FLIGHT SUMMARY REPORT

Flight #: 92-166

Date: 29 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:** 273

SENSOR DATA

Accession #:	04483	04484	04485
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:	72	72	146
% Overlap:	60	60	60
Quality:	Excellent	Excellent	Excellent

Remarks:

SENSOR DATA continued

Accession #:	4486	-----
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:	145	-----
% 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. 92-166

Accession # 04483

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	7047-7053	19:36:06	19:38:59	58000/17700	30-80% cumulus (frames 7047-7053)
C - D	7054-7061	19:43:30	19:46:51	62000/18900	30-80% cumulus (frames 7054-7061)
E - F	7062-7065	19:52:35	19:54:01	61000/18600	30-40% cumulus (frames 7062-7065)
G - H	7066-7074	20:27:38	20:31:26	60000/18300	10-50% cumulus (frames 7066-7074)
I - J	7075-7091	20:38:01	20:45:16	"	10-40% cumulus (frames 7077-7090); manufacturing emulsion defect throughout remainder of roll from frame 7076
K - L	7092-7102	20:51:12	20:55:57	61000/18600	10-50% cumulus (frames 7092-7098)
M - N	7103-7110	21:00:15	20:03:33	"	10-50% cumulus (frames 7108-7110)
H - O	7111-7118	21:17:40	21:20:59	62000/18900	20-60% cumulus (frames 7111-7118)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-166

Accession # 04484

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
A - B	2371-2377	19:35:37	19:38:33	58000/17700	30-80% cumulus
C - D	2378-2385	19:42:59	19:46:24	62000/18900	30-80% cumulus
E - F	2386-2389	19:52:10	19:53:38	61000/18600	30-40% cumulus
G - H	2390-2398	20:27:09	20:30:57	60000/18300	10-50% cumulus
I - J	2399-2415	20:37:33	20:45:08	"	10-40% cumulus
K - L	2416-2426	20:50:43	20:56:27	61000/18600	Minor-50% cumulus
M - N	2427-2434	20:59:51	21:03:09	"	Minor-10% cumulus (frames 2427-2428); 10-50% cumulus (frames 2432-2434)
H - O	2435-2442	21:17:10	21:20:27	62000/18900	20-60% cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-166

Accession # 04485

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0013	19:35:34	19:38:21	58000/17700	20-90% cumulus
C - D	0014-0028	19:42:57	19:46:21	62000/18900	20-80% cumulus
E - F	0029-0036	19:52:07	19:53:43	61000/18600	10-40% cumulus
G - H	0037-0055	20:27:05	20:31:09	60000/18300	10-50% cumulus
I - J	0056-0091	20:37:29	20:45:23	"	Minor cumulus (frames 0056-0059); 10-40% cumulus (frames 0060-0091)
K - L	0092-0114	20:50:40	20:55:37	61000/18600	Minor-50% cumulus (frames 0092-0105); minor-10% cumulus (frames 0108-0114)
M - N	0115-0129	20:59:47	21:02:56	"	Minor-10% cumulus (frames 0115-0116); 10-40% cumulus (frames 0125-0129)
H - O	0130-0146	21:17:05	21:20:42	62000/18900	10-70% cumulus (frames 0130-0145)

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-166

Accession # 04486

Sensor # 039

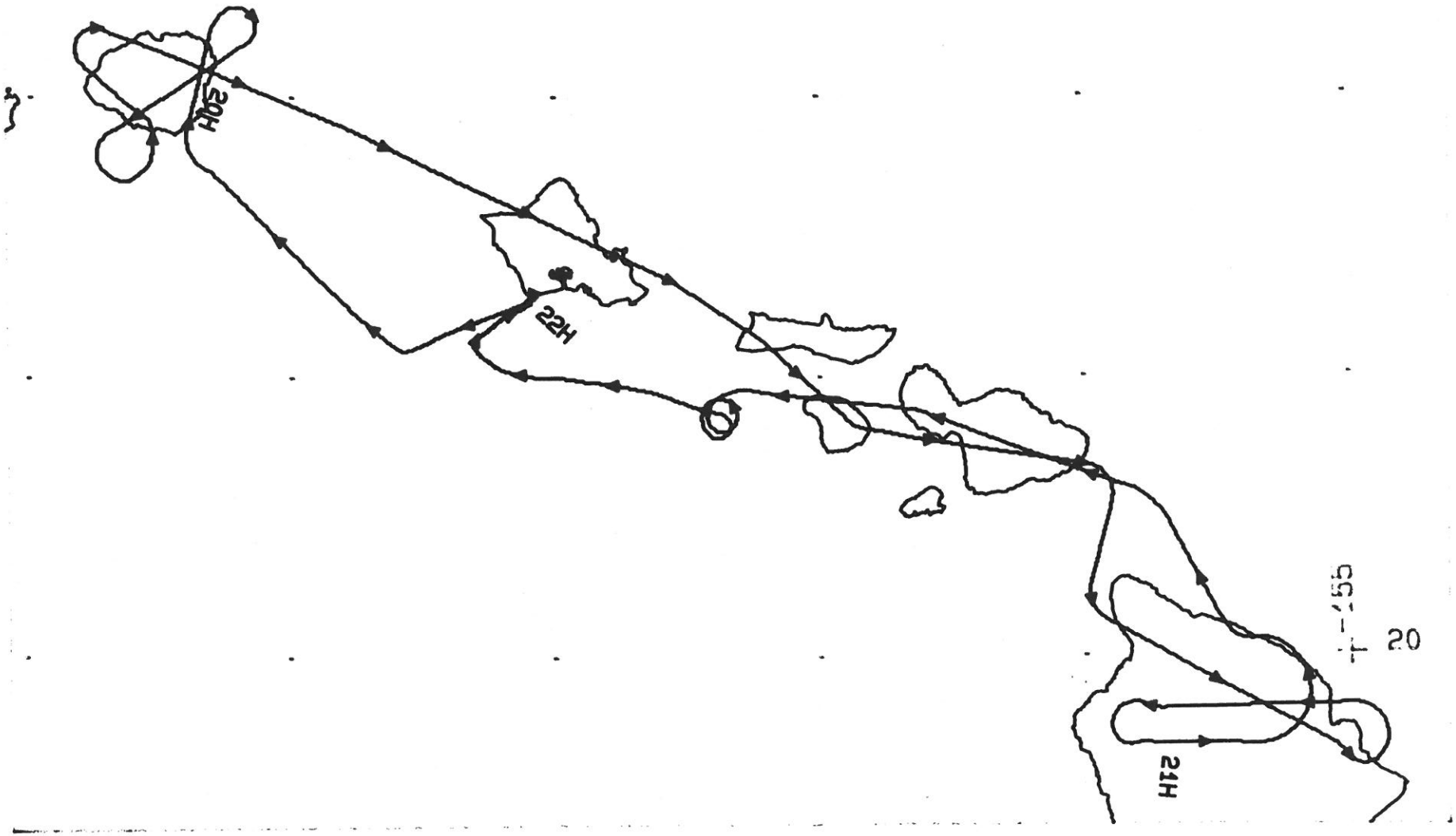
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0013	19:35:40	19:38:27	58000/17700	20-90% cumulus
C - D	0014-0028	19:43:03	19:46:18	62000/18900	20-80% cumulus
E - F	0029-0036	19:52:13	19:53:49	61000/18600	10-40% cumulus
G - H	0037-0055	20:27:12	20:31:16	60000/18300	10-50% cumulus
I - J	0056-0090	20:37:35	20:45:29	"	Minor cumulus (frames 0056-0059); 10-40% cumulus (frames 0060-0090)
K - L	0091-0113	20:50:46	20:55:43	61000/18600	Minor-50% cumulus (frames 0091-0104); minor-10% cumulus (frames 0108-0113)
M - N	0114-0128	20:59:53	21:03:02	"	Minor-10% cumulus (frames 0114-0115); 10-40% cumulus (frames 0124-0128)
H - O	0129-0145	21:17:18	21:20:48	62000/18900	10-70% cumulus (frames 0129-0144)

TMS SCANNER FLIGHT LINE DATA

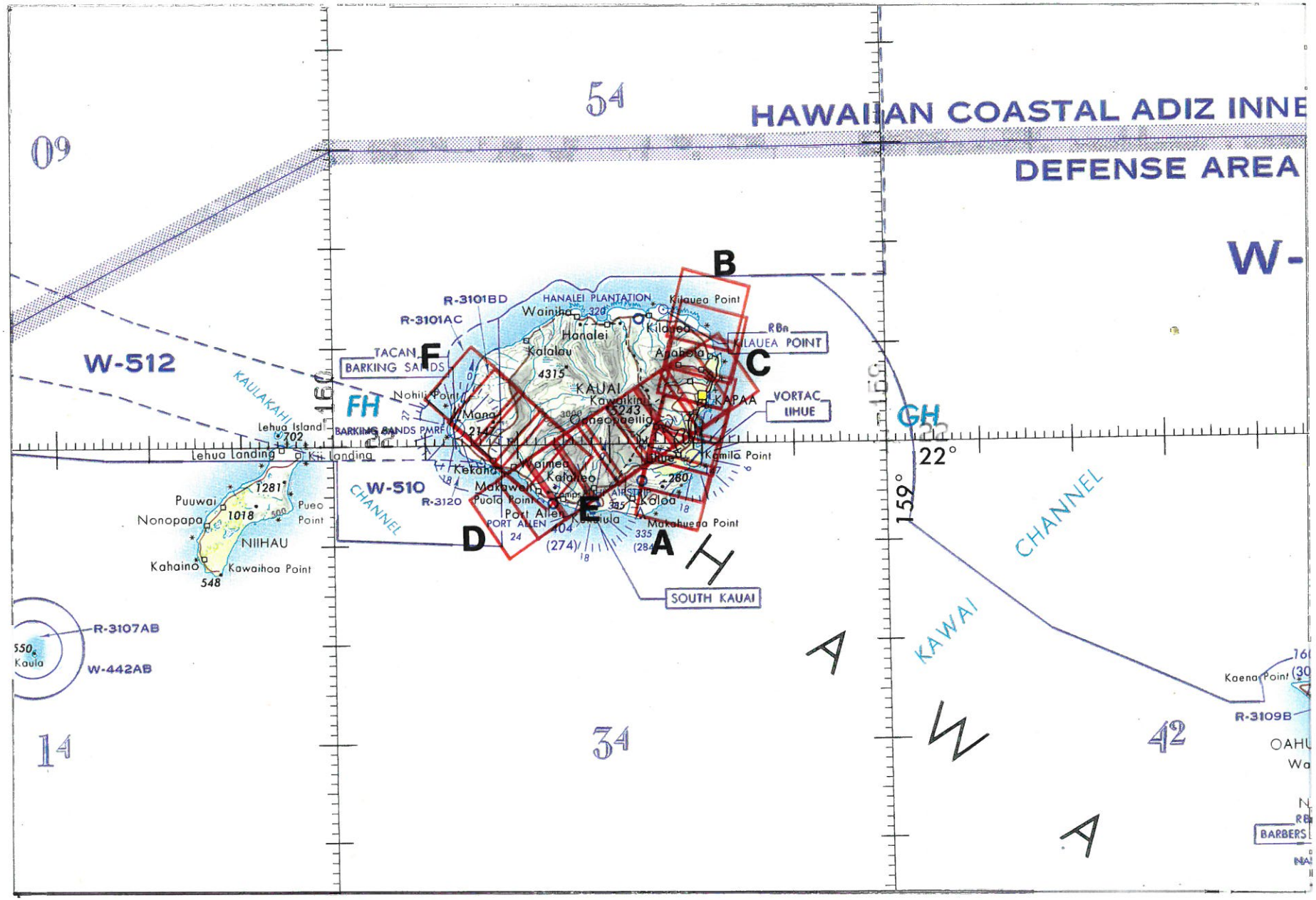
FLIGHT NO. 92-166

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 92-166

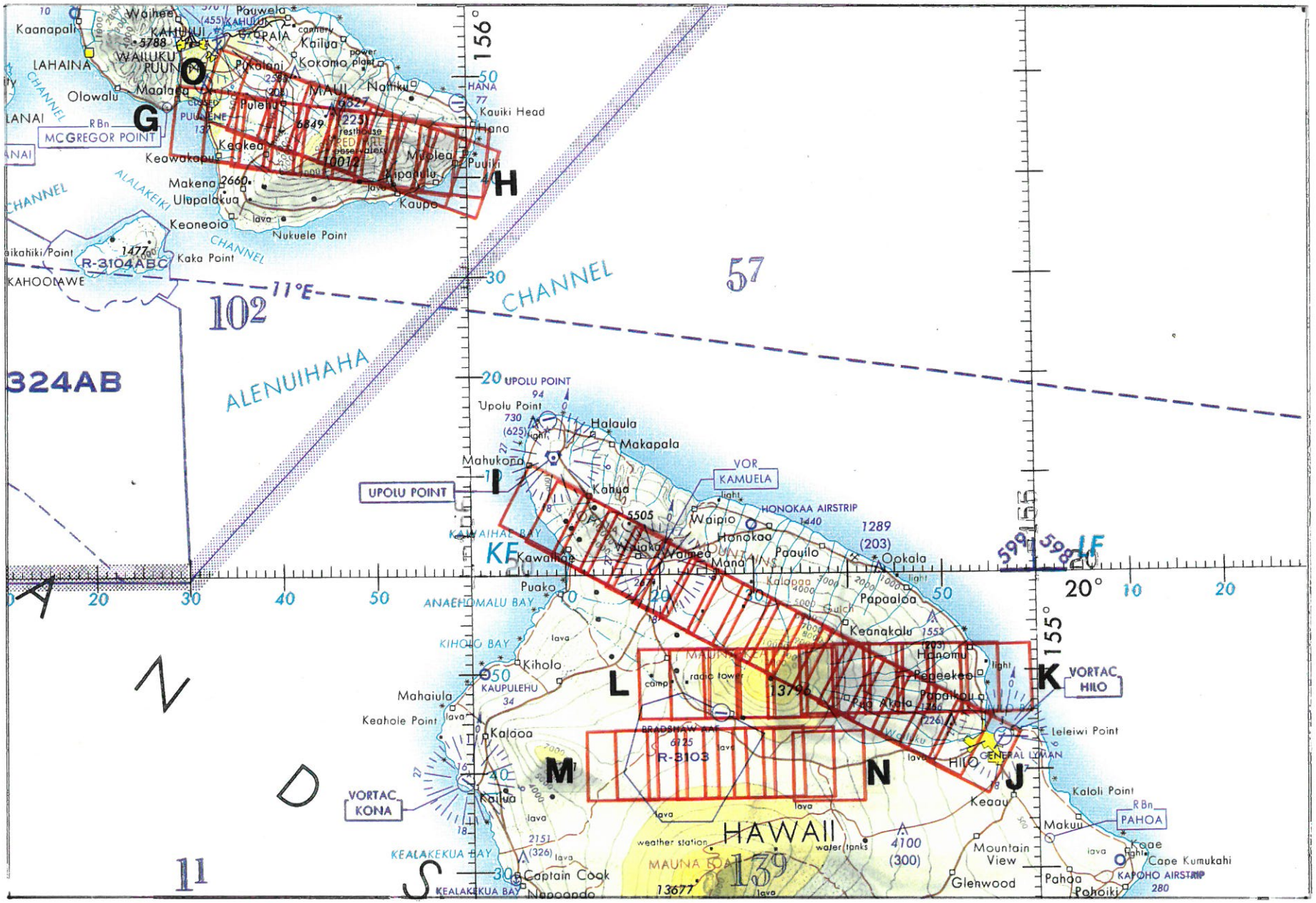
Check Points	Actual time (GMT) begin	end	Actual scanline begin	end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
A-B	19:35:36.Ø	19:38:33.Ø	2Ø384	22593	58ØØØ/17678	12.5Ø	22Ø1	Ø	9
C-D	19:42:26.Ø	19:46:35.Ø	2551Ø	28616	62ØØØ/18897	12.5Ø	31Ø1	Ø	6
E-F	19:52: 5.Ø	19:53:57.Ø	32742	34142	61ØØØ/18592	12.5Ø	14Ø1	Ø	Ø
G-H	2Ø:26:34.Ø	2Ø:31:12.Ø	58591	62Ø7Ø	6ØØØØ/18288	12.5Ø	34Ø1	2	77
I-J	2Ø:37:21.Ø	2Ø:45:29.Ø	66677	72781	6ØØØØ/18288	12.5Ø	61Ø1	Ø	4
K-L	2Ø:5Ø:18.Ø	2Ø:55:47.Ø	76397	8Ø5Ø9	61ØØØ/18592	12.5Ø	41Ø4	Ø	9
M-N	2Ø:59:47.Ø	21:Ø3: 8.Ø	835Ø9	86Ø13	61ØØØ/18592	12.5Ø	25Ø1	Ø	4
H-O	21:16:41.Ø	21:21:14.Ø	96185	99592	62ØØØ/18897	12.5Ø	34Ø1	Ø	7



FLIGHT 92-166 29 September 1992 A/C 708 Dual HR-732 / Dual RC-10 / TMS



FLIGHT 92-166 29 SEPTEMBER 1992 A/C 708 DUAL RC-10 / DUAL KC-135 / TMC ONC J-19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HONOKAA AIRSTRIP
KAPOHO AIRSTRIP
HAWAII
MAUNA KEA
MAUNA LOA
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KAHOOLAWE
Waihee
Pauwela
PAIA
Kailua
Kokomo
Nahiku
Kauiki Head
Hana
Keakea
Kapaulu
Kaupo
Upolu Point
Halaula
Makapala
Mahukona
Kahua
Waipio
Honokaa
Paauilo
Opkala
Kawaihae
Puako
Papaaloa
Keanakalu
Honomu
Pepeekeo
Papaikou
Hilo
Leleiwi Point
Kaloli Point
Makuu
Kaae
Cape Kumukahi
Kiholo
Mahaiula
Keahole Point
Kaloaa
Kailua
Captain Cook
Napoopoo
Mountain View
Glenwood
Pahoa
Pohoiki
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6827
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10010
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