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DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

FEDERAL COORDINATOR FOR  
METEOROLOGICAL SERVICES  
AND SUPPORTING RESEARCH



# National East Coast Winter Storms Operations Plan

FCM 77-3

Washington, D.C.  
October 1977

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U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
FEDERAL COORDINATOR FOR METEOROLOGICAL  
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OPERATIONS PLAN

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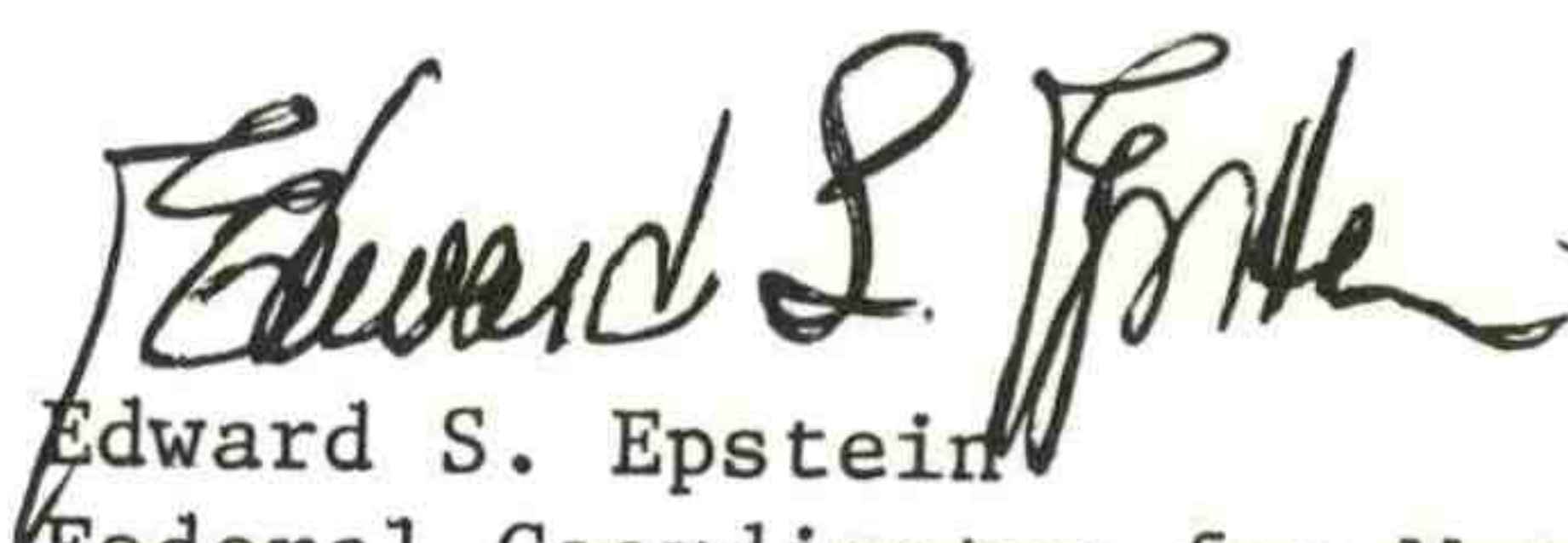
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## FOREWORD

In a memorandum dated October 23, 1969, the Chairman, Interdepartmental Committee for Meteorological Services (ICMS), established an Ad Hoc Group to function under the purview of the Subcommittee on Basic Meteorological Services (SC/BMS). The task of the Group was to develop an Operations Plan designed to furnish weather observations for use in predicting and providing adequate and timely warnings of severe and crippling winter storms along the east coast of the United States. This Plan was to consider use of surface platforms, aircraft, and satellites. Arrangements, if practical, were to be made to meet the data requirements of research facilities.

The National East Coast Winter Storms Operations Plan was developed to meet this request. The Plan covers that part of the year having a relatively high incidence of winter storms along the east coast. This period is from November 1 to April 15. The plan lists only those special arrangements between the various agencies involved in meeting the objective of furnishing special weather observations for use in warning of severe winter storms along the east coast.

This document is the 9th annual edition of the Plan. It represents a general update of the previous edition. The most significant changes include (1) deletion of material concerning OWS Hotel (termination September 1977), (2) addition of section on environmental data buoys, (3) new material on predevelopment storm mission data requirements for model input and, (4) revision of reconnaissance tracks.



Edward S. Epstein  
Federal Coordinator for Meteorological  
Services and Supporting Research

NATIONAL EAST COAST WINTER STORMS

OPERATIONS PLAN

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## ACKNOWLEDGMENTS

The Ad Hoc Group of the Subcommittee on Basic Meteorological Services gratefully appreciates the time and effort of the following member agencies in the development of this Plan.

### Department of Commerce:

National Oceanic and Atmospheric Administration

National Weather Service

National Environmental Satellite Service

Research Laboratories, Research Facilities Center

NOAA Data Buoy Office

### Department of Defense:

Deputy Director for Operations, Joint Chiefs of Staff  
(Environmental Services)

U.S. Air Force

U.S. Navy

### Department of Transportation:

Federal Aviation Administration

U.S. Coast Guard

RESPONSIBILITIES OF COOPERATING AGENCIES AND  
AREA OF CONCERN

1. The National Oceanic and Atmospheric Administration (NOAA) shall:
  - a. Provide basic surface, upper air, and radar observations from its network of stations making such observations.
  - b. Provide basic analyses and forecasts through the National Meteorological Center (NMC), Camp Springs, Md.
  - c. Provide special numbered storm summaries to the general public and to all concerned interests through Storm Coordination Centers (SCC) at Boston, Washington, Miami, New Orleans, and Chicago.
  - d. Provide statements and warnings through Weather Service Forecast Offices (WSFO) and local Weather Service Offices (WSO) along the eastern seaboard.
  - e. Provide advice on aircraft reconnaissance requirements forwarded through the WSFO Miami to the Chief, Aerial Reconnaissance Coordination, All Hurricanes (CARCAH), from the Storm Coordination Center Washington, the central coordinating office for this program for operational reconnaissance requirements, and from NMC for predevelopment storm mission requirements.
  - f. Provide additional observations, when required, making available all reports to any requesting agency.
  - g. Operate satellite systems capable of providing coverage of the east coast of the United States during the winter storms season.
  - h. Coordinate with the National Aeronautics and Space Administration (NASA) to obtain pertinent meteorological data from NASA research and development experimental satellites.
  - i. Coordinate with the DOD Services to obtain pertinent meteorological data from the Defense Meteorological Satellite Program.
  - j. Provide data in the form of pictures for selected situations to authorized research facilities.
  - k. Furnish aircraft to support the reconnaissance and research objectives of the National East Coast Winter Storms program.
    - (1) Primary Objective is to participate and provide additional real-time meteorological data to operational forecasters in an attempt to improve the quality of forecasts associated with winter coastal storms.
    - (2) Secondary Objective is to provide data that will permit analyses and a better understanding of the structure and dynamics of these winter storm systems.



## CHAPTER 1

1. Provide oceanographic and meteorological surface data obtained from offshore buoy deployment, if possible within existing facilities.
- m. Provide dissemination of weather observation data received by GULL monitor to appropriate agencies.
- n. Reimburse the Air Force for the aircraft reconnaissance flown in support of this Plan in accordance with the NOAA/USAF Memorandum of Understanding dated 16 March 1976.

The National Weather Service is responsible for the issuance of winter weather forecasts, watches and warnings to the public and various specialized user groups. Its responsibilities are documented in Weather Service Operations Manual Chapters A-02, "Weather Service Mission", and C-42, "Winter Weather Warnings."

### 2. The Department of Defense (DOD) shall:

- a. Make available to NOAA agencies through the Automated Weather Net (AWN) interface basic surface, upper air, and radar observations from those DOD stations making such observations and PIREPs that become available.
- b. Furnish to the National Weather Service, (1) aircraft reconnaissance observations that are within its capabilities and in accord with established reconnaissance priorities, and (2) special observations detailed in Chapter 3 of this Plan. (Current dropsonde frequency capability is one release every 450 nm).
- c. Designate CARCAH as the point of contact for coordination with Storm Coordination Center Washington for aircraft reconnaissance required in support of this Plan.
- d. Provide weather reconnaissance data monitor services to evaluate and disseminate reconnaissance reports.
- e. Provide USAF aeronautical station communications to relay reconnaissance reports from the aircraft to the weather monitors.
- f. Provide warnings to all DOD facilities and military units of weather factors which threaten to inhibit their operations or to damage their installations.

The U.S. Navy, through the Naval Weather Service, is responsible for issuance of gale, storm, and high seas warnings for fleet operations and Navy shore installations within the east coast area as elaborated in NAVWEASERVCOM Instruction 3140.1 (series).

The U.S. Air Force, through the Air Weather Service, is responsible for the issuance of military weather warning advisories and point warnings to all

Air Force and Army (including Reserve and National Guard) installations, facilities, and operations related to east coast storms for those hazardous phenomena specified in Air Weather Service Manual 105-8, Volume II.

3. The Federal Aviation Administration (FAA) shall provide for:
  - a. Air traffic control, communication, and flight assistance services as appropriate in support of this Plan.
  - b. Dissemination of Pilot Reports (PIREPS).
  - c. Flight Service Station (FSS) and Tower aviation observations.
4. The U.S. Coast Guard shall:
  - a. Provide surface observations to NWS from its coastal facilities and vessels.
  - b. Interrogate surface ships of opportunity for special weather observations through the Automated Mutual - Assistance Vessel Rescue (AMVER) system.
  - c. Provide personnel, vessel, and communication support to the NOAA Data Buoy Office for development, deployment, and operation of environmental data buoy systems.
  - d. Provide communication circuits for relay of weather observations to NWS.
  - d. Provide coastal broadcast facilities at selected locations for dissemination of forecasts and warnings.
5. Area of Concern:

The geographic area of concern will range from latitudes  $30^{\circ}\text{N}$  to  $48^{\circ}\text{N}$ , west of longitude  $65^{\circ}\text{W}$ , and will extend about 150 miles inland along the eastern coast of the United States (fig. 1-1).

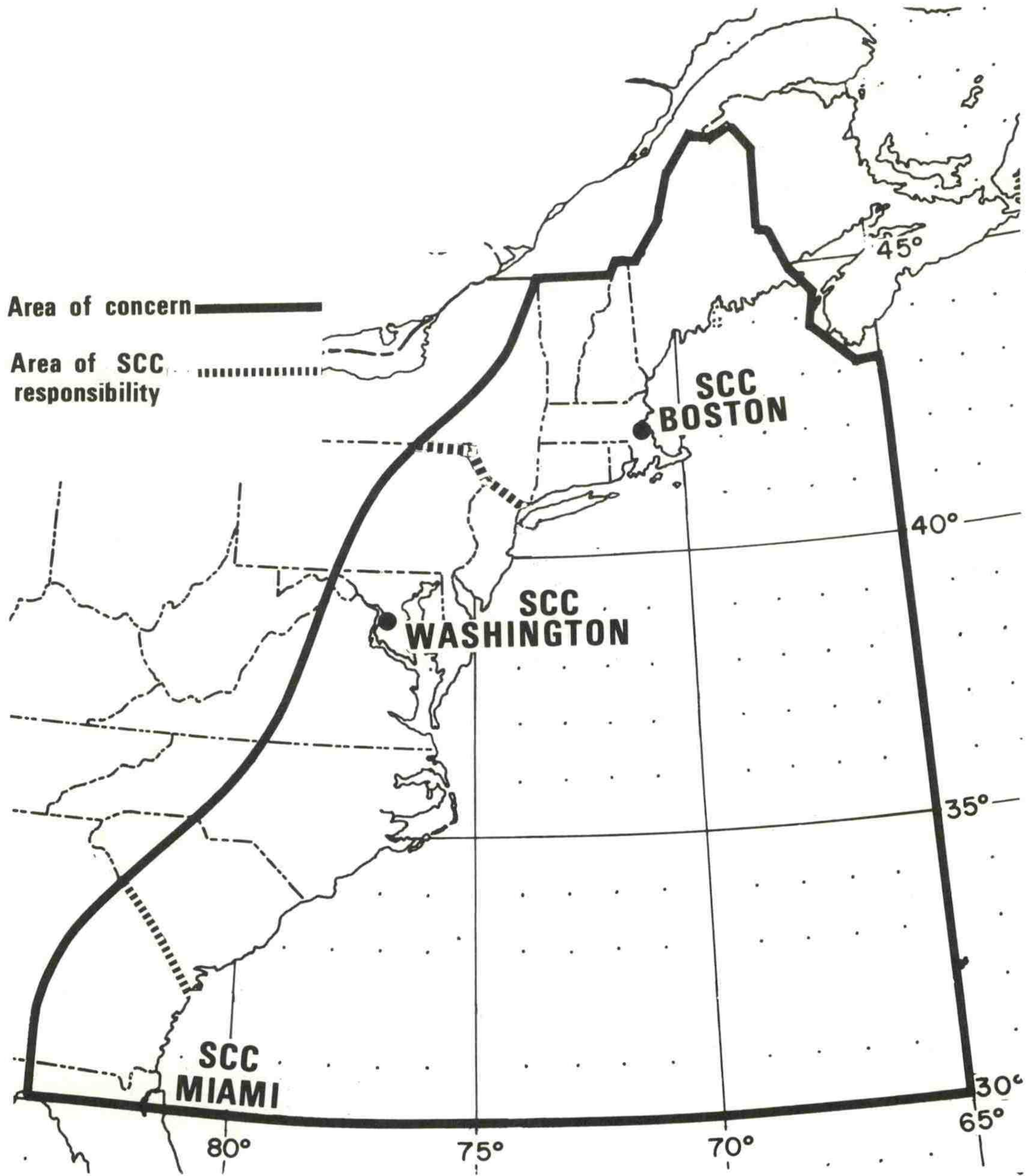


FIGURE 1-1. EAST COAST WINTER STORMS AREA OF CONCERN

AIRCRAFT RECONNAISSANCE1. Responsibility.

a. U.S. Air Force (USAF). The USAF WC-130 sorties will be conducted for storm and storm threat situations. All USAF sorties in support of this plan will be assigned by CARCAH in the Winter Storm Plan of the Day (WSPOD).

b. NOAA, Research Facilities Center (RFC). The NOAA RFC aircraft flights will be available on request for a storm or storm threat situation and will be used when available as backup for USAF aircraft reconnaissance. Additionally, they may be flown on storms of research interest as desired by the Environmental Research Laboratories. All such flights will be assigned by CARCAH in the WSPOD.

2. Operational Control Aircraft. Operational control of reconnaissance aircraft will be exercised by the agency to which the aircraft is assigned. Aircraft of the 53d WRS will use call sign Gull and the 920th WRG will use call sign Teal.

3. Reconnaissance Planning and Flight Notification.

a. Requirements. SCC (WSFO) Washington or NMC will forward sortie/alert needs to CARCAH through SCC Miami for tasking in the Winter Storm Plan of the Day (WSPOD) within responsibilities stated above. CARCAH will advise SCC Washington or NMC of mission availability or nonavailability and expected responsiveness of USAF and RFC assets (see paragraph 3e(4) on responsiveness). SCC Washington will be responsible for requesting operational reconnaissance flights and NMC will be responsible for requesting predevelopment reconnaissance flights. NMC/SCC Washington will provide track, control point and not-earlier-than time specifications where feasible during coordination calls for succeeding day outlook.

(1) Operational Reconnaissance Requirements. SCC Washington will forward NWS operational reconnaissance needs for the next 24-hour period (0500Z-0500Z) and an outlook for the succeeding 24 hours. This request will be provided to CARCAH not later than 1830Z each day.

(2) Predevelopment Reconnaissance Requirements. NMC will forward their predevelopment storm mission requirements to CARCAH through SCC Miami not later than 1330Z each day. Vertical observation positions will be identified by NMC through CARCAH and will identify primary vertical observation requirements (approximately 450 nm intervals) and secondary vertical observation requirements, the latter to be accomplished as resources permit.

## CHAPTER 2

b. Changes to Requirements. Changes to mission requirements will be accepted by the appropriate point of contact based on the following guidelines:

(1) Early departures will not be requested.

(2) When notification is received more than 2 1/2 hours prior to scheduled aircraft departure:

(a) Changes to tracks will be limited to substitution of one track for another.

(b) Departure delays will be accepted provided the delay plus the flight plan time does not exceed 13 1/2 hours.

(3) When notification is received more than four hours prior to scheduled aircraft departure time, departure delay requests will be evaluated in accordance with appropriate flight management directives. Delays exceeding that specified in paragraph 3b(2)(b) may be accepted in certain circumstances.

(4) Point of contact for changes will be CARCAH except for minor changes noted in paragraph 3.b(5) below.

(5) Coordination of meteorological data requirements will be accomplished prior to each flight. The flight meteorologist responsible for the mission will contact the SCC Washington or NMC as appropriate via telephone approximately 2 1/2 hours prior to scheduled aircraft departure time. At this time, minor changes such as dropsonde release position may be accepted and specific areas of interest will be discussed.

c. Cancellation of Requirements. Cancellations will be accepted at any time; however, every effort should be made to cancel prior to scheduled aircraft departure time and as much in advance as possible to allow maximum resource conservation.

d. Satisfaction of Requirements.

(1) Requirements are considered satisfied when an observation is or could have been taken (as in the case where aircraft are diverted from original track) at the specified location within the interval from one hour prior to 30 minutes after scheduled time.

(2) Requirements will be considered as satisfied "late" when an observation is or could have been taken at the specified location more than 30 minutes after the scheduled time, but prior to the requirement expiration time.

(3) Normally, no credit will be given for early missions.

(4) The requesting agency (NMC and/or appropriate WSFO) will provide CARCAH a written assessment of the weather reconnaissance mission anytime its timeliness and quality is outstanding or substandard. These assessments should be mailed to:

OL G, HQS AWS  
P.O. Box 248286  
University of Miami  
Coral Gables, FL 33124

e. Reconnaissance Winter Storm Plan of the Day (WSPOD).

(1) Coordination. Following coordination with SCC Boston, SCC Miami, and NMC, the SCC Washington will provide WSPOD information to CARCAH. Direct discussion in weather situations is also encouraged between the Navy and WSFO Washington with respect to storm or storm threat situations. Navy point of contact is the FLEAWEACEN Norfolk Command Duty Officer and the optimum time is 1330 local. The following data will be provided to CARCAH when applicable:

- (a) Track desired.
- (b) Selected track point (Control Point) and time aircraft is required at the point.
- (c) Special observations or dropsonde release points.
- (d) Expiration time of requirement (time mission is regarded as dropped).
- (e) Alert aircraft/crew requirement.

(2) Preparation. Utilizing requirements stated by WSFO Washington, CARCAH will prepare the WSPOD as required throughout the season in coordination with the Air Force and RFC to effect maximum useful data from available resources. Format will be as shown in Appendix 2-C.

(3) Dissemination. The WSPOD will be made available in message form to all appropriate agencies that provide support to or exercise control of the missions. CARCAH will be responsible for disseminating the WSPOD by 2000Z on the day preceding the planned requirement. Amendments will be disseminated as required. Negative WSPODs will not be disseminated.

## CHAPTER 2

### (4) Responsiveness.

(a) Notification of requirements must occur early enough to allow 16 hours plus en route flying time to the control point.

(b) The Succeeding Day Outlook portion of the WSPOD is designed to allow advance notification.

(c) When circumstances do not allow the appropriate notification lead time, the mission will be levied as "resources permitting."

### 4. Reconnaissance Flights.

#### a. General Storm Tracks.

(1) Air Force tracks Gull/Teal Bravo, Golf, and Juliet (Appendix 2-A) will normally be flown during storm situations or storm threat. GULL/TEAL Delta will be requested by NMC for predevelopment storm missions.

(2) Within operational limitations and with prior ARTCC approval, airborne diversions deemed advisable by the airborne meteorologist may be made from these tracks.

(3) Permanent changes to winter storm reconnaissance tracks must be coordinated with and approved by the appropriate FAA ARTCCs at least 30 days in advance of the implementation date.

b. Flight Plans. The flight plans for reconnaissance flights will be filed with FAA as soon as practicable before departure time.

c. Flight Levels. Reconnaissance aircraft will fly only at ARTCC assigned altitudes and will accept flight level changes when requested by FAA.

d. Dropsonde Releases. Dropsonde instrument releases will be coordinated with the appropriate ARTCC at least 10 minutes before droptime, except for those outside of controlled airspace which do not require coordination.

#### e. Air Traffic Control Clearances.

(1) Air Traffic Control clearances, unless otherwise coordinated prior to the flight with the responsible ATC facility, will provide ATC separation between all aircraft operating on storm missions and between these aircraft and other non-participating aircraft operating within controlled airspace. Mission commanders should be aware that non-participating aircraft may be operating over and nearby the storm area, thus adherence to ATC clearances is mandatory for safety purposes.

(2) Air Traffic Control, as a routine procedure, increases the vertical separation maintained between aircraft when reports from pilots indicate their inability to maintain assigned altitudes due to turbulence. Pilots should be aware, however, that unless such reports are received, only normal vertical separation of 1,000 feet below FL290 and 2,000 feet above FL290 will be provided by ATC to aircraft operating in the storm area. Thus, the fact that storm-mission aircraft have filed flight plans and are operating 5,000 or 10,000 feet apart, does not imply that the altitudes (flight levels) in between may not be in use by non-storm aircraft.

(3) Any procedures desired by storm-mission commanders concerning ATC separation which is outside of the above parameters must be specifically coordinated with the ATC center(s) of concern.

f. Data Requirements. Data requirements are defined in Table 2-1. Data will be coded and transmitted in standard RECCO (flight level observations) or WMO TEMP DROP (dropsonde soundings) format.

(1) Appended to the first observation will be plain language remarks stating departure station (ICAO four letter identifier), time of departure and ETA at control point.

Example:

```
AF987 GULL BRAVO OB 1
97779 ... 93/// DPTD KBIX 10/0845Z ETA 37.3N 72.3W
10/1210Z
```

(2) Appended to the last observation will be plain language remarks stating ETA and intended arrival station (ICAO four letter identifier), number of observations, and monitor that copies observations.

Example:

```
AF968 TEAL JULIET OB 14
97779 ... 91///
95559 ... ETA KBIX 17/2300Z OBS 1 THRU 14 to KMIA
```



TABLE 2-1. REQUIREMENT FOR AIRCRAFT RECONNAISSANCE DATA

Data required	Altitudes at which data are required	Areal portion of cyclone or environment in which data are needed	Time and frequency of observations	Accuracy required
Synoptic data-- pressure (heights), temperature, moisture, and winds--for national weather prediction and medium-range forecasting.	At altitudes required on the specified track or as indicated in the WSPOD.	Throughout the marine portion of east coast area as defined in Chapter 2.	Dropsondes as specified in Plan of the Day (predevelopment missions drop interval* approxi- mately 200nm*) Horizontal observations approximately every 100-120nm unless specified otherwise in WSPOD. Midpoint obser- vations will be appended to each horizontal observation. (No inter- mediate observations required on predevelop- ment flights.)	± 5 kt, ± 10° (Wind Direction) ± 1°C ± 20 m ± 2 mb Position within 20 nm
Location and strength of radar echoes	Any level.	All sectors.	When available.	Position within 20nm
Ocean wave heights and wave lengths, sea surface wind estimates.	Sea surface.	All quadrants.	Every horizontal observation at or below 700 mb.	± 10% (wave height) ± 10 ft (wave length) 5 kt (Wind speed) 10 (Wind direction)

\*See Chapter 1, paragraph 2b for USAF capability.

AIR FORCE TRACK GULL/TEAL BRAVO

LOCATION IDENTIFIER	COORDINATE	ALT	AIRSPEED
#MOB	3044N 8822W	10000 Ft	240
MGM	3213N 8619W	18000 Ft	265
MCN	3214N 8339W	18000 Ft	265
CHS	3254N 8002W	18000 Ft	265
WX01	3243N 7920W	6000 Ft	235
SMELT WX02	3159N 7700W	6000 Ft	235
LAMBERT WX03	3148N 7418W	6000 Ft	235
WX04	3325N 7334W	6000 Ft	235
PERCY WX05	3500N 7245W	6000 Ft	235
WX06	3700N 7226W	6000 Ft	235
ARCHER	3720N 7221W	6000 Ft	235
TUNNA WX07	3855N 7207W	6000 Ft	235
SHALL	3949N 7306W	6000 Ft	235
MANTA WX08	3954N 7332W	6000 Ft	235
SIE	3906N 7448W	6000 Ft	235
SWL	3803N 7528W	6000 Ft	235
WX09	3700N 7603W	6000 Ft	235
ORF	3654N 7612W	18000 Ft	265
RDU	3552N 7847W	18000 Ft	265
SPA	3502N 8156W	18000 Ft	265
MGM	3213N 8619W	18000 Ft	265
*MOB	3044N 8822W	18000 Ft	265
BIX DEST.	3025N 8855W	5000 Ft	230



AIR FORCE TRACK GULL/TEAL BRAVO ALTERNATE

LOCATION IDENTIFIER	COORDINATE	ALTITUDE	AIRSPEED
---------------------	------------	----------	----------

(ORIGINAL TRACK THROUGH SIE)

SHADS WX09	3742N 7300W	6000 Ft	235
CROAK	3657N 7300W	6000 Ft	235
WX 10	3654N 7500W	6000 Ft	265

THEN, ORF AND ORIGINAL TRACK (TRACK MAY BE FLOWN IN REVERSE)

(TRACK MAY BE FLOWN IN REVERSE)

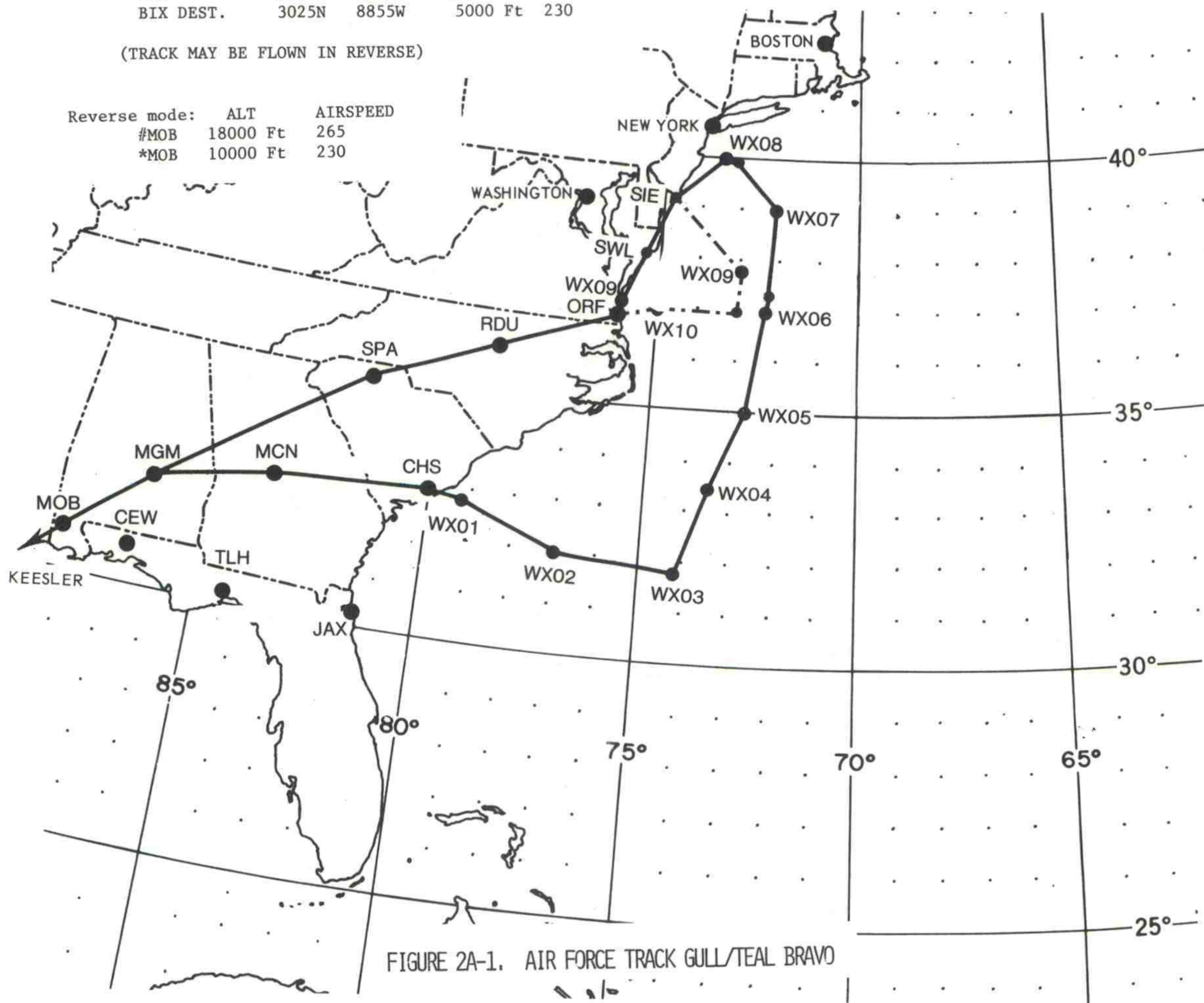
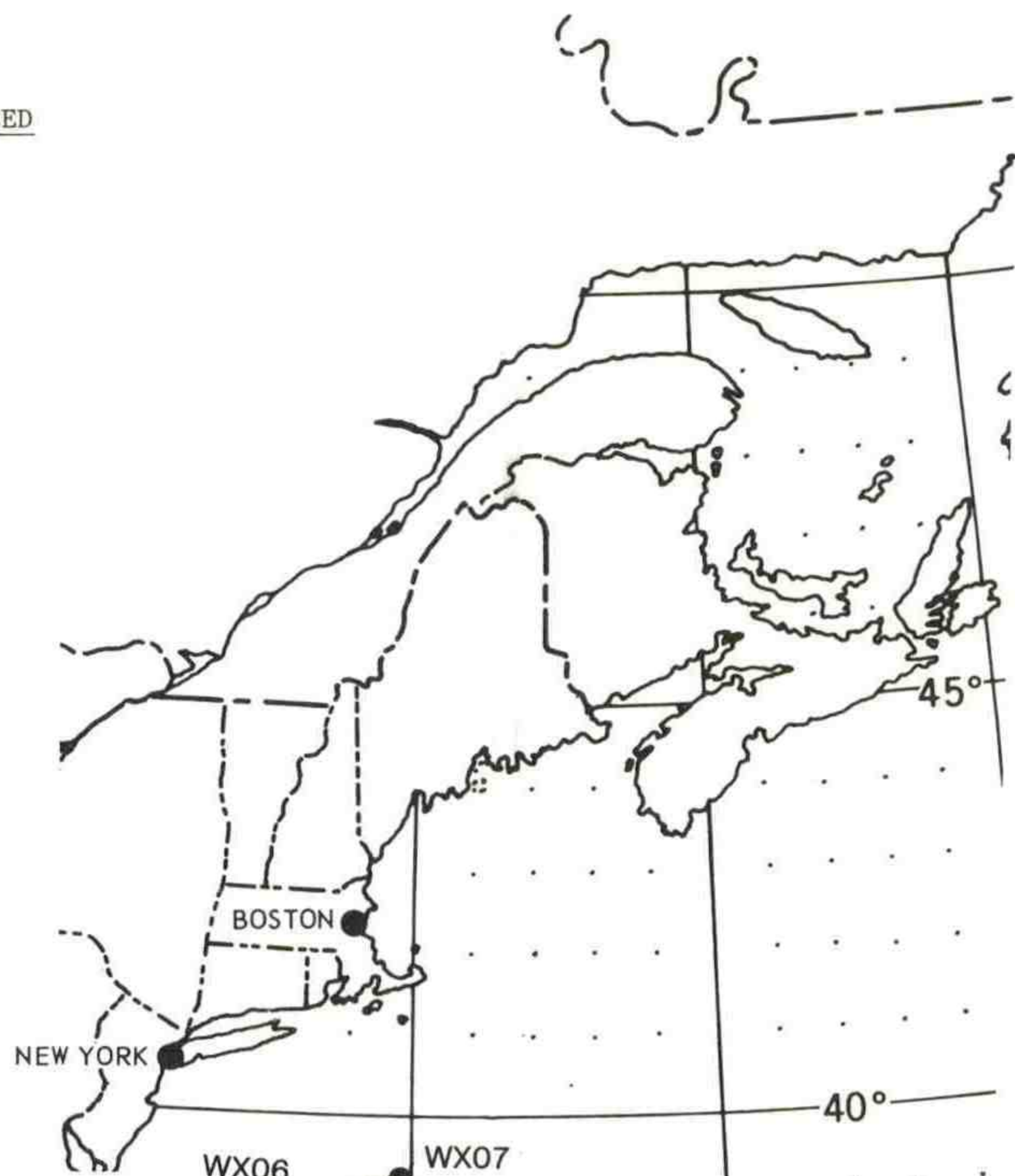


FIGURE 2A-1. AIR FORCE TRACK GULL/TEAL BRAVO

CHAPTER 2  
APPENDIX A

AIR FORCE TRACT GULL/TEAL DELTA

LOCATION IDENTIFIER	COORDINATE		ALTITUDE	AIRSPEED
BIX DEPARTURE	3025N	08855W		
MOB	3044N	08822W	5000 Ft	230
MGM	3213N	08619W	24000 Ft	280
MCN	3241N	08339W	24000 Ft	280
CHS	3254N	08002W	24000 Ft	280
WX01	3249N	07940W	24000 Ft	280
SMELT WX02	3159N	07700W	24000 Ft	280
LAMBERT WX03	3148N	07418W	24000 Ft	280
WX04	3406N	07313W	31000 Ft	250
PERCY	3500N	07245W	31000 Ft	285
WX05	3628N	07232W	31000 Ft	285
TUNNA WX06	3855N	07207W	31000 Ft	285
GOLD WX07	3913N	07014W	31000 Ft	285
ROY WX08	3632N	06924W	31000 Ft	285
GEORGE WX09	3413N	06848W	31000 Ft	285
LANDRY WX10	3150N	06805W	31000 Ft	285
CLARK	3131N	06955W	31000 Ft	285
WX11	3123N	07100W	31000 Ft	285
CHALMERS	3057N	07334W	31000 Ft	285
WX12	3054N	07400W	31000 Ft	285
TROUT WX13	3023N	07700W	31000 Ft	285
CARPS	3024N	07744W	31000 Ft	285
SQUID	3025N	07804W	31000 Ft	285
WX14	3027N	08000W	31000 Ft	285
JAX	3027N	08134W	31000 Ft	285
TLH	3033N	08422W	31000 Ft	285
CEW	3050N	08641W	31000 Ft	285
MOB	3044N	08822W	31000 Ft	285
BIX/DEST	3025N	08855W	10000 Ft	230



Note: Horizontal observations are prefixed by 'WX'.  
This flight plan used for predevelopment storm missions.

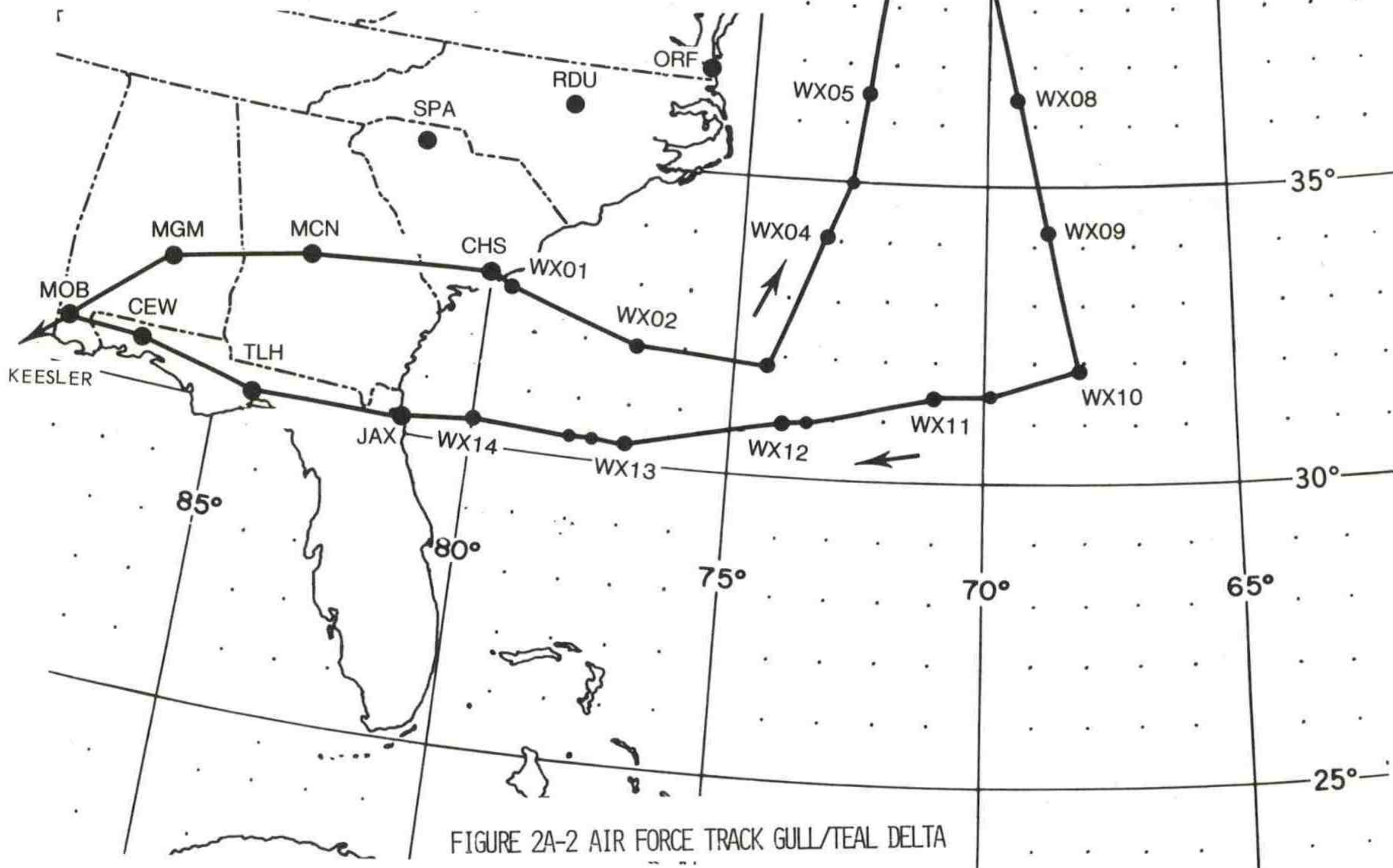
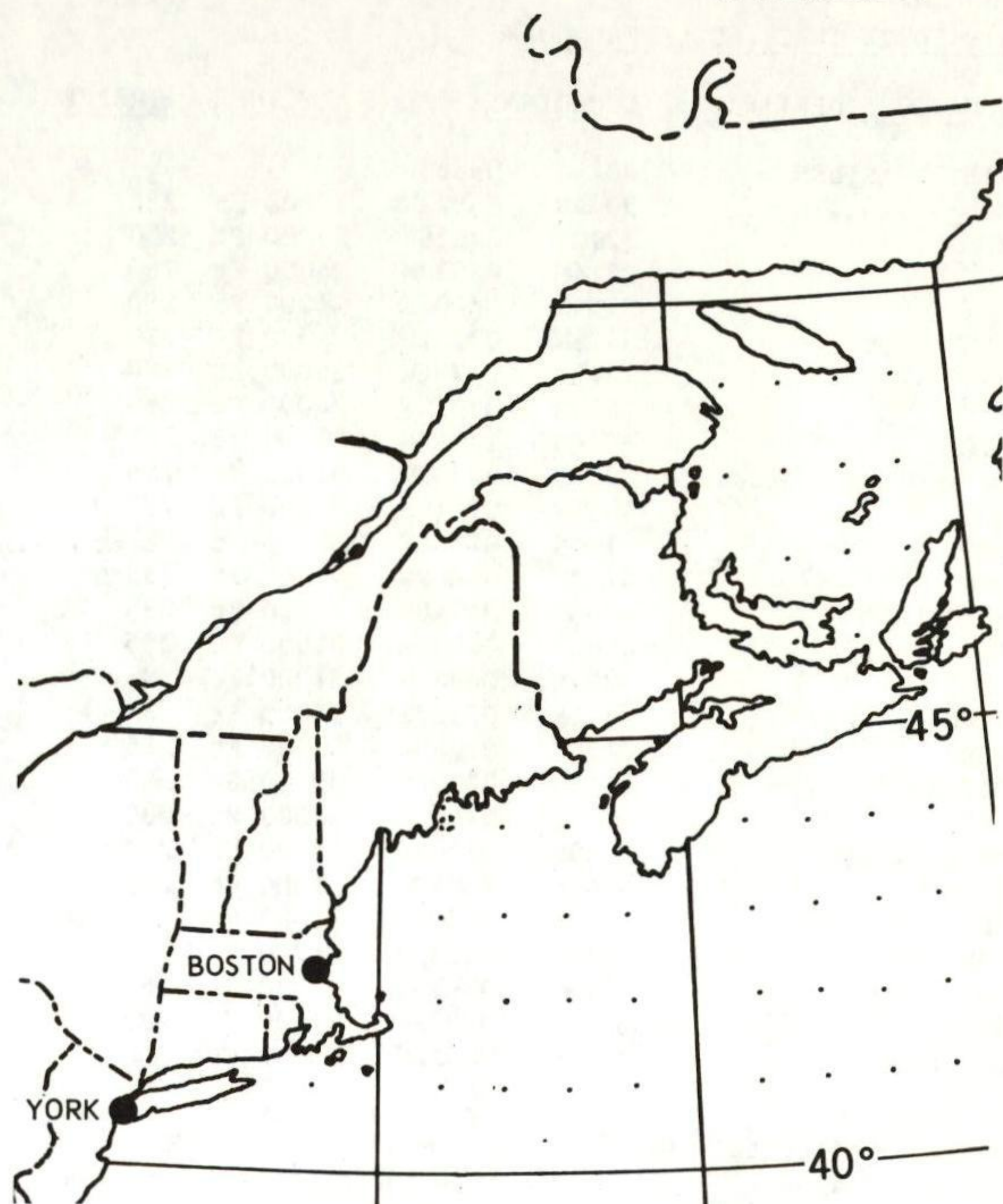


FIGURE 2A-2 AIR FORCE TRACT GULL/TEAL DELTA

AIR FORCE TRACK GULL/TEAL DELTA (REVERSE)

LOCATION IDENTIFIER	COORDINATE	ALT	AIR SPEED
BIX DEPARTURE PT	3025N 08855W		
MOB	3044N 08822W	10000 Ft	230
CEW	3050N 08641W	24000 Ft	280
TLH	3033N 08422W	24000 Ft	280
JAX	3027N 08134W	24000 Ft	280
WX14	3027N 08000W	24000 Ft	280
SQUID	3025N 07804W	24000 Ft	280
CARRS	3024N 07744W	24000 Ft	280
TROUT/WX13	3023N 07700W	24000 Ft	280
WX12	3054N 07400W	24000 Ft	280
CHALMERS	3057N 07334W	24000 Ft	280
WX11	3123N 07100W	31000 Ft	285
CLARK	3131N 06955W	31000 Ft	285
LANDRY WX10	3150N 06805W	31000 Ft	285
GEORGE WX09	3413N 06848W	31000 Ft	285
ROY WX08	3632N 06924W	31000 Ft	285
GOLD WX07	3913N 07014W	31000 Ft	285
TUNNA WX06	3855N 07207W	31000 Ft	285
WX05	3628N 07232W	31000 Ft	285
PERCY	3500N 07245W	31000 Ft	285
WX04	3406N 07313W	31000 Ft	285
LAMBERT WX03	3148N 07418W	31000 Ft	285
SMELT WX02	3159N 07700W	31000 Ft	285
WX01	3249N 07940W	31000 Ft	285
CHS	3254N 08002W	31000 Ft	285
MCN	3241N 08339W	31000 Ft	285
MGM	3213N 08619W	31000 Ft	285
MOB	3044N 08822W	31000 Ft	285
BIX/DEST	3025N 08855W	10000 Ft	230



Note: Horizontal observations are prefixed by 'WX'.  
This flight plan used for predevelopment storm missions.

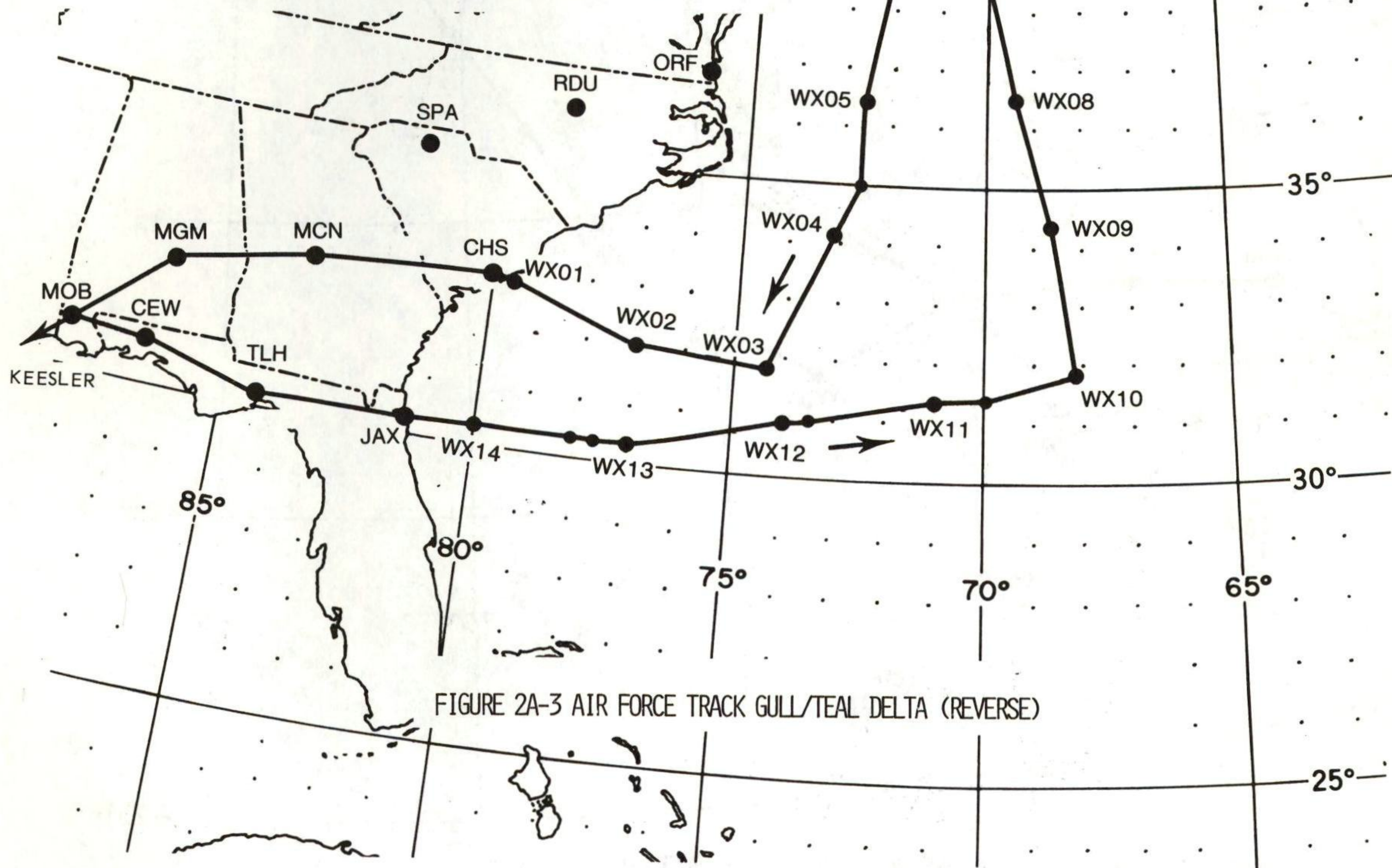


FIGURE 2A-3 AIR FORCE TRACK GULL/TEAL DELTA (REVERSE)

CHAPTER 2  
APPENDIX A

AIR FORCE TRACK GULL/TEAL GOLF

GOLF ALTERNATE

LOCATION IDENTIFIER	COORDINATE	ALTITUDE	AIRSPEED	ALTITUDE	AIRSPEED
BIX DEPARTURE	3025N 08855W				
MOB	3044N 08822W	10000 Ft	230	10000 Ft	230
MGM	3213N 08619W	24000 Ft	280	24000 Ft	280
MCN	3214N 08339W	24000 Ft	280	24000 Ft	280
CHS	3254N 08002W	24000 Ft	280	24000 Ft	280
ILM	3421N 07752W	24000 Ft	280	24000 Ft	280
HAH	3442N 07736W	24000 Ft	280	24000 Ft	280
ORF	3654N 07612W	24000 Ft	280	24000 Ft	280
SIE	3906N 07448W	31000 Ft	285	31000 Ft	285
TP/WX01	3955N 07333W	31000 Ft	285	31000 Ft	285
HTO	4055N 07219W	31000 Ft	285	31000 Ft <td 285	
WX02	4106N 07100W	31000 Ft	285	31000 Ft	285
ACK	4117N 07002W	31000 Ft	285	31000 Ft	285
HERON WX03	4200N 06748W	31000 Ft	285	31000 Ft	285
TP/WX04	4000N 06800W	31000 Ft	285	6000 Ft	235
WX05	3827N 06943W	31000 Ft	285	6000 Ft	235
BERMAN WX06	3645N 07127W	31000 Ft	285	6000 Ft	235
WX07	3450N 07245W	31000 Ft	285	6000 Ft	235
PITMAN	3415N 07307W	31000 Ft	285	6000 Ft	235
WX08	3319N 07445W	31000 Ft	285	6000 Ft	235
SMELT/WX09	3159N 07700W	31000 Ft	285	6000 Ft	235
WX10	3249N 07940W	31000 Ft	285	24000 Ft	280
CHS	3254N 08002W	31000 Ft	285	24000 Ft	280
MCN	3214N 08339W	31000 Ft	285	24000 Ft	280
MGM	3213N 08619W	31000 Ft	285	24000 Ft	280
MOB	3044N 08822W	31000 Ft	285	24000 Ft	280
BIX/DEST	3025N 08855W	10000 Ft	230	10000 Ft	230

Note: Horizontal observations are prefixed by 'WX'.  
Midpoint observations will be taken between each horizontal weather observation.

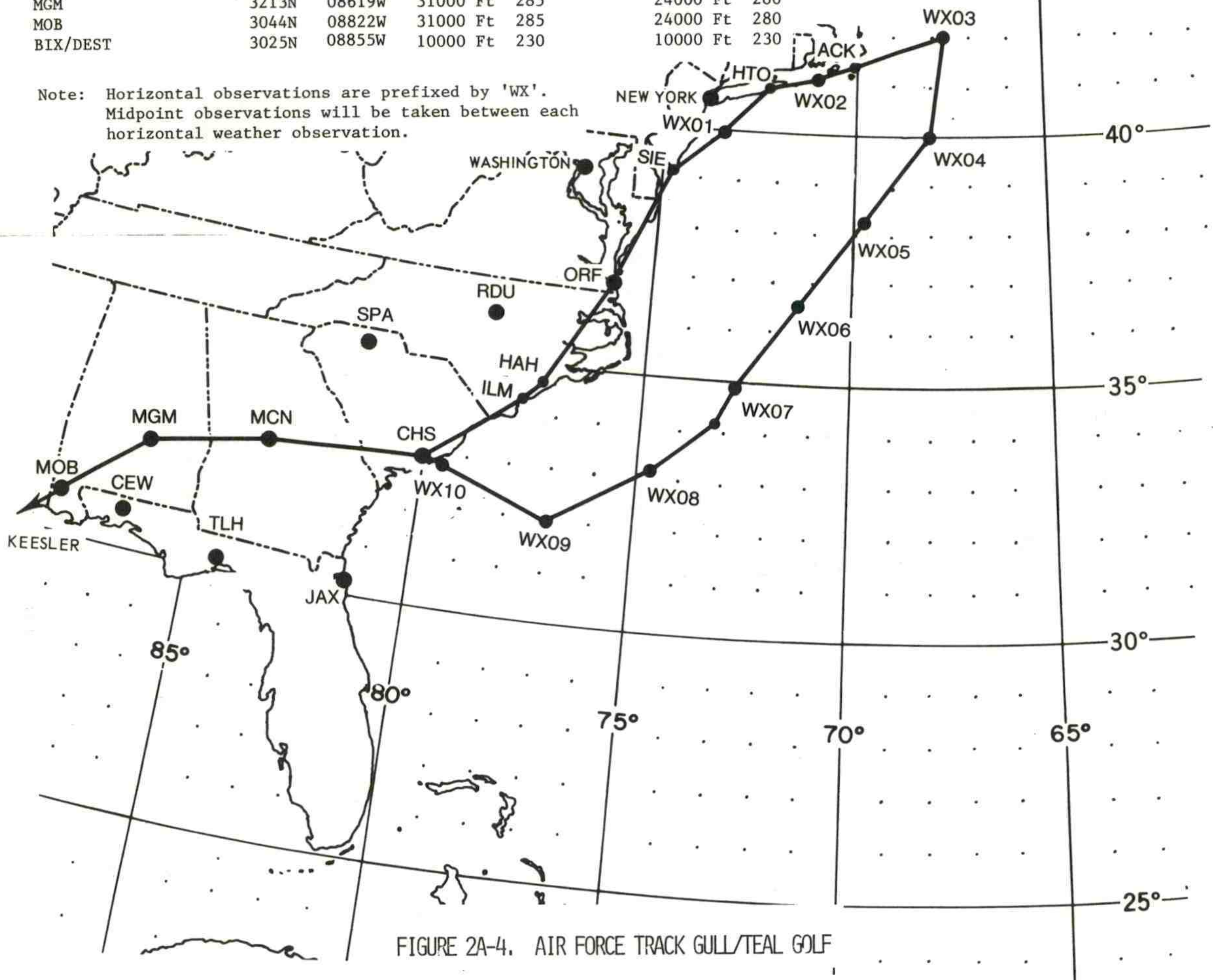


FIGURE 2A-4. AIR FORCE TRACK GULL/TEAL GOLF

AIR FORCE TRACK GULL/TEAL JULIET

LOCATION IDENTIFIER	COORDINATE	ALTITUDE	AIRSPEED
MOB	3044N 8822W	10000 Ft	240
TLH	3032N 8420W	18000 Ft	265
JAX	3027N 8134W	18000 Ft	265
WX01	3027N 8118W	6000 Ft	235
WX02	3027N 7910W	6000 Ft	235
TROUT WX03	3023N 7700W	6000 Ft	235
USHER WX04	3045N 7448W	6000 Ft	235
LAMBERT	3148N 7418W	6000 Ft	235
WX05	3300N 7348W	6000 Ft	235
PERCY WX06	3500N 7245W	6000 Ft	235
WX07	3700N 7227W	6000 Ft	235
ARCHER	3720N 7221W	6000 Ft	235
TUNNA	3855N 7207W	6000 Ft	235
ARCHER	3720N 7221W	18000 Ft	265
WX08	3700N 7227W	18000 Ft	265
PERCY WX09	3500N 7245W	18000 Ft	265
WX10	3300N 7348W	18000 Ft	265
LAMBERT	3148N 7418W	18000 Ft	265
USHER WX11	3045N 7448W	18000 Ft	265
TROUT WX12	3023N 7700W	18000 Ft	265
WX13	3027N 7910W	18000 Ft	265
WX14	3027N 8118W	18000 Ft	265
JAX	3027N 8134W	18000 Ft	265
TLH	3032N 8420W	18000 Ft	265
MOB	3044N 8822W	18000 Ft	265
BIX	3025N 8855W	5000 Ft	230

Note: Horizontal observations are prefixed by 'WX'.  
Midpoint observations will be taken  
between each horizontal weather  
observation.

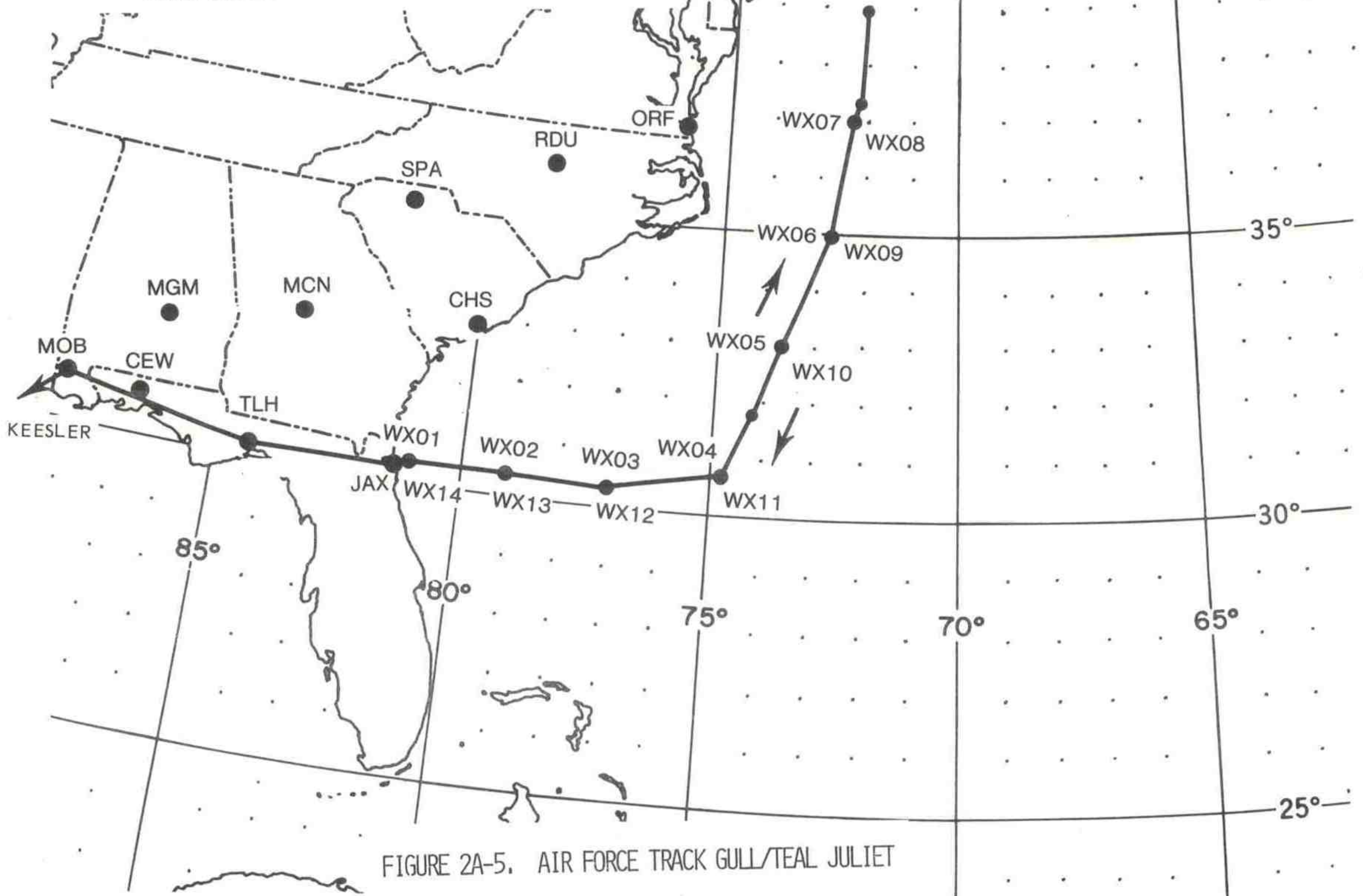


FIGURE 2A-5. AIR FORCE TRACK GULL/TEAL JULIET

CHAPTER 2  
APPENDIX B

WINTER STORM PLAN OF THE DAY FORMAT

O/R     (DTG)      
FM OLG AWS CORAL GABLES FL/CARCAH  
TO (MAC APPROVED MILITARY ADDRESSEES)/(NOAA ADDRESSEES VIA GT7072)/NOUS 42/ARTCC  
BT  
UNCLAS  
SUBJECT: RECONNAISSANCE WSPOD FM     (DTG)     TO     (DTG)      
(AMENDMENT NR     ) FOLLOWS

1. FLIGHT NR                     
  - A.     (CONTROL POINT)/(TIME)Z
  - B.     (MISSION IDENTIFIER\*)
  - C.     (ETD)
  - D.     (DEPARTURE STATION)
  - E.     (EN ROUTE ALTITUDE)
  - F.     (TRACK)
  - G.     (EXPIRATION TIME OF REQUIREMENT)
  - H.     (REMARKS)
  
2.     (OUTLOOK FOR SUCCEEDING DAY)    
  - a.     (ANTICIPATED TRACK)
  - b.     (CONTROL POINT)
  - c.     (CONTROL POINT TIME--NOT EARLIER THAN)

\*IDENTIFIER ASSIGNED BY CARCAH FOR WEATHER DATA IDENTIFICATION.  
MISSION IDENTIFIERS WILL INCLUDE THE WORDS "TEAL" FOR THE 920WRG,  
"GULL" FOR THE 53WRS, AND "NOAA" FOR THE RFC.

OBSERVATIONS

1. The observational system used in support of the East Coast Winter Storms Operations Plan is a mixture of land surface, ship, radar, buoys, and upper air networks, plus a series of satellites. The routine operations of these various data sources are detailed in the following series of Federal Handbooks and Plans:

Federal Meteorological Handbook Number 1, Surface Observations  
 Federal Meteorological Handbook Number 7, Weather Radar  
 Observations  
 National Weather Service Weather Radar Manual  
 Operations of the National Weather Service  
 Federal Meteorological Handbook Number 2, Synoptic  
 Observations  
 Federal Plan for Environmental Data Buoys  
 Federal Meteorological Handbook Number 4, Radiosonde Code  
 The GOES/SMS User's Guide

Procedures for obtaining special or non-routine observations required in support of winter storm detection and forecasting, while covered to some extent in these documents, are described in detail in Weather Service Operations Manual Chapter B-90, Special Warning Program Observations. This chapter covers observational programs of the several agencies involved.

The only observational programs which will be covered in any detail here are the two data sources which are still considered somewhat unique and/or were established particularly to help in the winter storm analysis and forecast problem.

## 2. Satellite Observations

a. Department of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite Service (NESS).

(1) The following types of data from satellites are available for surveillance of storms:

(a) Direct readout of scanning radiometer data from NOAA-5 (137.5 MHz) is available to the Automatic Picture Transmission (APT) System at approximately 900 and 2100 Local Standard Time. The NOAA-4 spacecraft (137.62 MHz) is on "standby" mode.

(b) Very High Resolution Radiometer (VHRR) data from NOAA-5. See 2.a.(1)(a) about NOAA-4.

(c) Full earth disc, visible (VIS) and infrared (IR), as well as visible and equivalent IR sectors from GOES EAST. Data will be made available to WSFO's (and other users) in near real time through the Central Data Distribution System (CDDS) via the Washington Satellite Field Services Station (DCA SFSS) at the World Weather Building (WWB).



## CHAPTER 3

(2) The improved TIROS operational satellite, (NOAA-5) provides the following types of data:

(a) Direct readout of visible and IR data from the Scanning Radiometer at 0900 and 2100 local time, respectively.

(b) Stored visible and IR data from the Scanning Radiometer at 0900 and 2100 local time, respectively.

(c) Atmospheric soundings from the Vertical Temperatures Profile Radiometer (VTPR) at 0900 and 2100 local time.

(d) Data from the VHRR. This instrument is similar to the Scanning Radiometer and produces data of higher resolution (0.5 nautical mile at subpoint for both visible and IR data compared to 2 nautical miles for visible and 4 nautical miles for IR from the scanning radiometer). The data from the VHRR for 0900 and 2100 local time are available in near real time from the SFSS.

(e) See Section 2.a.(1)(a) about NOAA-4.

(3) The Geostationary Operational Environmental Satellite (GOES), is the primary source of satellite information for the East Coast. Data from this satellite are available at the NESS/SFSSs at Washington and Miami, which are co-located with the Washington WSFO and the Miami NHC respectively. All data from GOES presently available to the Eastern Region are listed in the GOES/SMS User's Guide.

(4) All satellite data for the East Coast are available at the National Environmental Satellite Service (NESS), World Weather Building, Marlow Heights, Md. The APT and Direct Readout Scanning Radiometer data are available to those stations possessing direct readout receivers. Stored Scanning Radiometer data are transmitted in digitized mapped format or facsimile circuits.

(5) Meteorologists of the NESS Synoptic Analysis Section personally confer with meteorologists of the NMC concerning current and probable future direction and speed of winter storms based on satellite data and numerical forecasts. Differences between the numerical forecasts and indications from satellite data are discussed in detail. The possibility of turbulence, icing, and precipitation amounts are also discussed.

(6) The DCA SFSS co-located with the NWS Washington WSFO, is available to all Eastern Region stations via phone (area code 301, 763-8425 or 8424) 24 hours/day, seven days a week. Oceanographic and Meteorological advice and analysis are provided.

(7) Satellite Interpretation Messages (SIM) from the SFSSs at DCA and MKC are available through the FAA Request/Reply, RAWARC, and Service "C" teletype circuits. All WSFOs in the Eastern and Central Regions receive these automatically as transmitted from the SFSSs. However, other users such as those WSOs which are co-located with FAA-FSS may also have access to these SIMs by using the standard Request/Reply teletype capabilities of the FAA-FSS. For receipt of Eastern Region SIMs the code is: RC TBXX6 KWBC. For receipt of the Central Region SIMs it is: RC TBXX6 KMKC. The DCA SFSS prepares routine SIMS at 0300, 0900, 1500, and 2100; updated SIMS are issued at 0600, 1200, and 1830 local time "as required" by weather conditions. The MKC SFSS prepares SIMs at 0200Z, 0800Z, 1400Z, and 2000Z.

(a) The DCA SFSS prepares Satellite Cloudtop and Tropopause (SCAT) messages which contain information on cloud top heights, cloudtop temperatures, and associated tropopause heights over areas of interest throughout the Eastern Region. The SCAT carries the heading TBXX10 KWBC and can be accessed similar to the SIM as outlined in section 2.a.(7)(a) above. Issued times are 0530Z, 1130Z, 1730Z, 2330Z.

(b) The DCA SFSS prepares and issues a daily message on snow and ice cover within its area of responsibility. The TBXX11 KWBC is issued at approximately 2130Z daily (Monday through Friday) during the winter season. This message is a "verbal nephanalysis" of existing ground snow and river ice cover and any major changes (plus or minus) since the previous day. This message can also be accessed similar to the SIM as outlined in section 2.a.(7)(a) above.

(8) That imagery of particular interest to the support of East Coast winter storms is shown in Fig. 3-1. Complete imagery available from the SFSSs can be found in The GOES/SMS User's Guide.

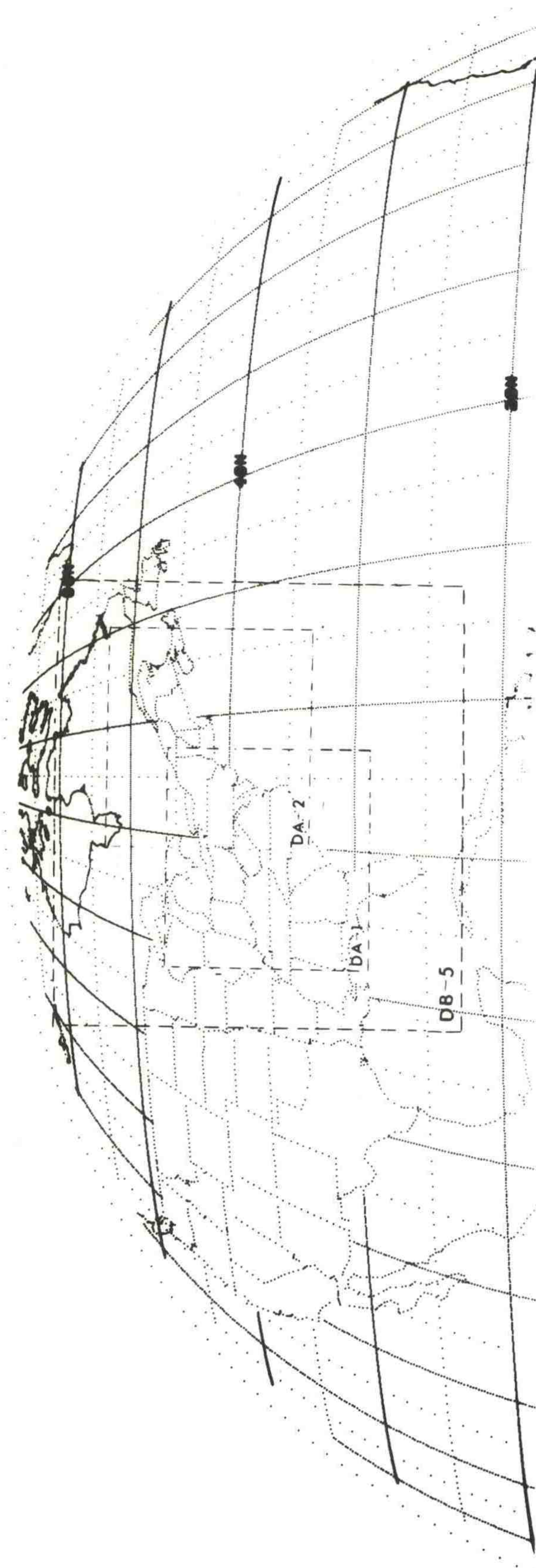
#### b. Department of Defense

(1) The Defense Meteorological Satellite Program (DMSP) routinely has two satellites collecting meteorological imagery and vertical temperature profile data. One satellite is in an early morning/evening orbit, approximately 0700/1900 local equator crossing time. The second is in a noon/midnight orbit, approximately 1200/2400 local equator crossing time. Normal data acquisition covering the East Coast Winter Storm's area is as follows:

(a) Two nautical mile resolution visual (0.4-1.1  $\mu\text{m}$ ) and infrared (8-13  $\mu\text{m}$ ) day and nighttime data, and vertical temperature profile data.

(b) One-third nautical mile resolution visual (0.4-1.1  $\mu\text{m}$ ) and/or one-third nautical mile resolution infrared (9-13  $\mu\text{m}$ ) data.

(2) Special requests for DMSP support will be addressed to the Air Force Global Weather Central operations officer.



GOES-1 EAST COAST IMAGERY FOR SUPPORT OF WINTER STORMS OPERATIONS

**FROM WASHINGTON SFSS:**

- 1. FULL DISC IR
- 2. DB5 VIS & EQUIV IR
- 3. DA-1 AND DA-2 VIS ONLY
- 4. TWO FLOATERS (CAPABLE OF PROVIDING VIS OR EQUIV IR AT 1/2, 1, OR 2 MI RESOLUTION)

**FROM MIAMI SFSS:**

- 1. FULL DISC IR
- 2. TWO FLOATERS (CAPABLE OF PROVIDING VIS OR EQUIV IR AT 1/2, 1, OR 2 MI RESOLUTION)

FIG 3-1

3. Environmental Data Buoy Observations. Through its National Data Buoy Office (NDBO), NOAA operates environmental data buoys which provide meteorological and oceanographic data. (See figure 3-2 for location of data buoys off the U. S. east coast.) Normally, synoptic data are reported once every three hours but may be requested on an hourly basis. Data are relayed to NMC via GOES and the satellite ground station at Wallops Island, Va.

a. Special Requests for Data. Requests for reports of hourly data during critical storm periods will be accommodated by telephone requests to the Miami Radio Station duty officer, 305-233-2743 (FTS 350-4750). The start and stop time for special hourly reports should be given and limited to 24 hour consecutive operation unless an emergency exists. In an emergency, the NDBO should also be consulted, telephone 601-688-2800 or FTS 494-2800.

b. Data Provided by Buoys. The parameters measured are sea level pressure, wind direction and speed, air temperature, sea surface temperature and wave height spectral data (except EB-34 and EB-63). Significant wave height and average period are obtained for standard reporting codes from wave height spectral data. Subsurface water temperatures to 300 meters are experimentally measured from the large discus buoys. The data are sampled digitally and averaged over an 8 to 10 minute period.

c. International Identifiers. The international identifiers for data buoys (approved by the WMO) are as follows:

<u>EB Numbers</u>	<u>International Identifiers</u>
EB-01	44001
EB-07	44007
EB-15	41015
EB-34	44034
EB-41	44041
EB-63	44063

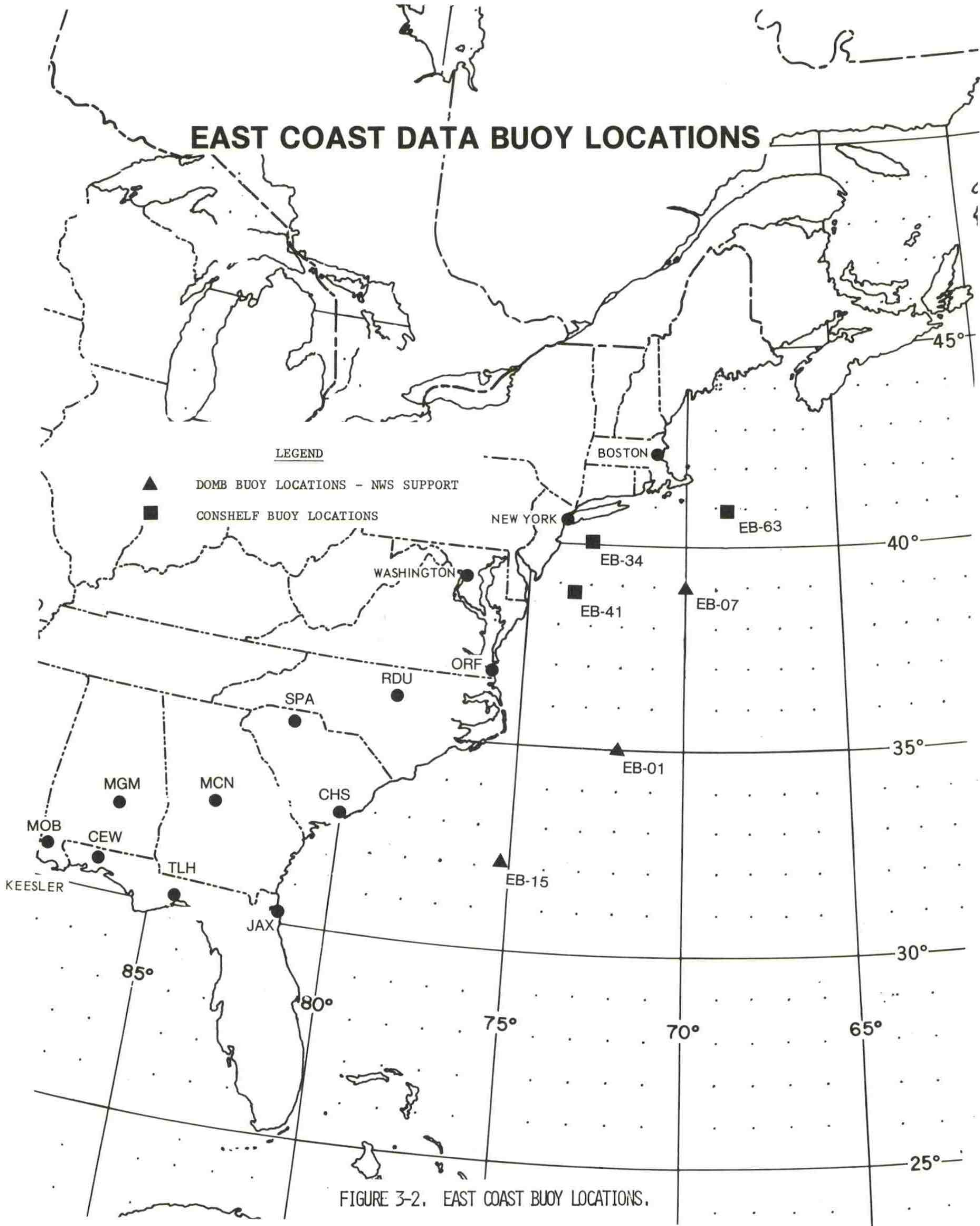


FIGURE 3-2. EAST COAST BUOY LOCATIONS.

COMMUNICATIONS1. Department of Commerce.a. National Weather Service.

All of the communication systems in use by the National Weather Service are used in support of the data collection and warning program given in this plan. These communication systems are described in the publication, Operations of the National Weather Service.

b. Research Facilities Center.

The RFC will use the communications facilities of the Air Force described in Appendix 4-A.

2. Department of Defense.

a. The Air Force's COMEDS Circuit will be used for collection and distribution of east coast winter storms information received from WSFO Washington. The Air Force's Automated Weather Net (AWN) will be used for the exchange of data between NOAA and DOD.

b. The USAF East Coast Winter Storms Reconnaissance Communications Support Plan is contained in Appendix 4-A.

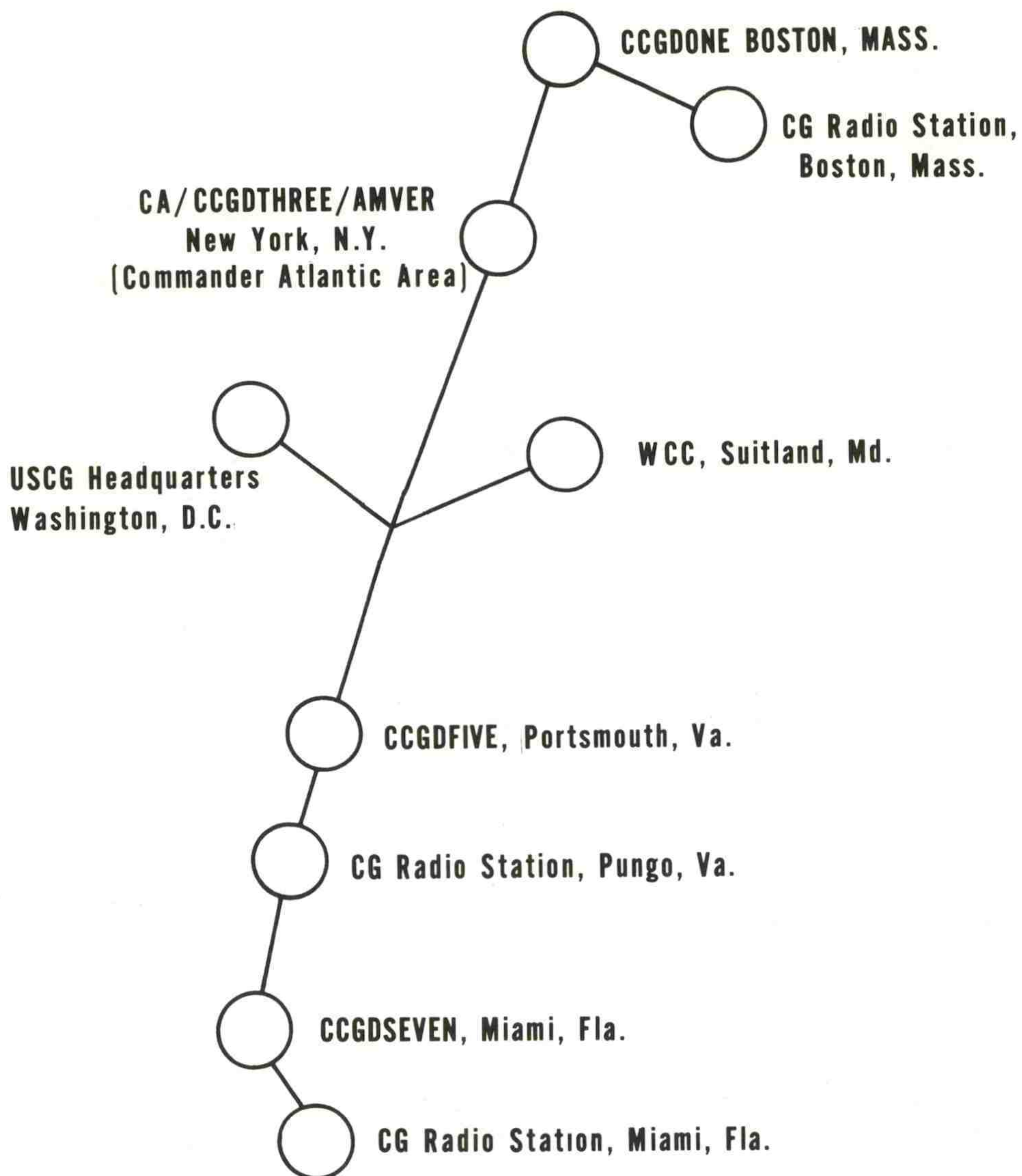
c. The Common Communication Capabilities of DOD and the National Weather Service are contained in Appendix 4-B.

3. U.S. Coast Guard.

a. Weather Reporting and Data Collection. The Coast Guard operates numerous activities which routinely report or collect meteorological data. Those units which will provide data inputs for this program are as follows:

(1) Radio Stations.

(a) Coast Guard communications facilities at Boston, Portsmouth (northwest), Va., Miami, and San Juan collect AMVER and METEO messages from merchant vessels on a routine basis. The METEO data are then passed directly to the NMC Suitland over various teletypewriter circuits such as GT7990. Figure 4-1 shows the applicable east coast commands which have terminations on this circuit.



Note 1. All stations have send/receive capabilities.

Note 2. CCGD Commander, Coast Guard District.

Note 3. CA: Commander, Atlantic Area.

FIGURE 4-1. SEARCH & RESCUE CIRCUIT (SARLANT) GT 7990

AIRCRAFT RECONNAISSANCE COMMUNICATIONS

1. General. USAF and NOAA aircraft will transmit reconnaissance observations using HF single side band radio through the USAF aeronautical station complex to the appropriate weather reconnaissance data monitor. Weather monitors will evaluate these reports and disseminate them.

2. Air/Ground Communications. The USAF aeronautical station contact will depend upon aircraft location and radio propagation conditions. Initial contact frequencies are as published in appropriate enroute flight publications. After initial contact, aeronautical stations will provide a discreet frequency for mission use if possible. Aircrew relay of weather reconnaissance data will be by direct phone-patch to the weather monitor. Specific radio procedures and terminology will be as described in Allied Communications Publication (ACP) 125. USAF has authorized the use of "Immediate" precedence for transmission of winter storm reconnaissance data as follows:

PRIMARY

Direct phone-patch  
between aircraft and  
the Gull Weather monitor  
through any aero station.

SECONDARY

Direct phone-patch  
between aircraft and  
any weather monitor  
through any aero station.



ORGANIZATIONAL COMMUNICATION CAPABILITIES

<u>STATION</u>	<u>AUTODIN ADDRESS</u>	<u>TELETYPE</u>	<u>PHONE NUMBER</u>
CARCAH / GULL WX MONITOR	OL G HQ AWS CORAL GABLES, FL	A, B	AV 894-3430 FTS 350-5547/4265 COMM 305-666-4612
ALT GULL WX MONITOR	DET 7 24 WS MATHER AFB CA	B	AV 894-1150 (monitor only)
SCC MIAMI	NAT HURR CNTR CORAL GABLES FL	A, B	AV 828-4377 FTS 350-5547/4265/4303 COMM 305-667-3108
SCC WASHINGTON	WSFO WASHINGTON DC	A, B	FTS 763-8261/8271 COMM 301-899-3152
MACDILL AERO STATION	MACDILL AERO STA MACDILL AFB FL		AV 434-1750
ALBROOK AERO STATION	ALBROOK AERO STA ALBROOK AFB CZ		AV 313-286-3272
SCOTT AERO STATION	SCOTT AERO STA SCOTT AFB IL		AV 631-3980
CINCLANTFLT OAC	CINCLANTFLT OCEANIC AIRSPACE COORDINATOR NY NY		AV 938-1694
ARTCC MIAMI	ARTCC MIAMI FL		AV 894-1910
ARTCC JACKSONVILLE	ARTCC JACKSONVILLE FL		AV 434-3744
ARTCC NEW YORK	ARTCC NEW YORK NY		AV 938-3730
ARTCC WASHINGTON	ARTCC WASHINGTON DC		AV 937-1420
ARTCC BOSTON	ARTCC BOSTON MASS		AV 881-1635
53 WRS	53 WRS KEESLER AFB MS		AV 868-4540
920 WRG	920 WRG KEESLER AFB MS		AV 868-4318
RFC	RFC MIAMI FL	A	FTS 350-2936 COMM 305-526-2936
FWC NORFOLK	FLEWEACEN NORFOLK VA	B	AV 690-7750
ADWS	DET 7 AFGWC CARSWELL AFB TX	A, B	AV 739-5559
AFGWC	AFGWC OFFUTT AFB NB	B	AV 271-2586

LEGEND

- A - GT 7072
- B - COMEDS

PUBLICITY

News media releases that concern the cooperative efforts in severe winter storms activities of the Department of Defense, National Weather Service, Federal Aviation Administration, and U.S. Coast Guard should reflect the joint nature of these efforts by giving due credit to participating agencies. Copies of these releases should be forwarded to:

Deputy Director for Operations (Environmental Services)  
The Joint Chiefs of Staff  
Washington, D.C. 20301

Department of the Army  
Attention: DAMI-TST-I  
Washington, D.C. 20310

Director, Naval Oceanography  
and Meteorology  
NSTL Station  
Bay St. Louis, Miss. 39529

Military Airlift Command (MAFOI)  
Scott Air Force Base, Ill. 62225

National Oceanic and Atmospheric Administration  
Office of Public Affairs  
6010 Executive Boulevard  
Rockville, Md. 20852

Federal Aviation Administration  
800 Independence Avenue, S.W.  
Washington, D.C. 20590

Commandant (GAPA)  
U.S. Coast Guard  
400 Seventh Street, S.W.  
Washington, D.C. 20590

Commandant, Marine Corps  
Headquarters, U.S. Marine Corps  
Washington, D.C. 20380

Headquarters Aerospace Rescue & Recovery Service  
ARRS/DO  
Scott Air Force Base, Ill. 62225

Headquarters Air Force Reserve  
AFRES/DO  
Robins Air Force Base, Ga. 31098

Headquarters, Air Weather Service  
(AWS/DO)  
Scott Air Force Base, Ill. 62225

## ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFGWC	Air Force Global Weather Central
AFRES	Air Force Reserve
A/G	Air Ground
AIRMET	Airmen's Meteorological Information
AMVER	Automated Merchant Vessel Reporting
APT	Automatic Picture Transmission
ARINC	Aeronautical Radio Inc.
ARRS	Aerospace Rescue and Recovery Service
ARTCC	Air Route Traffic Control Center
AUTODIN	Automatic Digital Network
AUTOVON	Automatic Voice Network
AWN	Automated Weather Network
AWS	Air Weather Service
CARCAH	Chief, Aerial Reconnaissance Coordination, All Hurricanes
COMEDS	CONUS Meteorological Data System
COMET II	CONUS Meteorological Teletype
DOC	Department of Commerce
DOD	Department of Defense
DMSP	Defense Meteorological Satellite Program
DRSR	Direct Readout Scanning Radiometer
ESSA	Environmental Survey Satellite
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FAA	Federal Aviation Administration
FLEWEACEN	Fleet Weather Central
FSS	Flight Service Station
FTS	Federal Telecommunications System
GOES	Geostationary Operational Environmental Satellite
HF	High Frequency
ICMS	Interdepartmental Committee for Meteorological Services
MSD	Meteorological Services Division
NASA	National Aeronautics and Space Administration
NAWAS	National Warning System
NESS	National Environmental Satellite Service
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NSSFC	National Severe Storms Forecast Center
NAVWEASERVFAC	Naval Weather Service Facility
NSSL	National Severe Storm Laboratory
NWS	National Weather Service
OSV	Ocean Station Vessel
OWS	Ocean Weather Station
PIREP	Pilot Report
RAREP	Radar Report
RAWARC	Internal RAREP
RECCO	Reconnaissance Code
RFC	Research Flight Center

SAR	Search and Rescue
SARLANT	Search and Rescue Atlantic Circuit
SC/BMS	Subcommittee on Basic Meteorological Services
SCC	Storm Coordination Center
SFSS	Satellite Field Services Station
SIGMET	Significant Meteorological Information
SMS	Synchronous Meteorological Satellite
SSB	Single Side Band
USAF	United States Air Force
USCG	United States Coast Guard
USN	United States Navy
UTC	Coordinated Universal Time (Z)
VHRR	Very High Resolution Radiometer
VISSR	Visual-Infrared Spin-Scan Radiometer
VTPR	Vertical Temperature Profile Radiometer
WMO	World Meteorological Organization
WRG	Weather Reconnaissance Group
WRS	Weather Reconnaissance Squadron
WSFO	Weather Service Forecast Office
WSO	Weather Service Office
WSPOD	Winter Storm Plan of the Day