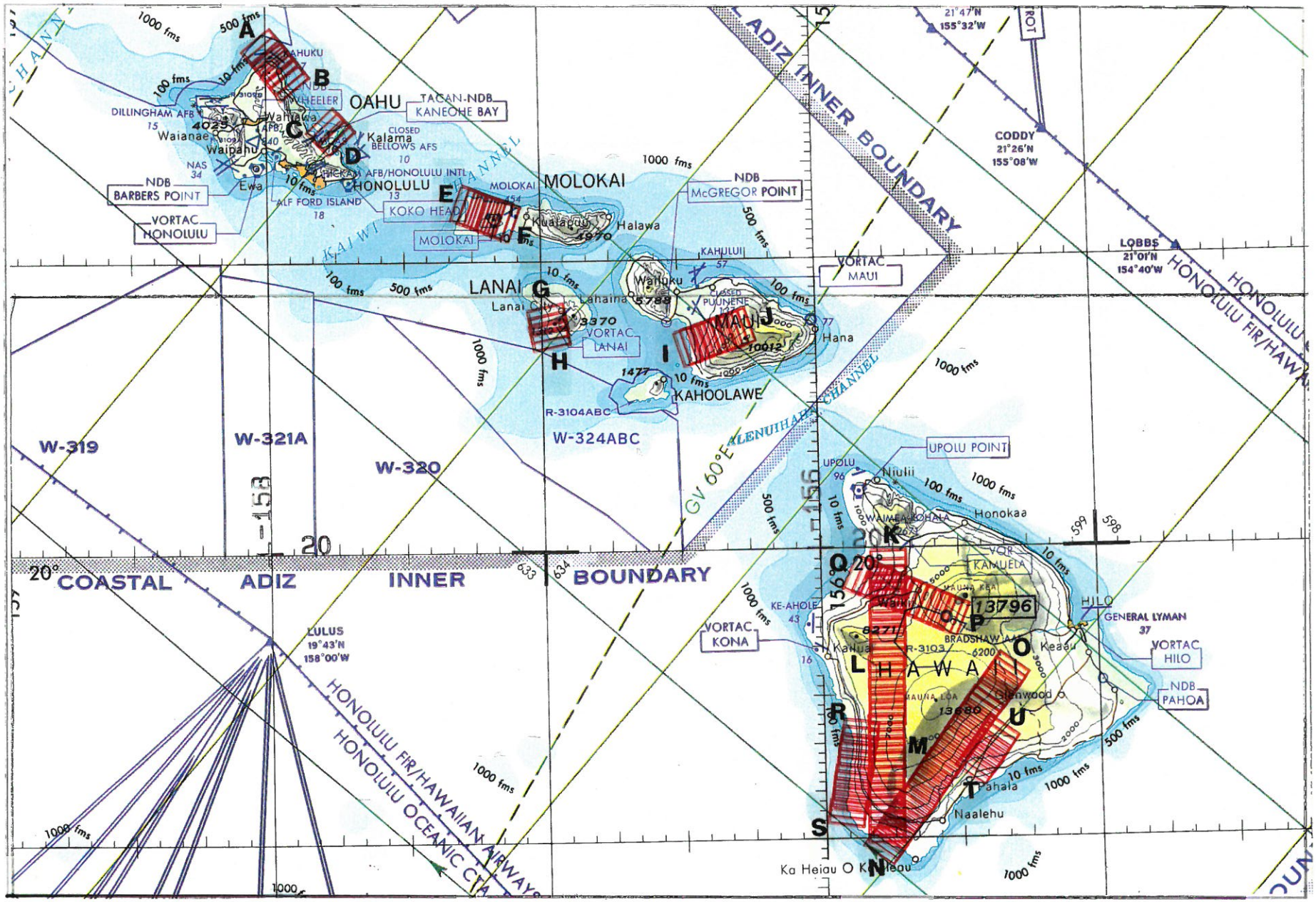
Check Points	Actual time (GMT) begin	end	Actual scanline begin	end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
C-D	19:31:59.0	19:33:19.0	28872	29872	60000/18288	12.50	1001	0	0
E-F	19:36:57.0	19:38:42.0	32590	33912	61000/18592	12.50	1301	0	22
G-H	19:41:47.0	19:42:45.0	36223	36944	61000/18592	12.50	701	0	21
I-J	19:47:35.0	19:49:52.0	40566	42280	60000/18288	12.50	1701	0	14
K-N	19:59:42.0	20:08:19.0	49653	56121	59000/17983	12.50	6101	0	368
N-O	20:18:32.0	20:26:11.0	63782	69522	59000/17983	12.50	5700	0	41
P-Q	20:29:25.0	20:42:54.0	71941	74339	59000/17983	12.50	2601	0	18
R-S	20:39:19.0	20:44: 0.0	79372	82879	59000/17983	12.50	3501	0	7
T-U	20:50:43.0	20:52:28.0	87920	89268	60000/18288	12.50	1301	0	18



FLIGHT 92-165 25 September 1992 A/C 708 Dual HR-732 / Dual RC-10 / TMS



FLIGHT 92-165 25 SEPTEMBER 1992 A/C 708 DUAL RC-10 / TMS JNC 41



FLIGHT 92-165 25 SEPTEMBER 1992 A/C 708 DUAL HR-732 JNC 41