

FLIGHT SUMMARY REPORT

Flight #: 90-069
Date: 5 April 1990
Sensor Package: Wild-Heerbrug RC-10
Dual Hycon HR-732
Thematic Mapper Simulator (TMS)
Thermal Infrared Multispectral Scanner (TIMS)
Area(s) Covered: South Florida

Investigator(s): Patterson, University of Virginia **Aircraft #:** 709
Flight Request: 89R247 **Julian Date:** 095

SENSOR DATA

Accession #:	04014	04015	----	----
Sensor ID #:	026	018	101	086
Sensor Type:	RC-10	HR-732	TMS	TIMS
Focal Length:	12" 304.97 mm	24" 609.6 mm	----	----
Film Type:	High Definition Aerochrome IR SO-131	High Definition Aerochrome IR SO-131	----	----
Filtration:	cc.30B	cc.30B	----	----
Spectral Band:	510-900 nm	510-900 nm	----	----
f Stop:	4	8	----	----
Shutter Speed:	1/200	1/75	----	----
# of Frames:	453	617	----	----
% Overlap:	60	60	----	----
Quality:	Excellent	Excellent	Poor	Excellent
Remarks:				

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 used for data collection during this flight.

Thematic Mapper Simulator

The Daedalus Thematic Mapper Simulator (TMS) is a high altitude 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:	1.3 mrad
Ground Resolution:	91 feet (28 meters at 70,000 feet)
Total Scan Angle:	43 ^o
Swath Width:	9.0 nmi (16.6 km at 70,000 feet)
Pixels/Scan Line:	716 (750 following rectification)
Scan Rate:	12.5 scans/second
Ground Speed:	400 kts (206 m/second)

Thermal Infrared Multispectral Scanner

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2 μm to 12.2 μm region.

<u>Channel</u>	<u>Wavelength, μm</u>	<u>NET</u>
1	8.2 - 8.6	< 0.3 ^o C
2	8.6 - 9.0	< 0.3 ^o C
3	9.0 - 9.4	< 0.3 ^o C
4	9.4 - 10.2	< 0.3 ^o C
5	10.2 - 11.2	< 0.3 ^o C
6	11.2 - 12.2	< 0.3 ^o C

Sensor/aircraft parameters are as follows:

I FOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56 ^o
Swath Width:	16.9 nmi (31.3 km)
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

NOTE: 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 or FTS 464-6252.

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 90-069**

Accession # 04014

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	1019-1032	14:37:02	14:42:54	65000/19800	Clear
C - D	1033-1057	14:51:02	15:01:52	"	Clear
E - F	1058-1086	15:09:05	15:21:43	"	Clear
G - H	1087-1111	15:25:30	15:36:15	"	Clear
I - J	1112-1141	15:42:49	15:55:50	"	Clear
K - L	1142-1172	16:03:07	16:16:26	"	Clear
M - N	1173-1200	16:19:56	16:32:00	"	Clear
O - P	1201-1224	16:35:47	16:45:59	"	Clear
Q - R	1225-1252	16:53:13	17:05:02	"	Clear
S - T	1253-1276	17:08:56	17:18:58	"	Clear
U - V	1277-1298	17:23:39	17:32:56	"	Clear

**CAMERA FLIGHT LINE DATA
FLIGHT NO. 90-069**

Accession # 04014

Sensor # 026

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
W - X	1299-1320	17:39:33	17:48:34	65000/19800	Clear
Y - Z	1321-1338	17:53:09	18:00:35	"	Clear
1 - 2	1339-1350	18:04:52	18:09:04	"	Clear
3 - 4	1351-1366	18:15:07	18:21:20	"	Clear
5 - 6	1367-1409	18:47:03	19:05:37	"	Clear
7 - 8	1410-1449	19:11:25	19:28:38	"	Clear
9 - 10	1450-1471	19:36:25	19:45:35	"	Clear

CAMERA FLIGHT LINE DATA
FLIGHT NO. 90-069

Accession # 04015

Sensor # 018

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
A - B	0001-0025	14:37:00	14:42:53	65000/19800	Clear
C - D	0026-0070	14:51:05	15:01:50	"	Clear
E - F	0071-0123	15:09:09	15:21:49	"	Clear
G - H	0124-0168	15:25:34	15:36:17	"	Clear
I - J	0169-0222	15:42:53	15:55:47	"	Clear
K - L	0223-0278	16:03:10	16:16:32	"	Clear
M - N	0279-0329	16:20:00	16:32:10	"	Clear
O - P	0330-0372	16:35:50	16:46:03	"	Clear
Q - R	0373-0422	16:53:16	17:05:10	"	Clear
S - T	0423-0464	17:08:59	17:18:57	"	Clear
U - V	0465-0503	17:23:42	17:32:56	"	Clear

CAMERA FLIGHT LINE DATA
FLIGHT NO. 90-069

Accession # 04015

Sensor # 018

Check Points	Frame Numbers	Time (GMT-hr, min, sec)		Altitude, MSL feet/meters	Cloud Cover/Remarks
		START	END		
W - X	0504-0541	17:39:36	17:48:34	65000/19800	Clear
Y - Z	0542-0573	17:53:12	18:00:44	"	Clear
1 - 2	0574-0591	18:04:45	18:09:02	"	Clear
3 - 4	0592-0617	18:15:10	18:21:14	"	Clear

SCANNER FLIGHT LINE DATA

FLIGHT NO. 90-069

DAEDALUS FLIGHT DATA
FLIGHT NUMBER: 90-069

Check Points	A c t u a l t i m e b e g i n	(GMT) 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	Scan 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	14:39:18.0	14:42:2.0	34551	36610	65000/19812	12.50	2017	0	43
C-D	14:49:57.0	15:01:0.0	42595	50953	65000/19812	12.50	8206	0	153
E-F	15:08:0.0	15:21:0.0	56251	66080	65000/19812	12.50	9437	2	399
G-H	15:24:26.0	15:35:22.0	68683	76960	65000/19812	12.50	7978	1	299
I-J	15:41:44.0	15:54:59.0	81785	91816	65000/19812	12.50	9638	0	394
K-L	16:02:2.0	16:15:32.0	97150	107373	65000/19812	12.50	10053	0	171
M-N	16:18:51.0	16:31:9.0	109881	119198	65000/19812	12.50	8909	1	408
O-P	16:34:41.0	16:45:3.0	121881	129724	65000/19812	12.50	7634	0	210
Q-R	16:52:7.0	17:04:10.0	135080	144199	65000/19812	12.50	8817	0	303
S-T	17:07:50.0	17:18:2.0	146985	154710	65000/19812	12.50	7612	0	114
U-V	17:22:33.0	17:31:59.0	158129	165271	65000/19812	12.50	7003	0	140
W-X	17:38:27.0	17:47:39.0	170162	177133	65000/19812	12.50	6774	0	198
Y-Z	17:52:2.0	17:59:44.0	180463	186289	65000/19812	12.50	5663	0	164
1-2	18:03:47.0	18:08:8.0	189358	192655	65000/19812	12.50	3150	0	148
3-4	18:14:2.0	18:20:29.0	197133	202015	65000/19812	12.50	4700	0	183
5-6	18:45:57.0	19:04:45.0	221310	235559	65000/19812	12.50	13827	0	423
7-8	19:10:20.0	19:27:43.0	239792	252960	65000/19812	12.50	12634	0	535
9-10	19:35:20.0	19:44:40.0	258732	265806	65000/19812	12.50	6785	0	290

TIMS SCANNER FLIGHT LINE DATA

FLIGHT NO. 90-069

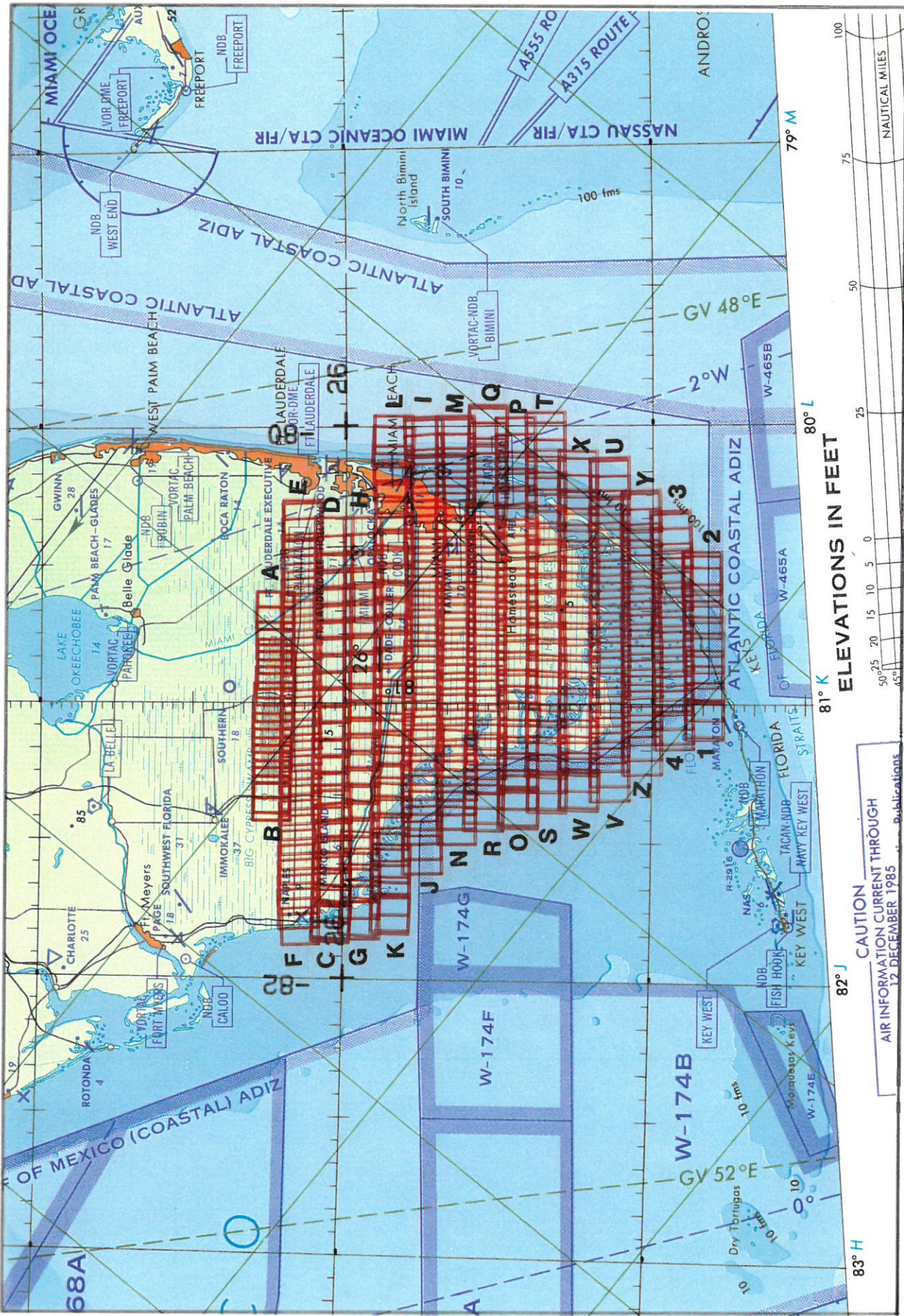
TIMS FLIGHT DATA FLIGHT NUMBER: 90-069

Check Points	Actual Time (GMT) begin	Actual Time (GMT) end	Actual Scanline begin	Actual Scanline end	Altitude feet/meter	Scan Speed (m/s)	Total Scanned Scanlines	Total Interpolated Scanlines	Total Repeated Scanlines
6-E	16:55:52.0	16:56:14.0	218575	221392	65000/19812	7.30	2818	0	10
6-D	16:59:57.0	16:00:59.0	224779	232611	65000/19812	7.30	8330	0	12
6-F	16:03:14.0	16:03:59.0	232692	233384	65000/19812	7.30	6879	0	14
6-H	16:04:26.0	16:05:21.0	233893	244392	65000/19812	7.30	9776	0	14
6-J	16:04:44.0	16:04:58.0	244487	245329	65000/19812	7.30	8401	0	2
6-L	16:06:24.0	16:06:31.0	255387	262201	65000/19812	7.30	6706	0	9
6-N	16:06:51.0	16:06:18.0	262260	269192	65000/19812	7.30	6877	0	16
6-P	16:09:42.0	16:09:24.0	270712	285245	65000/19812	7.30	1425	0	10
6-R	16:09:24.0	16:09:24.0	285256	285699	65000/19812	7.30	4350	0	14
6-S	17:00:51.0	17:00:24.0	285283	289718	65000/19812	7.30	4234	0	12
6-U	17:00:33.0	17:00:56.0	289745	293633	65000/19812	7.30	4123	0	6

TIMS SCANNER FLIGHT LINE DATA

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H-3	17:33:27.0	17:47:38.0	295573	302702	65000/19812	7.30	8027	1	2
Y-Z	17:52:2.0	17:59:43.0	306556	309001	65000/19812	7.30	3354	0	12
I-2	18:03:47.0	18:08:7.0	309793	311593	65000/19812	7.30	1903	0	0
S-4	18:18:2.0	18:20:38.0	313293	317102	65000/19812	7.30	2909	0	12
S-6	18:45:57.0	19:04:43.0	326279	336518	65000/19812	7.30	8227	0	14
F-6	19:00:20.0	19:27:42.0	338974	346592	65000/19812	7.30	7973	1	49
9-10	19:35:20.0	19:44:38.0	349937	354011	65000/19812	7.30	8168	1	6



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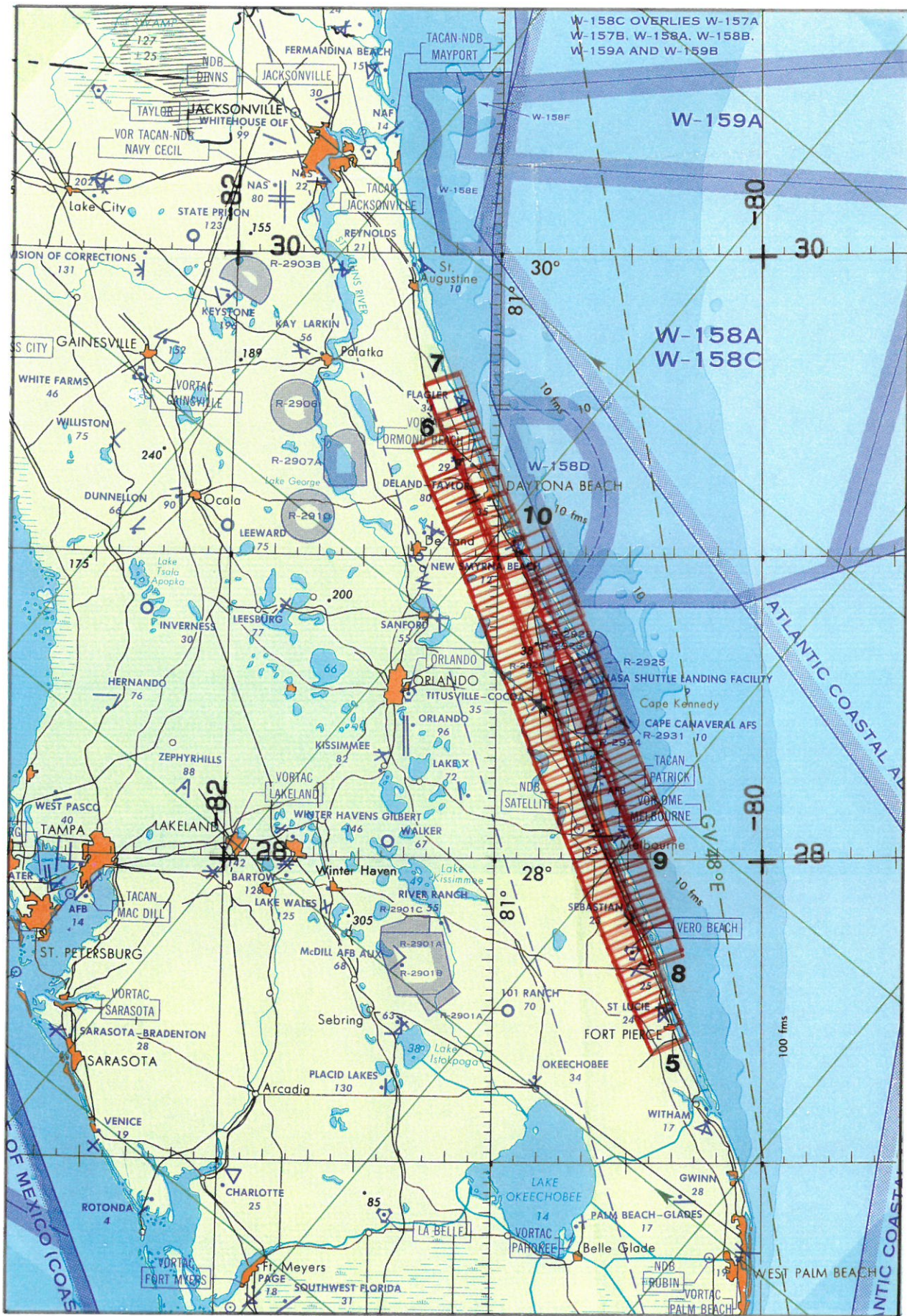
RC-10

Accession # 04014

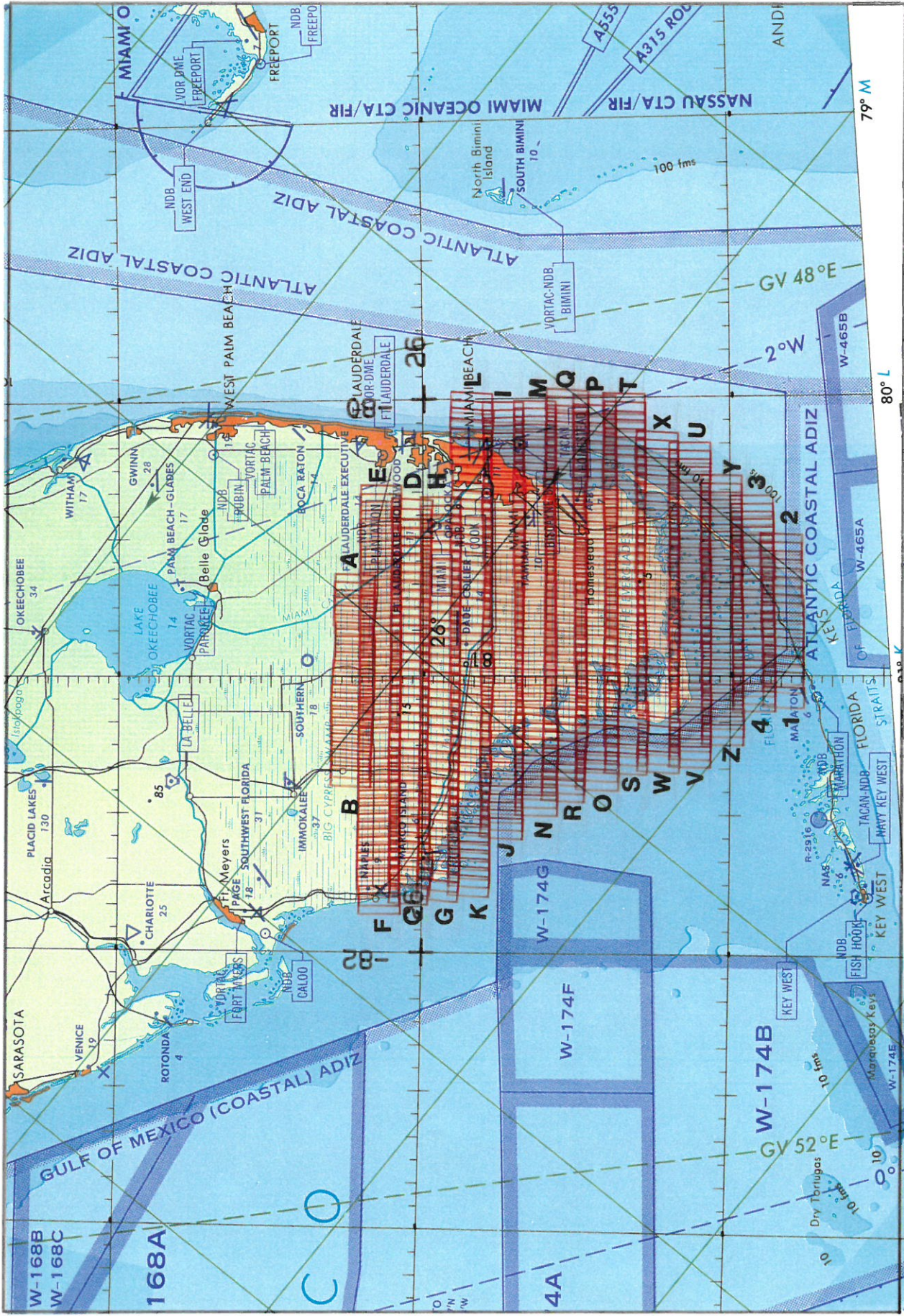
JNC 45



CAUTION
AIR INFORMATION CURRENT THROUGH
12 DECEMBER 1985



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