

FLIGHT SUMMARY REPORT

Flight #: 93-001
Date: 01 October 1992
Sensor Package: Dual Wild-Heerbrug RC-10
Dual Hycon HR-732
Thematic Mapper Simulator (TMS)
Area(s) Covered: Hawaii

Investigator(s): Masumoto, State of Hawaii

Aircraft #: 708

Flight Request: 2XZ2040

Julian Date: 275

SENSOR DATA

Accession #:	04487	04488	04489
Sensor ID #:	034	026	038
Sensor Type:	RC-10	RC-10	HR-732
Focal Length:	12" 304.66	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.20B
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:	58	58	113
% Overlap:	60	60	60
Quality:	Excellent	Excellent	Excellent
Remarks:			

SENSOR DATA continued

Accession #:	04490	-----
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:	115	-----
% Overlap:	60	-----
Quality:	Fair	Excellent
Remarks:	1 stop over-processed very thin neg	

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. 93-001**

Accession # 04487

Sensor # 034

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	7128-7135	19:19:32	19:22:51	53000/16100	10-30% cumulus (frames 7128-7132)
C - A	7136-7143	19:29:24	19:32:45	59000/18000	10-30% cumulus (frames 7136-7143)
D - E	7144-7148	19:38:05	19:40:04	61000/18300	10-20% cumulus (frames 7144-7148)
B - F	7149-7154	19:42:43	19:45:07	"	10-60% cumulus (frames 7150-7154)
G - H	7155-7165	19:57:01	20:01:53	62000/18900	10-60% cumulus (frames 7157-7165)
I - J	7166-7176	20:05:15	20:10:23	"	10-40% cumulus (frames 7166-7176)
K - L	7177-7180	20:12:02	20:13:28	"	10-60% cumulus and strato-cumulus (frames 7177-7180)
M - N	7181-7185	20:16:19	20:18:13	"	30-60% cumulus (frames 7181-7185)

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-001**

Accession # 04488

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	2452-2459	19:19:03	19:22:29	53000/16100	10-30% cumulus (frames 2452-2456)
C - A	2460-2467	19:28:55	19:32:20	59000/18000	10-30% cumulus (frames 2464-2467)
D - E	2468-2472	19:37:41	19:39:37	61000/18300	10-20% cumulus (frames 2468-2472)
B - F	2473-2478	19:42:14	19:44:39	"	40-50% cumulus (frames 2475-2478)
G - H	2479-2489	19:56:38	20:01:25	62000/18900	10-50% cumulus (frames 2481-2489)
I - J	2490-2500	20:05:06	20:09:53	"	10-40% cumulus (frames 2490-2500)
K - L	2501-2504	20:11:34	20:13:00	"	10-60% cumulus and strato-cumulus (frames 2501-2504)
M - N	2505-2509	20:15:51	20:17:45	"	30-60% cumulus (frames 2505-2509)

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-001**

Accession # 04489

Sensor # 038

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0016	19:19:00	19:22:29	53000/16100	10-30% cumulus (frames 0001-0010)
C - A	0017-0031	19:28:52	19:32:06	59000/18000	10-30% cumulus (frames 0025-0031); smoke obstruction (frames 0024-0025)
D - E	0032-0041	19:37:37	19:39:41	61000/18300	10-20% cumulus
B - F	0042-0053	19:42:10	19:44:41	"	10-60% cumulus
G - H	0054-0075	19:56:34	20:12:21	62000/18900	Minor-50% cumulus (frames 0055-0075)
I - J	0076-0097	20:05:02	20:09:49	"	10-30% cumulus
K - L	0098-0105	20:11:30	20:13:06	"	10-60% cumulus and strato-cumulus
M - N	0106-0113	20:15:47	20:17:22	"	10-70% cumulus; stepwedge overprints (frame 0113)

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 93-001**

Accession # 04490
Sensor # 039

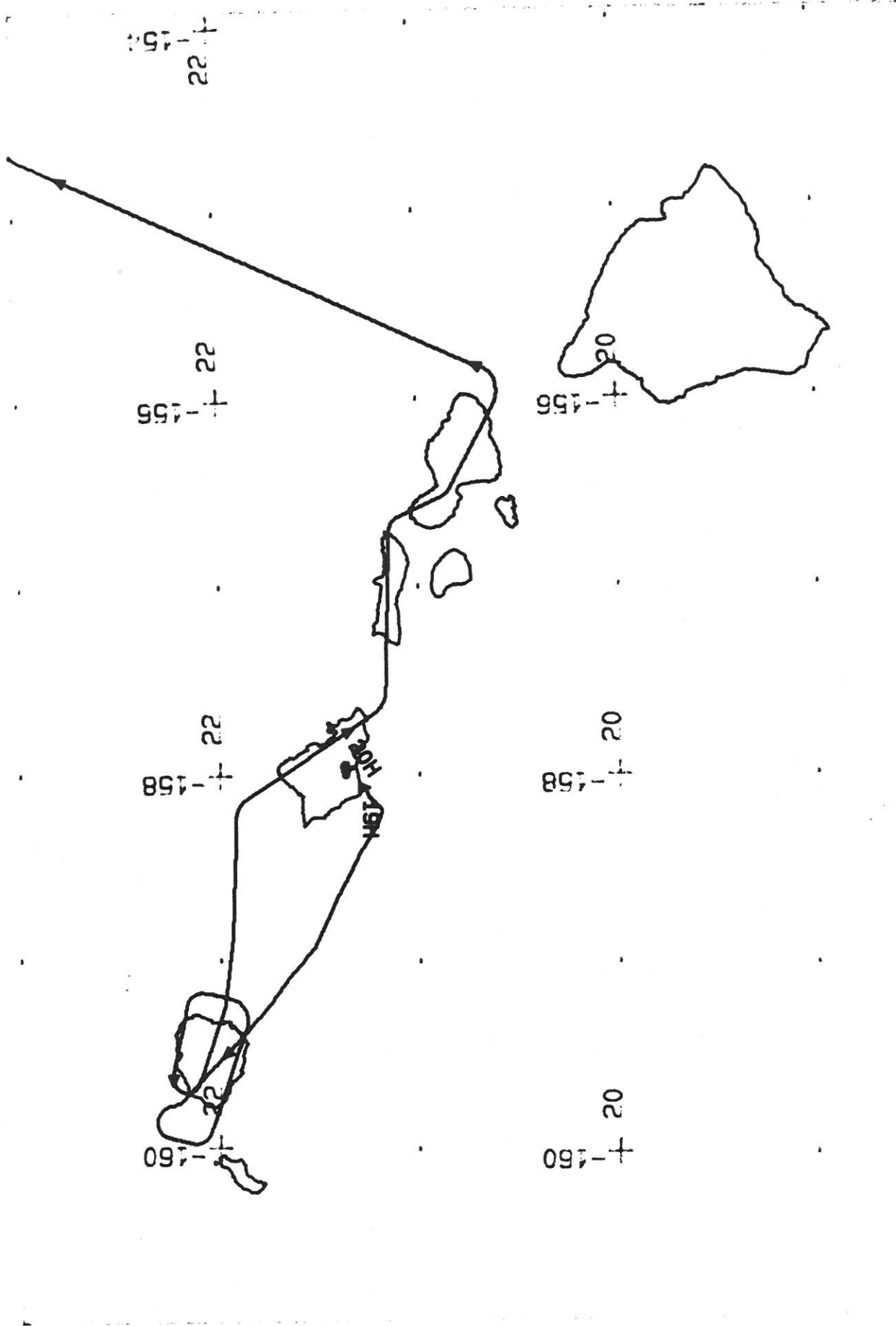
Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0016	19:19:07	19:22:36	53000/16100	10-30% cumulus (frames 0001-0010)
C - A	0017-0031	19:28:53	19:32:13	59000/18000	10-30% cumulus (frames 0025-0031);
D - E	0032-0041	19:37:44	19:39:48	61000/18300	10-20% cumulus (frames 0032-0041)
B - F	0042-0053	19:42:11	19:44:48	"	10-60% cumulus (frames 0045-0053)
G - H	0054-0075	19:56:44	20:01:22	62000/18900	10-50% cumulus (frames 0058-0075)
I - J	0076-0097	20:05:06	20:09:56	"	10-30% cumulus (frames 0076-0097)
K - L	0098-0105	20:11:33	20:13:13	"	10-60% cumulus and strato-cumulus (frames 0098-0105)
M - N	0106-0115	20:15:54	20:17:56	"	10-60% cumulus (frames 0106-0115)

TMS SCANNER FLIGHT LINE DATA

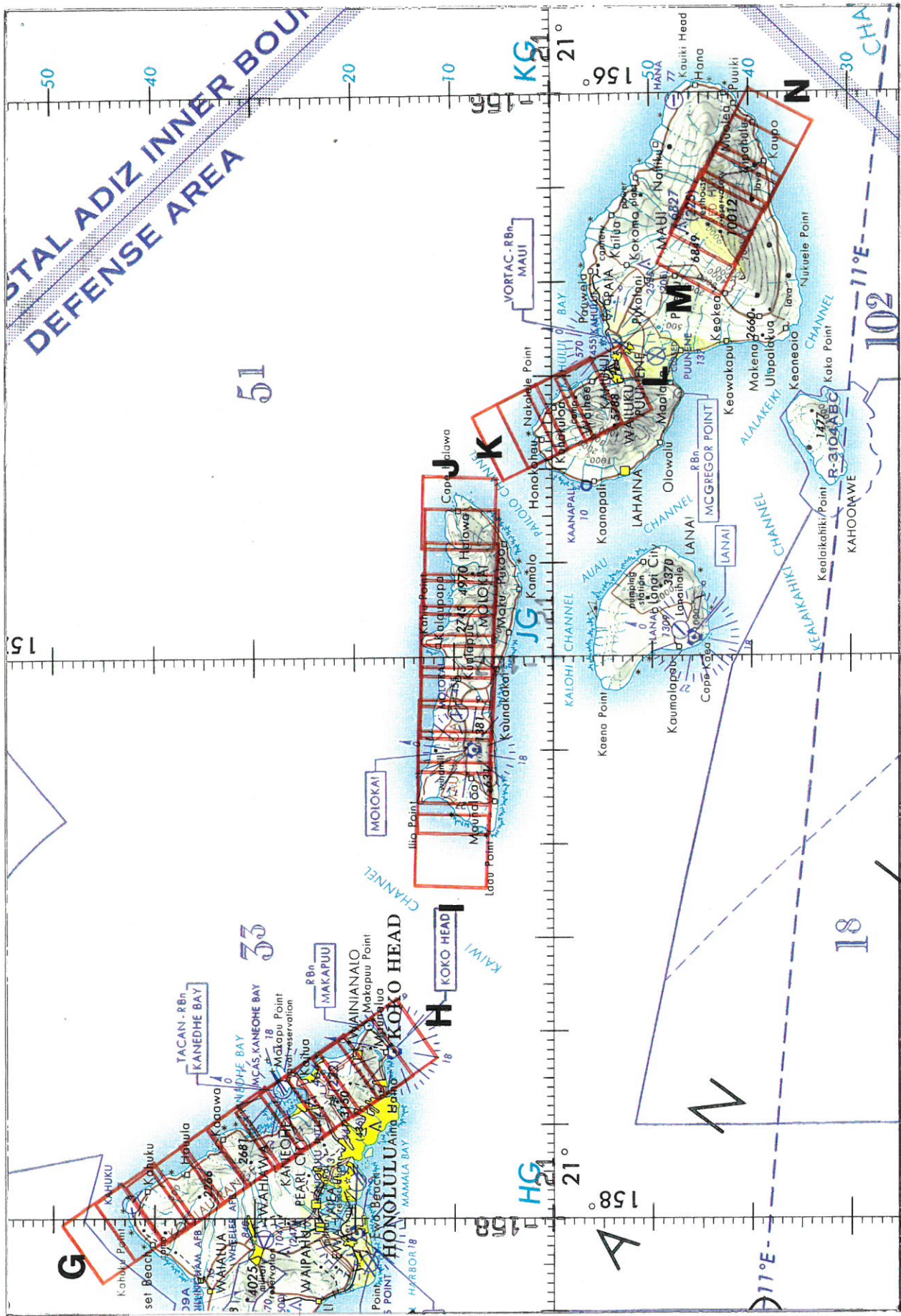
FLIGHT NO. 93-001

DIEDALUS: FLIGHT DATA
FLIGHT NUMBER: 93-001

Check Points	A c t u a l t i m e 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 / a c 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	19:20:57.0 19:22:54.0	20205 21917	55000/15154	12.50	1701	0	12
C-A	19:28:31.0 19:32:49.0	26126 29548	59000/17983	12.50	3201	0	22
D-E	19:57:25.0 19:59:44.0	52306 54541	61000/18592	12.50	1701	6	29
B-F	19:42: 2.0 19:45:26.0	36262 38805	61000/18592	12.50	2301	7	36
G-H	19:56:38.0 20:01:44.0	47073 51032	62000/18897	12.50	5901	15	41
I-J	20:04:18.0 20:09:58.0	52562 57202	62000/18897	12.50	4201	6	34
K-L	20:11:13.0 20:15:11.0	58206 59519	62000/18897	12.50	1400	3	11
M-N	20:15:52.0 20:18: 4.0	60126 63250	62000/18897	12.50	3101	6	46



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STAL ADIZ INNER BOUNDARY
DEFENSE AREA

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