19900927I1-LPS

E.2 Lead Project Scientist (On-Board)

E.2.1 Preflight

_____ 1. Participate in general mission briefing.

_____ 2. Determine specific mission and flight requirements for assigned aircraft.

_____ 3. Determine from CARCAH or field program director whether aircraft has operational fix responsibility and discuss with OAO flight director/meteorologist and CARCAH unless briefed otherwise by field program director.

_____ 4. Contact HRD members of crew to:

a. Assure availability for mission.
b. Arrange ground transportation schedule when deployed.
c. Determine equipment status.

_____ 5. Meet with OAO flight crew at least 90 minutes before takeoff, provide copies of flight requirements and provide a formal briefing for the flight director, navigator, and pilots.

_____ 6. Report status of aircraft, systems, necessary on-board supplies and crews to appropriate HRD operations center (MGOC in Miami or FGOC at remote recovery location).

E.2.2 In-Flight

_____ 1. Confirm from OAO flight director/meteorologist that satellite data link is operative (information).

_____ 2. Confirm camera mode of operation.

_____ 3. Confirm data recording rate.

_____ 4. Complete Form E-2.

E.2.3 Postflight

_____ 1. Debrief scientific crew.

_____ 2. Report landing time, aircraft, crew, and mission status along with supplies (tapes, etc.) remaining aboard the aircraft to the appropriate HRD operations center (MGOC or FGOC).

_____ 3. Gather completed forms for mission and turn in at the appropriate operations center. [Note: all data removed from the aircraft by HRD personnel should be cleared with the OAO flight director.]

_____ 4. Obtain a copy of the 10-s flight listing from the OAO flight director. Turn in with completed forms.

_____ 5. Determine next mission status, if any, and brief crews as necessary.

_____ 6. Notify the appropriate operations center (FGOC or MGOC) as to where you can be contacted and arrange for any further coordination required.

Form E-2
Page 1 of 5

On-Board Lead Project Scientist Check List

Date 9/27/90 Aircraft 43RF Flight ID 900927I

SFMR Cal. Flt.

A. Participants

HRD		OAO	
Function	Participant	Function	Participant
Lead Proj. Sci.	Black	Flight Director	Damiano
Cloud Physics		Pilots	Lichnor / Layden
Radar	Dorst	Navigator	
Doppler		Sys. Engr.	Goldstein
Photographer		Data Tech.	Lynch
Omegasonde		El. Tech.	
AXBT/AXCP		Other	

Take-Off	Location	Landing	Location
1505			

B. Past and Forecast Storm Locations

Date/Time	Latitude	Longitude	MSLP	Max. Wind

C. Mission Briefing

D. Equipment Status

Equipment	Pre-Flight	In-Flight	Post-Flight
Aircraft			
Radar			
Cloud physics			
Data system			
Omegasondes			
AXBT/AXCP			
Doppler			
Photography			

REMARKS:

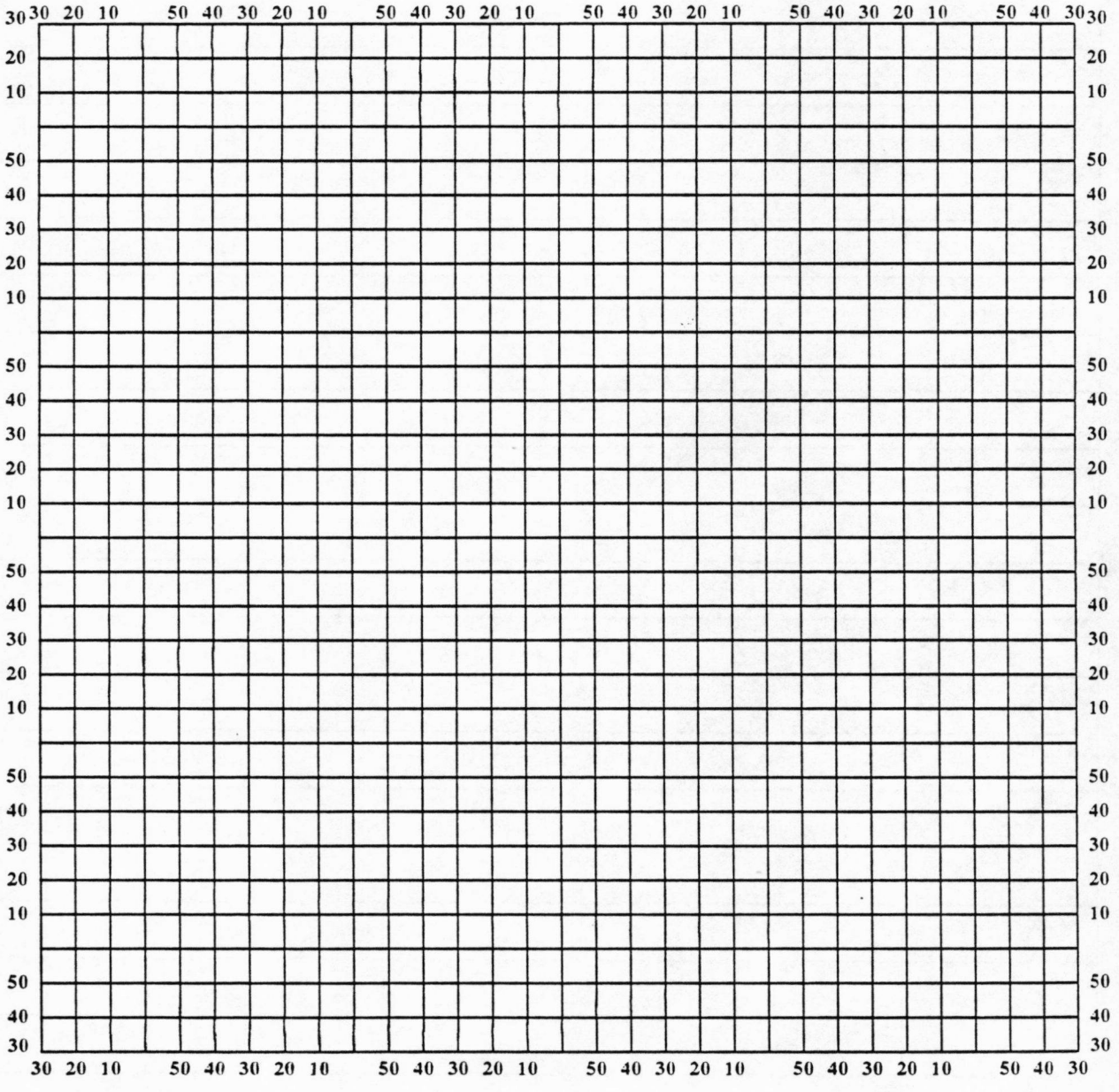
E. I. Proposed Flight Pattern (sketch or designate by number)

E. II. Actual Flight Pattern

Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes of ϕ and λ.

Date_____ Longitude _____ Observer _____



Note: Label full degrees according to location of flight area.

Lead Project Scientist Event Log

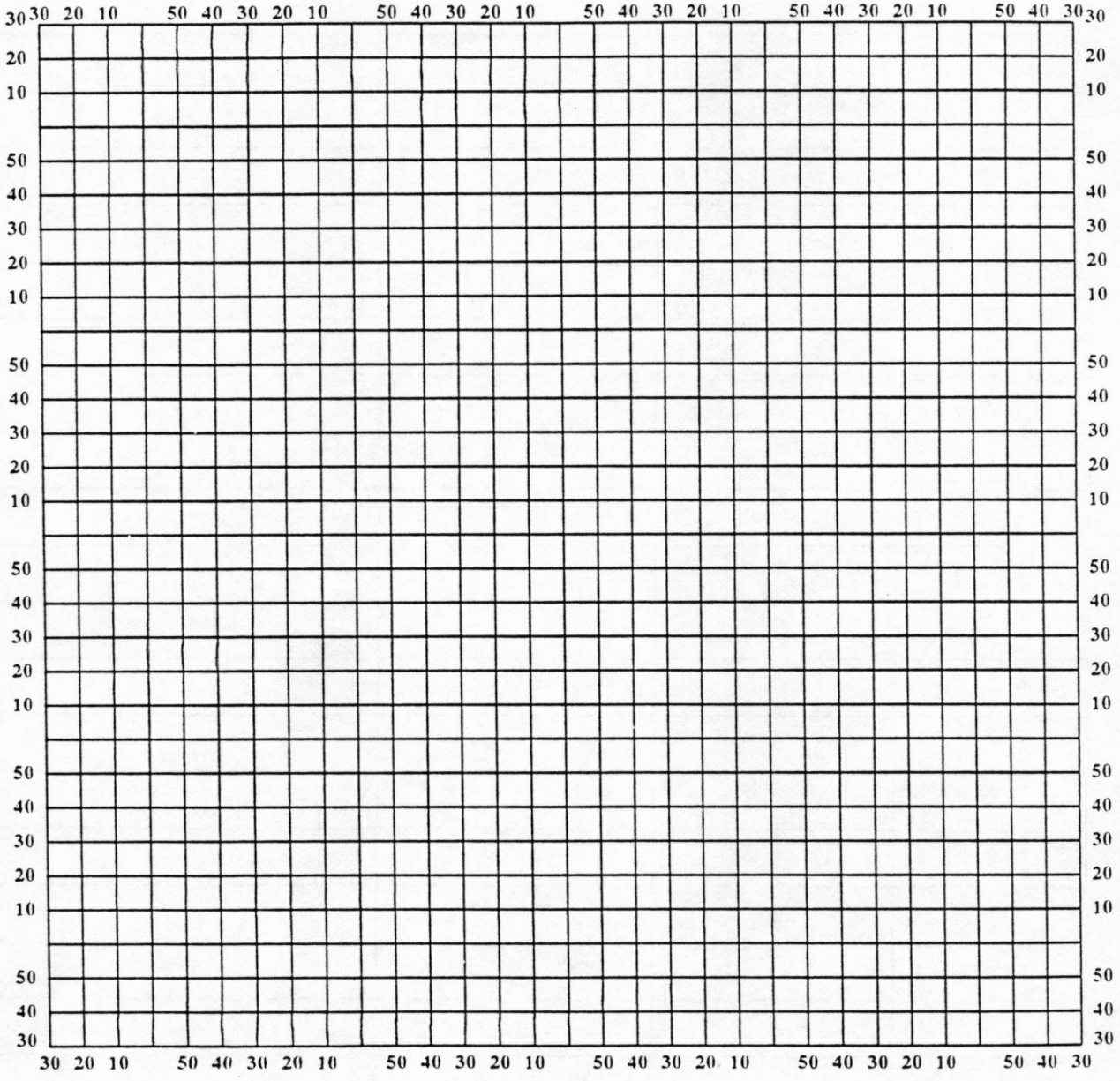
Date ________________ Flight ________________ LPS ________________

Time	Event	Position	Comments

Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes of ϕ and λ.

Date_____ Longitude _____ Observer _____

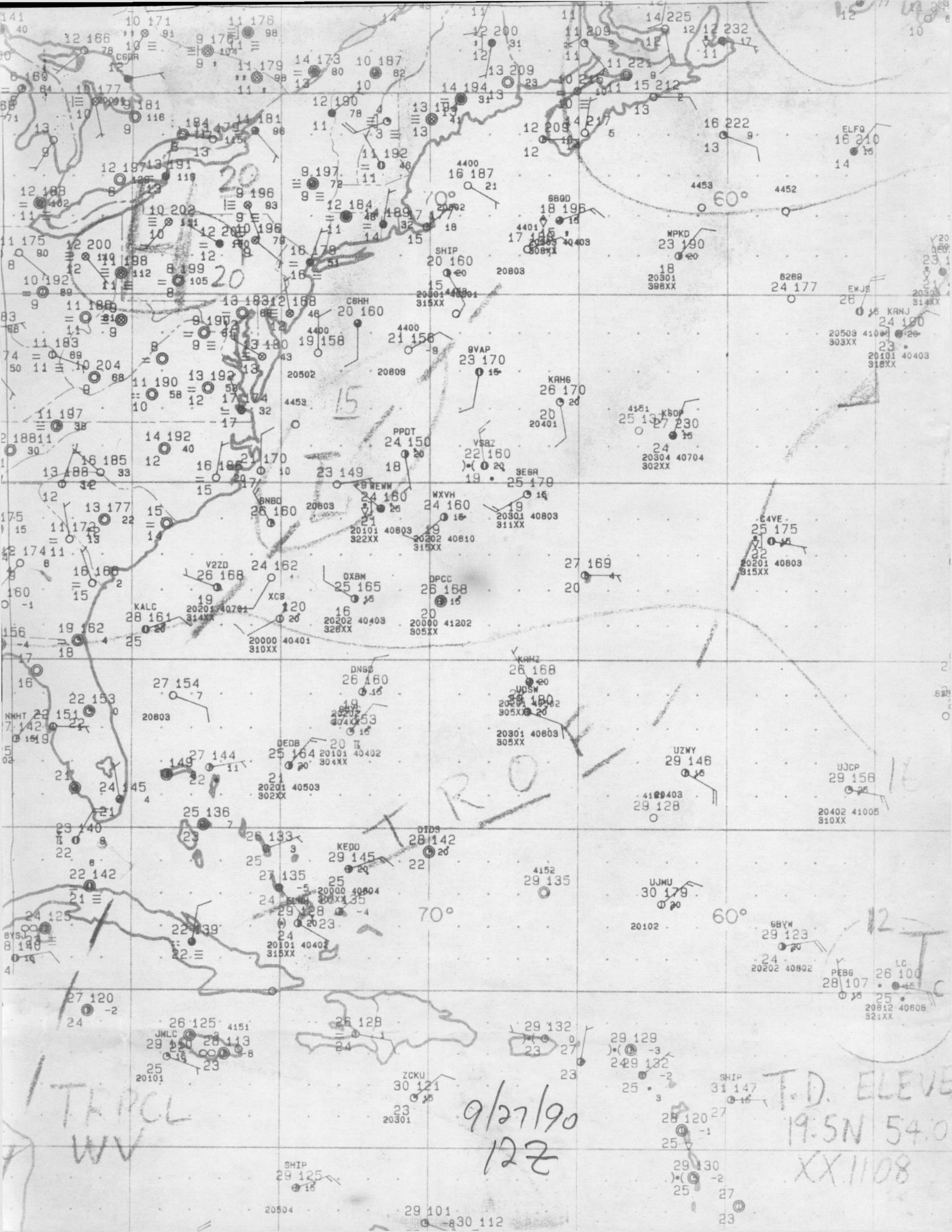


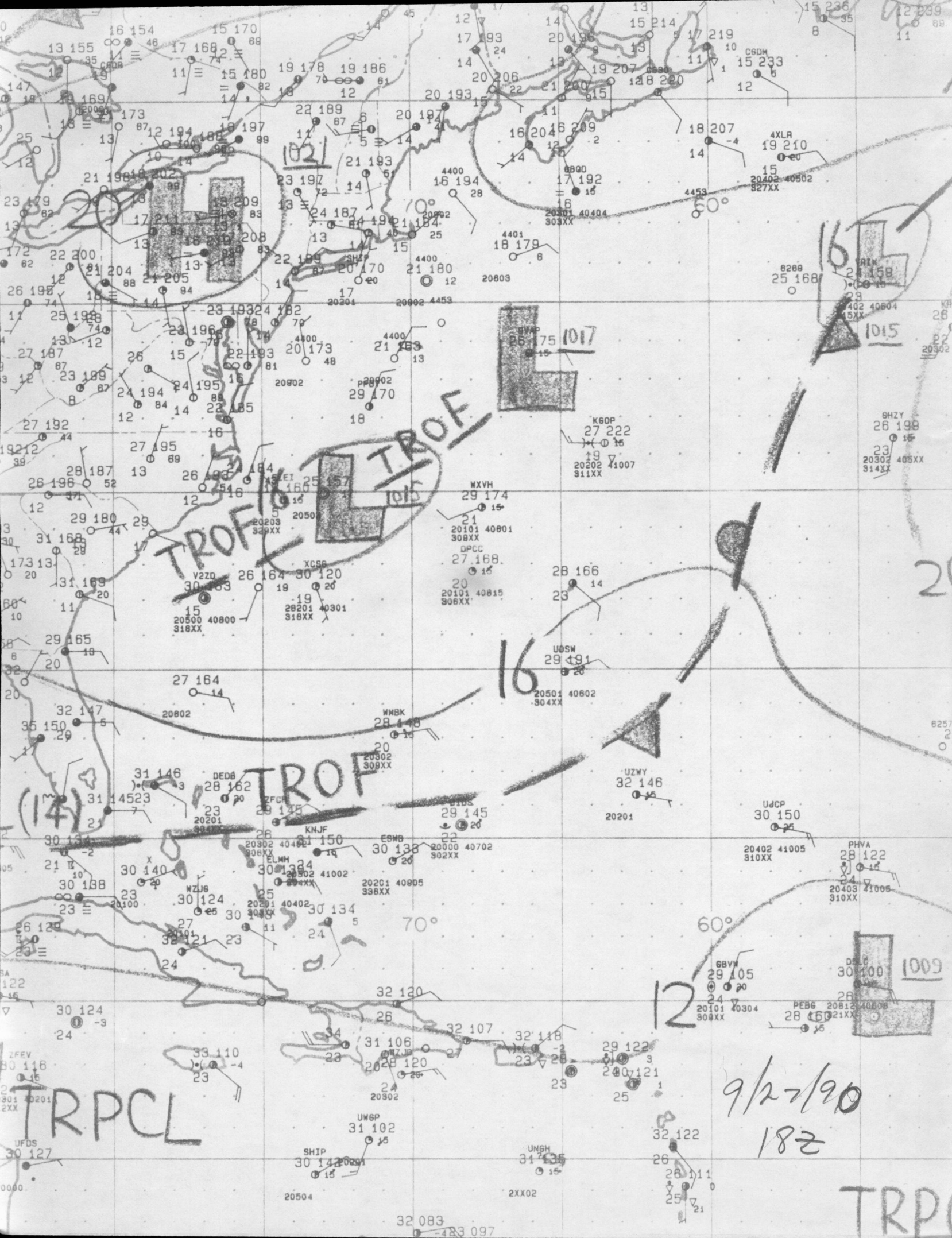
Note: Label full degrees according to location of flight area.

Lead Project Scientist Event Log

Date ________________ Flight ________________ LPS ________________

Time	Event	Position	Comments


70°
60°
9/27/90
12Z
T.D. ELEVE
19.5N 54.0
XX1108


TROF
TROF
TROF
1021
1017
1015
1009
70°
60°
70°
60°
TRPCL
9/2-/90
182


TROF
TROF
TROF
60°
9/28/90
002

SFMR/Buoy Calibration Flight Plan

8/21/90 rev. 8/23/90

Peter G. Black

1. MISSION OVERVIEW

Offshore from Cape Kennedy there is now a line of three buoys operated by the National Data Buoy Center (NDBC). Also, at Lake Worth and at West End, Grand Bahama, on opposite sides of the Gulf Stream, are located two automated, coastal weather stations (C-MAN) operated by NDBC These platforms represent excellent locations to calibrate the Stepped Frequency Microwave Radiometer, and infrared radiometer, at different flight levels away from the C-band and other microwave noise generated in close proximity to the Cape. This mission also provides a means to calibrate our algorithm for predicting true SSTs from flight level measurements using the infrared radiation thermometer.These platforms are:

1) Canaveral	41009	3-m disc	28.30.07N	80.11.00W	18 nm
2) E. Canaveral	41010	10-m disc	28.52.48N	78.31.59W	108 nm
3) E. Daytona	41006	6-m Nomad	29.18.07N	77.22.54W	178 nm
4) Lake Worth	LKWF1	C-MAN	26.36.42N	80.02.00W	0 nm
5) West End	SPGF1	C-MAN	26.41.30N	79.00.00W	58 nm

Positions are in degrees, minutes and seconds and distance is nautical miles from the Florida shoreline.

The buoys report the most recent 8 or 10 minute average on the hour in real time. Off-hour observations are made at variable time intervals and are transmitted to NDBC for archiving. Aerovane wind sensor heights are also variable. These heights in meters as well as observation times in minutes past the hour for the above platforms are as follows:

1) 41009	5 m	12-20	42-50				
2) 41010	10 m	12-20	42-50				
3) 41006	5 m	00-10	10-20	20-30	30-40	40-50	50-58
4) LKWF1	8 m	00-10	10-20	20-30	30-40	40-50	50-52
5) SPGF1	10 m	00-10	10-20	20-30	30-40	40-50	50-52

The proposed calibration flight plan requires about 4 hours and involves flying a flight segment across the Gulf Stream between Lake Worth and West End, Grand Bahama in route to 41009 offshore from the Cape, a stepped descent sounding over 41010 and 41006 and a repeat of the Gulf Stream transect enroute to Miami. Two minute level flight legs at penetration airspeeds are required over the buoys at five altitudes ranging from 20,000 ft to 200 ft. Two ODW drops plus five AXBT drops, three freefall and two external (cad-launched), are required. One reserve ODW, two free fall reserve AXBTs and one reserve cad-launched AXBT are also required on the flight as backup in the event of failure of

the primary. A cloud free path is required along at least 50 % of the pattern for one of the soundings. If both soundings are to be completed, then one could be done through a rain area if it exists, along the 2-min leg over the buoy. The orientation of the pattern is east-west, but can be anything that is convenient.

2. MISSION DESCRIPTION

2.1 Expendables: 3 ODWs
8 AXBTs
3 cads

2.2 Flight plan segments:

1) 60 nm, 15 min- Transit to IP1, Lake Worth
2) 60 nm, 15 min- 1500 ft. Gulf Stream leg LKWF1 to SPGF1
3) 130 nm, 30 min- Transit to IP2
4) 10 nm, 2 min- 1500 ft. overflight of 41009.
5) 80 nm, 20 min- Transit to IP3
6) 100 nm, 30min- Stepped descent sounding over 41010.
7) 60 nm, 15 min- Transit to IP4
8) 100 nm, 30 min- Stepped descent sounding over 41006.
9) 180 nm, 35 min- Transit to IP5
10) 60 nm, 15 min- 1500 ft. Gulf Stream leg SPGF1 to LKWF1
11) 60 nm, 15 min- Transit Miami International
12) TOTAL: 900 nm, 4 hrs

2.3 Initial Points (IP), altitudes and times after the hour:

Point	Lat	Lon	Heading	Radar Alt	Time
IP1	26.36.42	80.02.00	090	1,500 ft	0,10,20,30,40,50
IP2	28.30.07	80.15.00	090	1,500 ft	12,42
IP3	28.52.48	78.36.00	090	20,000 ft	0,30
IP4	29.18.07	77.27.00	090	20,000 ft	0,10,20,30,40,50
IP5	26.41.30	78.56.00	270	1,500 ft	0,10,20,30,40,50

2.4 Chronology:

1) After takeoff, procede to IP1. Depart IP1 heading east for West End at 1,500 ft. at one of the times listed in the above table.

2) Proceed from West End to IP2 near 41009. Initiate a two-minute leg at IP2 at 12 or 42 minutes after the hour, overflying 41009 at 1500 ft (540 m). Drop an AXBT (freefall) over, but not on, the buoy.

3) Initiate a climb to 500 mb (5.1 km) enroute to IP3, 4 nm west of 41010.

4) Initiate the first stepped descent sounding at IP3, on the hour or half-hour according to the above table.

5) After completing the stepped descent, climb to 20,000ft again enroute to IP4, 4 nm west of 41006.

6) Initiate the second stepped descent sounding at IP4 at one of the times in the above table.

7) After completing the stepped descent, climb to a comfortable altitude and proceed to IP5, over West End, descending to 1500 ft prio to arrival.

8) Depart IP5 at one of the times in the table and proceed to Lake Worth at 1500 ft. Head for Miami International.

2.5 **Stepped descent procedure:**

The stepped descent should be flown in about one half hour and can be flown in either of two ways:

Type I: Fly 2 minute leg followed by reversal in heading and a gradual descent to the next level.

Type II: Fly 2 minute leg followed by a reversal in heading, another 2 minute leg at the same level and a rapid spiral descent to the next level.

1) The pattern begins from the IP at 20,000 ft with an ODW drop at the beginning of the two minute leg. This is followed with an AXBT (external) drop one minute later over the buoy position.

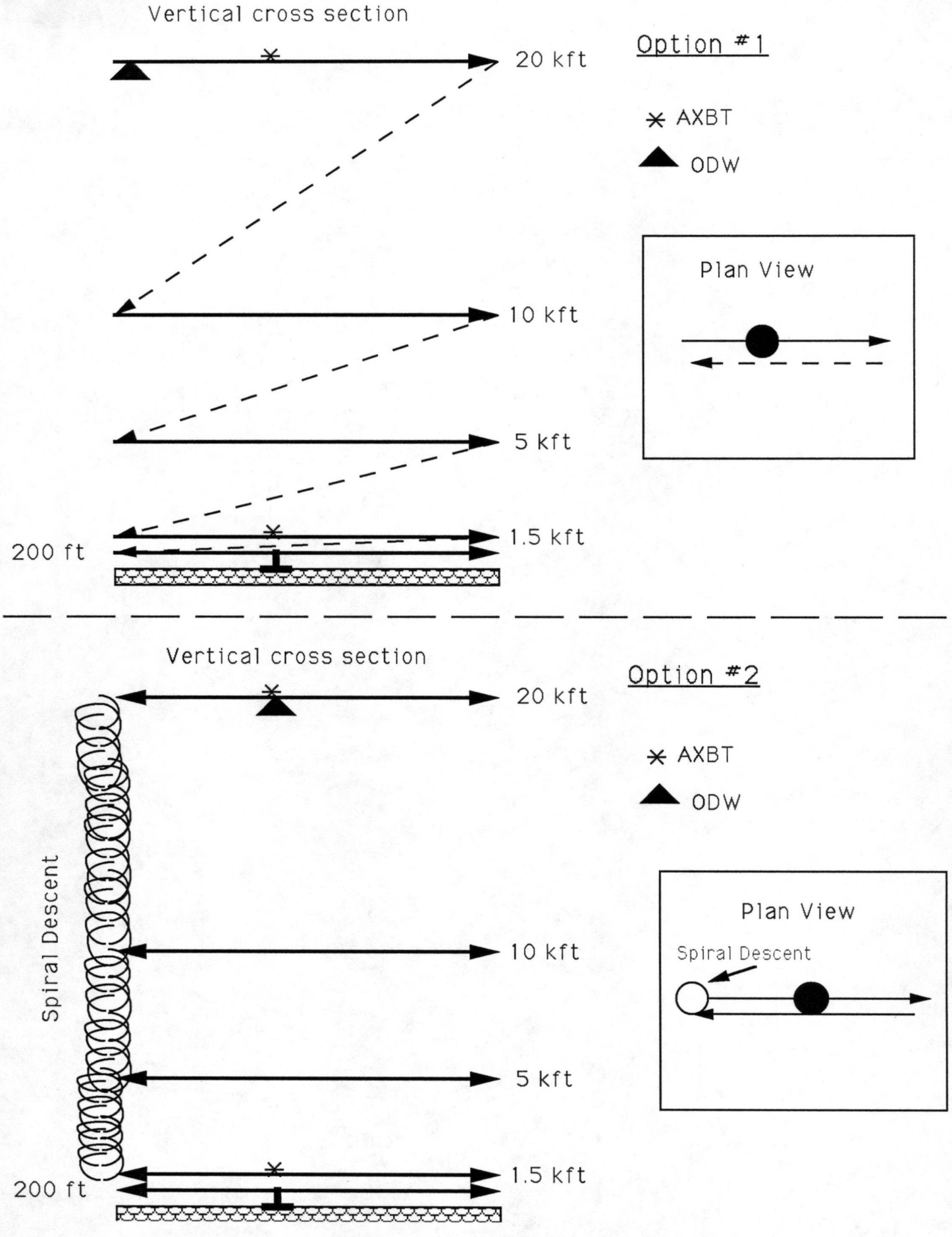
2) At the end of the two minute leg, reverse heading and proceed to the 10,000 ft level using either Type I or II strategy. If option II is used, and it can be determined that the ODW is bad before reaching the IP at 20,000 ft, deploy a second ODW just before reaching the IP.

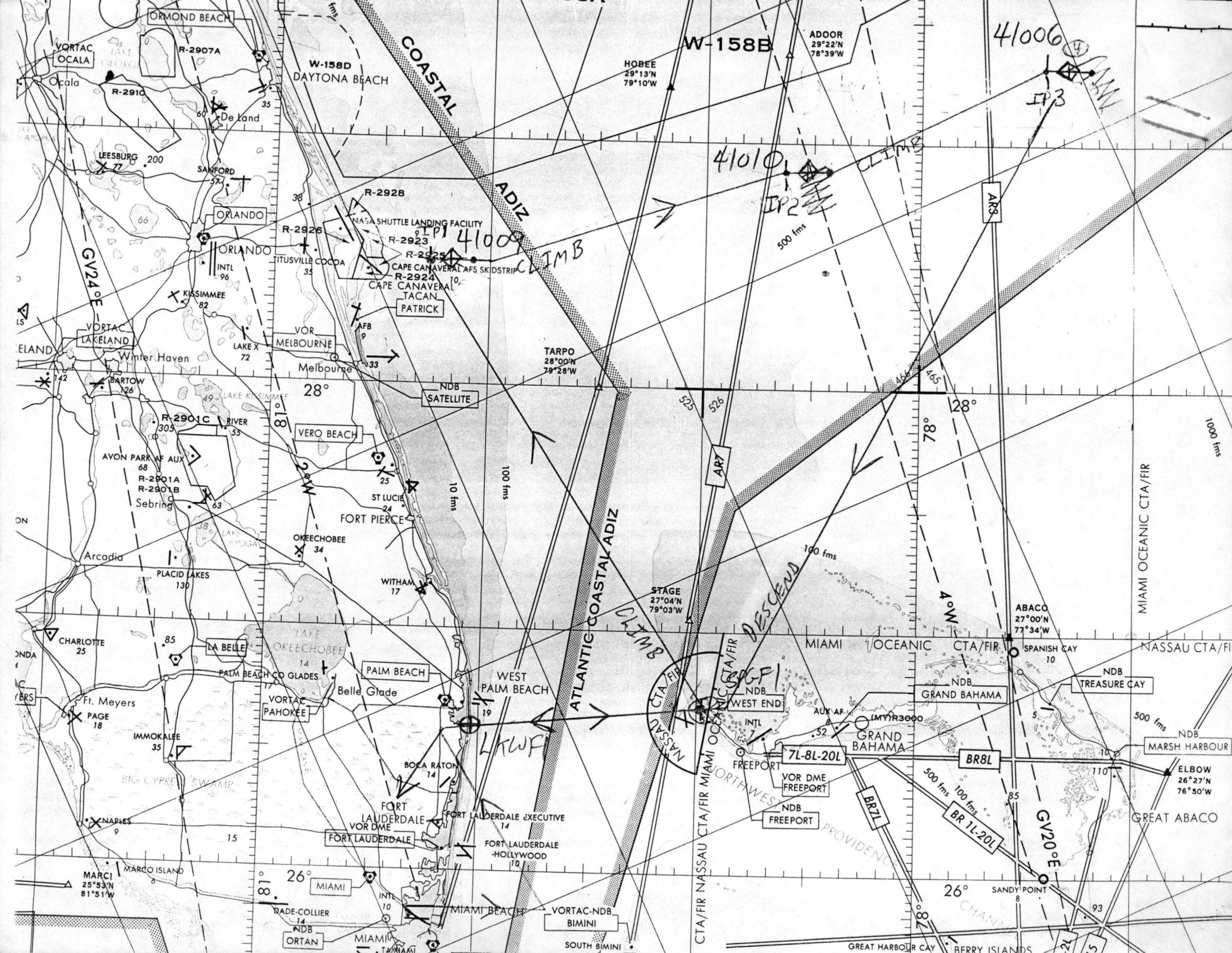
3) Commence the 10,000 ft two minute leg. If no AXBT signal is received by the mid point of the 10,000 ft leg, deploy another.

4) After the second two minute leg, proceed to 5,000 ft. Fly the third two minute leg and proceed to 1500 ft.

5) Begin the fourth two minute leg. After one minute at 1500 ft, drop an AXBT (freefall) over the buoy position. If no signal is received by the end of the leg, deploy another AXBT.

6) Complete the fourth two minute leg and descend to 200 ft. Fly the fifth two minute leg and climb.


Vertical cross section
Option #1
20 kft
AXBT
ODW
Plan View
10 kft
5 kft
200 ft
1.5 kft
Vertical cross section
Option #2
20 kft
AXBT
ODW
Plan View
Spiral Descent
Spiral Descent
10 kft
5 kft
200 ft
1.5 kft


ORMOND BEACH
VORTAC OCALA
Ocala
R-2907A
R-2910
W-158D
DAYTONA BEACH
COASTAL ADIZ
W-158B
HOBEE 29°13'N 79°10'W
ADOOR 29°22'N 78°39'W
41006
IP3
De Land
LEESBURG 77
SANFORD 57
41010
IP2
CLIMB
R-2928
NASA SHUTTLE LANDING FACILITY
ORLANDO
R-2926
R-2923
IP1
41009
R-2925
CLIMB
ORLANDO INTL 96
TITUSVILLE COCOA 35
CAPE CANAVERAL AFS SKIDSTRIP
R-2924
CAPE CANAVERAL
TACAN PATRICK
500 fms
AR3
GV24°E
KISSIMMEE 82
VORTAC LAKELAND
Winter Haven
LAKE X 72
VOR MELBOURNE
Melbourne
AFB
TARPO 28°00'N 79°28'W
BARTOW 126
28°
NDB SATELLITE
525
526
466
465
28°
78°
1000 fms
R-2901C
RIVER 55
VERO BEACH
AR7
AVON PARK AF AUX 68
R-2901A
R-2901B
Sebring
2°W
81°
ST LUCIE 24
FORT PIERCE
10 fms
100 fms
OKEECHOBEE 34
Arcadia
PLACID LAKES 130
100 fms
WITHAM 17
ATLANTIC COASTAL ADIZ
STAGE 27°04'N 79°03'W
CLIMB
DESCEND
4°W
ABACO 27°00'N 77°34'W
MIAMI OCEANIC CTA/FIR
CHARLOTTE 25
LA BELLE
LAKE OKEECHOBEE
PALM BEACH CO GLADES
PALM BEACH
WEST PALM BEACH
MIAMI OCEANIC CTA/FIR
SPANISH CAY 10
NASSAU CTA/FIR
Ft. Meyers
PAGE 18
VORTAC PAHOKEE
Belle Glade
NDB WEST END
SPGF1
NDB GRAND BAHAMA
NDB TREASURE CAY
IMMOKALEE 35
LKWF1
AUX AF
(MY)R3000
GRAND BAHAMA
500 fms
NDB MARSH HARBOUR
BOCA RATON 14
FREEPORT
7L-8L-20L
BR8L
ELBOW 26°27'N 76°50'W
VOR DME FREEPORT
NDB FREEPORT
BR7L
500 fms
100 fms
BR 1L-20L
GV20°E
GREAT ABACO
NAPLES 9
FORT LAUDERDALE
VOR DME FORT LAUDERDALE
FORT LAUDERDALE EXECUTIVE 14
FORT LAUDERDALE -HOLLYWOOD 10
NORTHWEST PROVIDENCE
MARCI 25°53'N 81°51'W
MARCO ISLAND
26°
MIAMI
81°
DADE-COLLIER 14
NDB ORTAN
MIAMI INTL 10
MIAMI BEACH
VORTAC-NDB BIMINI
SOUTH BIMINI
CTA/FIR NASSAU CTA/FIR MIAMI
78°
26°
SANDY POINT 8
GREAT HARBOUR CAY
BERRY ISLANDS