

FLIGHT SUMMARY REPORT

Flight #: 92-158
Date: 18 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: 262

SENSOR DATA

Accession #:	04459	04460	04461
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:	75	75	148
% Overlap:	60	60	60
Quality:	Excellent	Excellent	Excellent
Remarks:	27.39 sec. off- set between clock and nav data		

SENSOR DATA continued

Accession #:	4462	-----
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:	148	-----
% 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:

<u>Daedalus Channel</u>	<u>TM Band</u>	<u>Wavelength, μm</u>
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. 92-158

Accession # 04459

Sensor # 034

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Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	6461-6468	19:22:28	19:25:50	55000/16700	40-60% scattered cumulus
C - D	6469-6476	19:29:45	19:33:07	61000/18600	20-60% scattered cumulus; minor smoke (frames 6474-6476)
E - F	6477-6482	19:37:06	19:39:30	"	Minor-10% scattered cumulus
G - H	6483-6490	19:50:51	19:54:11	60000/18300	20-60% scattered cumulus
I - J	6491-6496	20:05:04	20:07:26	"	Minor-30% scattered cumulus
K - L	6497-6502	20:14:59	20:17:21	"	Minor-20% scattered cumulus
M - N	6503-6514	20:41:07	20:46:18	"	Minor-70% scattered cumulus
O - P	6515-6518	20:55:38	20:57:03	"	30-60% scattered cumulus and strato-cumulus
Q - R	6519-6521	21:00:35	21:01:31	"	Minor-30% scattered cumulus

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04459

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
S - T	6522-6525	21:09:04	21:10:29	60000/18300	Minor-30% scattered cumulus
U - V	6526-6529	21:13:31	21:14:55	"	10-20% scattered cumulus and strato-cumulus
W - X	6530-6535	21:18:42	21:21:04	58000/17700	Minor-30% scattered cumulus and strato-cumulus

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04460

Sensor # 026

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Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	1794-1801	19:21:56	19:25:21	55000/16700	40-60% scattered cumulus
C - D	1802-1809	19:29:16	19:32:40	61000/18600	20-60% scattered cumulus; minor smoke (frames 1808-1809)
E - F	1810-1815	19:36:40	19:39:06	"	Minor-10% scattered cumulus; minor emulsion abrasions (frame 1813)
G - H	1816-1823	19:50:24	19:53:46	60000/18300	20-60% scattered cumulus
I - J	1824-1829	20:04:39	20:07:02	"	Minor-30% scattered cumulus
K - L	1830-1835	20:14:34	20:16:57	"	Minor-20% scattered cumulus
M - N	1836-1847	20:40:42	20:45:52	"	Minor-70% scattered cumulus
O - P	1848-1851	20:55:12	20:56:36	"	30-60% scattered cumulus and strato-cumulus
Q - R	1852-1854	21:00:09	21:01:06	"	Minor-30% scattered cumulus

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04460

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
S - T	1855-1858	21:08:39	21:10:03	60000/18300	Minor-30% scattered cumulus
U - V	1859-1862	21:13:05	21:14:29	"	10-20% scattered cumulus and strato-cumulus
W - X	1863-1868	21:18:15	21:20:35	58000/17700	Minor-30% scattered cumulus and strato-cumulus; light streak (frame 1868)

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04461

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0016	19:22:13	19:25:32	55000/16700	20-60% scattered cumulus
C - D	0017-0032	19:29:25	19:32:53	61000/18600	10-70% scattered cumulus; minor smoke (frames 0029-0030)
E - F	0033-0044	19:36:46	19:39:18	"	Minor-10% scattered cumulus (frames 0034-0039)
G - H	0045-0061	19:50:30	19:54:08	60000/18300	10-70% scattered cumulus
I - J	0062-0072	20:04:45	20:07:01	"	Minor-40% scattered cumulus
K - L	0073-0084	20:14:39	20:17:09	"	Minor-30% scattered cumulus
M - N	0085-0108	20:40:47	20:45:58	"	Minor-80% scattered cumulus
O - P	0109-0115	20:55:18	20:56:39	"	10-60% scattered cumulus and strato-cumulus
Q - R	0116-0121	21:00:15	21:01:22	"	Minor-40% scattered cumulus

CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158

Accession # 04461

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
S - T	0122-0128	21:08:49	21:10:05	60000/18300	Minor-30% scattered cumulus
U - V	0129-0137	21:13:11	21:14:59	"	Minor-30% scattered cumulus and strato-cumulus
W - X	0138-0148	21:18:20	21:20:35	58000/17700	Minor-40% scattered cumulus and strato-cumulus

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04462

Sensor # 039

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0016	19:22:13	19:25:32	55000/16700	20-60% scattered cumulus; handling scratch (frame 0003)
C - D	0017-0032	19:29:25	19:32:53	61000/18600	10-70% scattered cumulus; minor smoke (frames 0029-0030)
E - F	0033-0044	19:36:46	19:39:18	"	Minor-10% scattered cumulus (frames 0034-0039)
G - H	0045-0061	19:50:30	19:54:08	60000/18300	10-70% scattered cumulus; processing scratch (frame 0049); minor light streak (frame 0061)
I - J	0062-0072	20:04:45	20:07:01	"	Minor-40% scattered cumulus
K - L	0073-0084	20:14:39	20:17:08	"	Minor-30% scattered cumulus; minor light streak (frame 0084)
M - N	0085-0108	20:40:47	20:45:58	"	Minor-80% scattered cumulus; processing scratch (frame 0105)

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 92-158**

Accession # 04462

Sensor # 039

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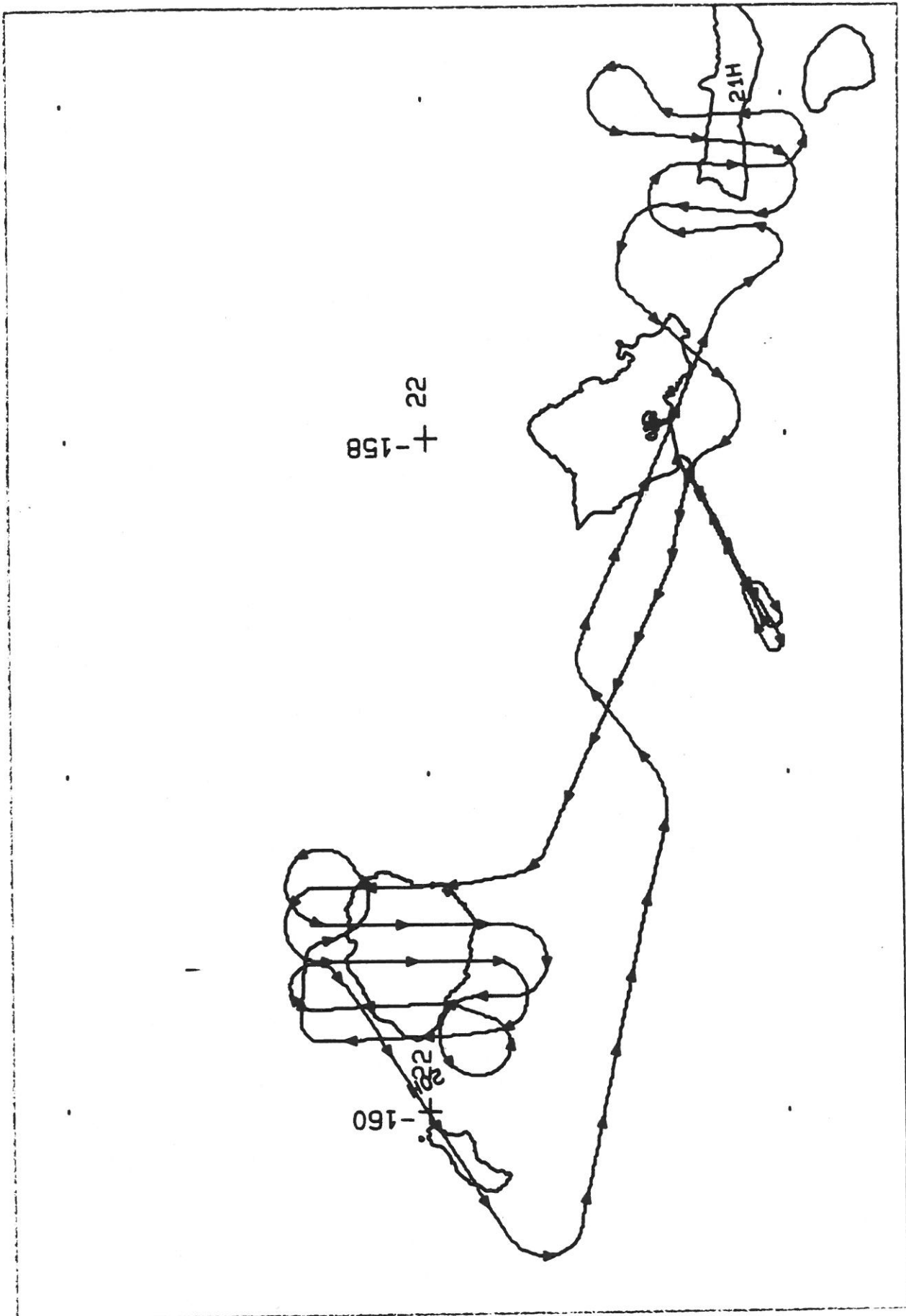
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		START	END		
O - P	0109-0115	20:55:18	20:56:39	60000/18300	10-60% scattered cumulus and strato-cumulus
Q - R	0116-0121	21:00:15	21:01:22	"	Minor-40% scattered cumulus
S - T	0122-0128	21:08:49	21:10:05	"	Minor-30% scattered cumulus
U - V	0129-0137	21:13:11	21:14:59	"	Minor-30% scattered cumulus and strato-cumulus
W - X	0138-0148	21:18:20	21:20:35	58000/17700	Minor-40% scattered cumulus and strato-cumulus

TMS SCANNER FLIGHT LINE DATA

FLIGHT NO. 92-158

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 92-158

Check Points	A c t u a l t i m e (GMT) b e g i n e n d	A c t u a l s c a n l i n e b e g i n e n d	A l t i t u d e f e e t / m e t e r	S c a n S p e e d (r p s)	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	19:21:45.0 19:25:38.0	19410 22322	55000/16764	12.50	2901	0	12
C-D	19:28:59.0 19:32:46.0	24836 27673	61000/18592	12.50	2801	0	37
E-F	19:35:43.0 19:39:45.0	29885 32906	61000/18592	12.50	3001	0	21
G-H	19:50:11.0 19:54:19.0	40729 43833	60000/18288	12.50	3101	0	4
I-J	20:04:28.0 20:07:16.0	51444 53550	60000/18288	12.50	2101	0	6
K-L	20:13:11.0 20:17:26.0	57990 61167	60000/18288	12.50	3101	0	77
M-N	20:39: 1.0 20:46:19.0	77363 82845	60000/18288	12.50	5401	0	82
O-P	20:55: 0.0 20:56:44.0	89358 90664	60000/18288	12.50	1301	0	6
Q-R	20:59:24.0 21:01:32.0	92666 94266	60000/18288	12.50	1601	0	0
S-T	21:07:33.0 21:09:57.0	98772 100574	60000/18288	12.50	1801	0	2
U-V	21:13: 1.0 21:14:54.0	102880 104286	60000/18288	12.50	1401	0	6
W-X	21:18: 6.0 21:21: 2.0	106688 108896	58000/17678	12.50	2201	0	8

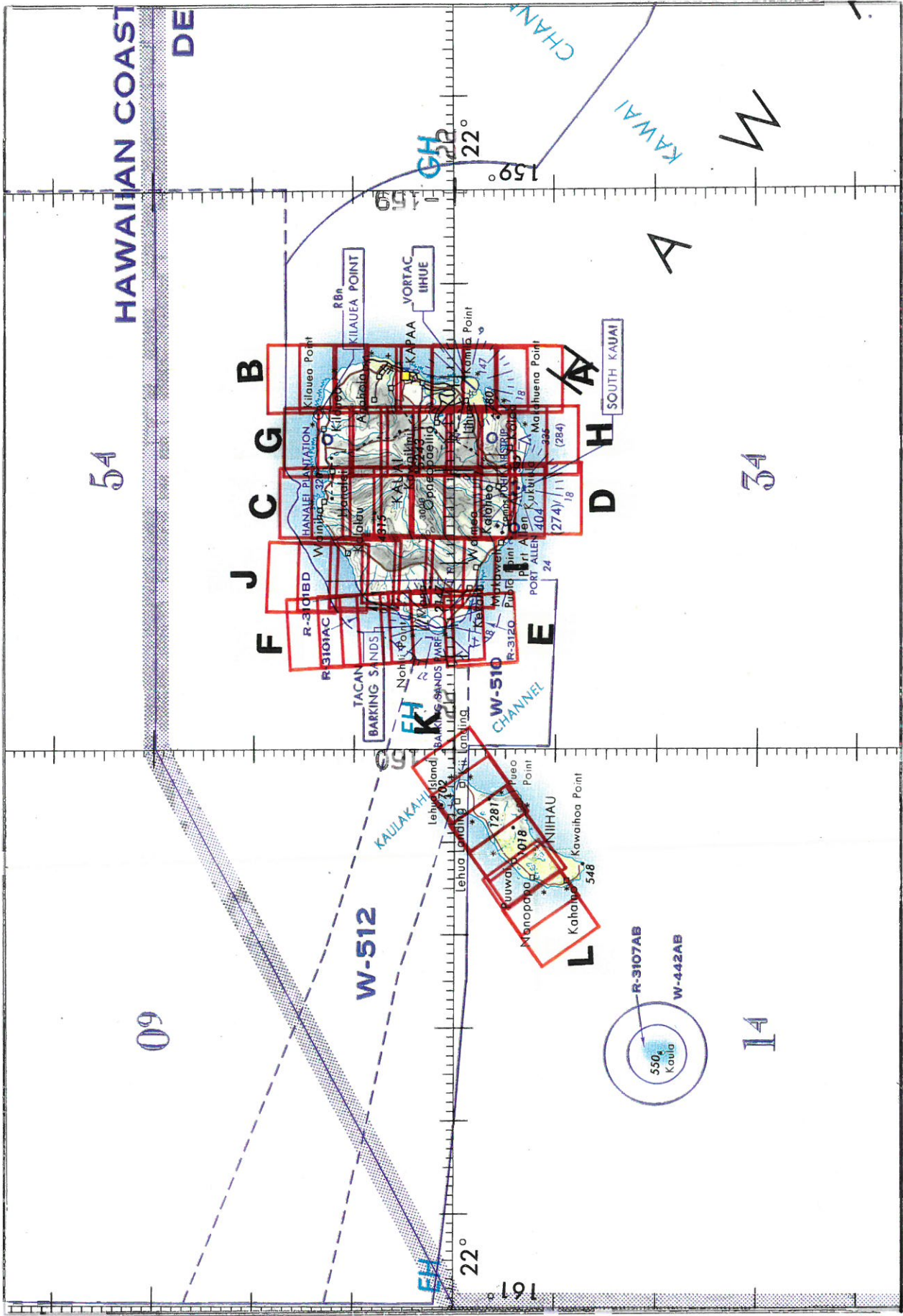


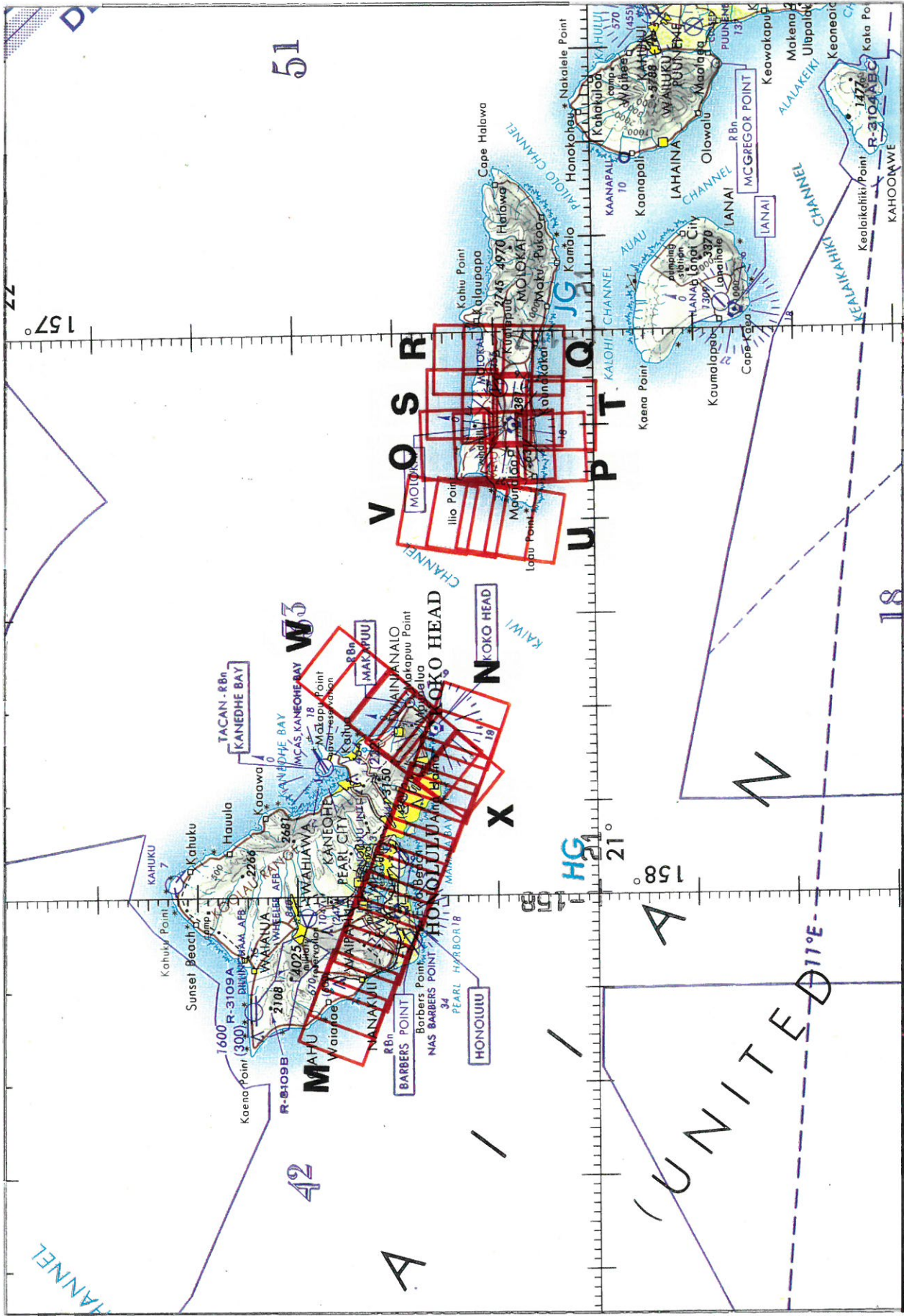
FLIGHT 92-158

18 September 1992

A/C 708

Dual HR-732 / Dual RC-10 / TMS





FLIGHT 92-158 16 SEPTEMBER 1992 A/C 708 DUAL RC-10 / DUAL HI-732 / TMS ONC J-19