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DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH



National Winter Storms Operations Plan

FCM-P 13-1981

Washington, D.C.
October 1981



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NATIONAL WINTER STORMS
OPERATIONS PLAN

Washington, D. C.
October 1981

FCM-P13-1981

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CHANGE LOG

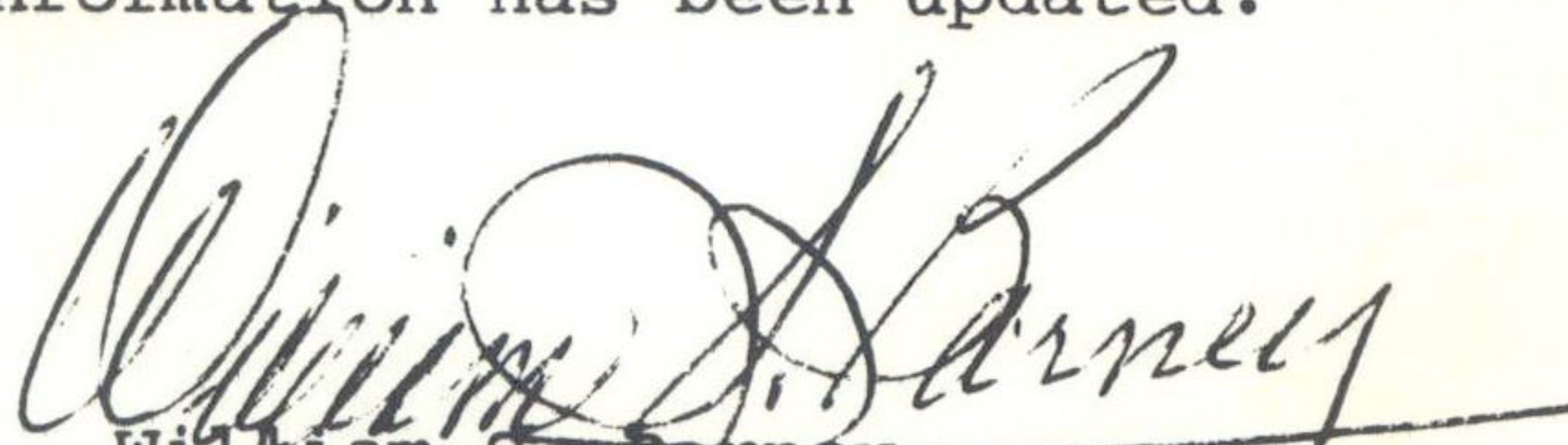
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FOREWORD

In a memorandum dated October 23, 1969, the Chairman, Interdepartmental Committee for Meteorological Services (ICMS), established a Working Group under the purview of the Subcommittee on Basic Meteorological Services (SC/BMS) 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.

The National East Coast Winter Storms Operations Plan was developed to meet this request. In 1978, the Plan was expanded to cover data requirements in the Gulf of Mexico. The Plan covers that part of the year (November 1 to April 15) having a relatively high incidence of winter storms along the East and Gulf Coasts and lists only those special arrangements, between the agencies involved, in meeting the objective of furnishing special weather observations for use in warning of severe winter storms along the Gulf and East Coasts.

This document is the 12th edition of the Plan and represents a general update of the previous edition published in October 1979, and page changes that constituted the 1980 Plan. New reconnaissance tracks have been designed for the East Coast, and buoy and satellite information has been updated.



William S. Barney
Acting Federal Coordinator for
Meteorological Services and
Supporting Research

MEMORANDUM

The purpose of this memorandum is to provide a summary of the information received from the [redacted] regarding the [redacted] project. The information was obtained from a meeting held on [redacted] at [redacted].

The [redacted] project is being undertaken to [redacted] the [redacted] system. The project is being managed by [redacted] and is expected to be completed by [redacted]. The project is currently in the [redacted] phase and is progressing well.

The [redacted] project is being funded by [redacted] and is expected to cost [redacted]. The project is being undertaken by [redacted] and is expected to be completed by [redacted].

[Redacted signature block containing illegible text]

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CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

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 additional observations, when required, making available all reports to any requesting agency.
 - c. Provide basic analyses and forecasts through the National Meteorological Center (NMC), Camp Springs, Maryland.
 - d. Provide special numbered national storm summaries to the general public and to all concerned interests through the National Public Service Unit (NPSU) at Kansas City, Missouri.
 - e. Provide statements and warnings through Weather Service Forecast Offices (WSFO) and local Weather Service Offices (WSO) along the eastern seaboard and the Gulf of Mexico.
 - f. Provide advice on aircraft reconnaissance requirements forwarded through the WSFO Miami to the Chief, Aerial Reconnaissance Coordination, All Hurricanes (CARCAH), from the National Meteorological Center (NMC), Washington. NMC is the central coordinating office for this program for all reconnaissance requirements.
 - g. Operate satellite systems capable of providing coverage of the east coast of the United States and the Gulf of Mexico 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 satellite pictures for selected situations to authorized research facilities.
 - k. Furnish aircraft to support the operational reconnaissance and research objectives of the National 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.

1. Provide oceanographic and meteorological surface data obtained from offshore buoy deployment, if possible, within existing facilities.

m. Provide dissemination of weather observation data 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, Chapter A-02, "Weather Service Mission," and Chapter 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 pilot reports (PIREPs) that become available.

b. Furnish to the National Weather Service: (1) aircraft reconnaissance observations that are within its capabilities and in accordance with established reconnaissance priorities; and (2) special observations detailed in Chapter 3 of this Plan.

c. Designate CARCAH as the point of contact for coordination with NMC and Miami WSFO 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 Oceanography Command (NAVOCEANCOM), is responsible for issuance of gale, storm, and high seas warnings for fleet operations and Navy shore installations, as elaborated in NAVOCEANCOM 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 winter storms for those hazardous phenomena specified in Air Weather Service Regulation 105-8.

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 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.

e. Provide coastal broadcast facilities at selected locations for dissemination of forecasts and warnings.



USAF WC-130 AIRCRAFT
USED FOR WINTER STORM RECONNAISSANCE

CHAPTER 2

AIRCRAFT RECONNAISSANCE

1. 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). Normally, DOD will be prepared to generate one reconnaissance sortie per day. Requirements exceeding this capability will be accomplished on a "resource permitting" basis. In times of national emergency or war, some or all DOD reconnaissance resources may not be available to fulfill DOC needs.

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 of Aircraft. Operational Control of reconnaissance aircraft will be exercised by the agency to which the aircraft is assigned.

3. Reconnaissance Planning and Flight Notification.

a. Requirements. NMC will forward sortie/alert needs to CARCAH through the Storm Coordination Center (SCC) Miami for tasking in the Winter Storm Plan of the Day (WSPOD) within responsibilities stated above. CARCAH will advise NMC of mission availability or nonavailability and expected responsiveness of USAF and RFC assets. NMC will be responsible for requesting all reconnaissance flights and will provide information as specified in paragraph 3.e. below.

(1) Reconnaissance Requirements. NMC will forward NWS mission requirements for the next 24-hour period (0500Z-0500Z) and an outlook for the succeeding 24 hours to CARCAH not later than 1430Z each day. Vertical observation positions, other than those described on the tracks, will be identified by NMC through CARCAH and the WSPOD.

b. Change 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 2.5 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 13.5 hours.

(3) When notification is received more than 4 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 all of the above changes will be CARCAH.

(5) Coordination of meteorological data requirements will be accomplished prior to each flight over the Gulf of Mexico. The flight meteorologist responsible for the mission will contact the Lead Forecaster (telephone 504-525-0823) at the Storm Coordination Center (SCC), New Orleans, approximately 2.5 hours prior to scheduled aircraft departure time. Since CARCAH publishes the WSPOD, all changes to the WSPOD will be made through CARCAH.

c. Cancellation of Requirements. Missions should be cancelled prior to aircraft departure and as much in advance as possible to allow maximum resource conservation. Cancellation after departure may result in degradation of follow-on mission capability.

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 (Appendix 2C) of the weather reconnaissance mission any time its timeliness and quality are outstanding or sub-standard. Requirements levied as resources permitting will not be assessed for timeliness. These assessments should be mailed to:

OL G, HQS AWS
National Hurricane Center
Gables One Tower, Room 631
Coral Gables, FL 33146

(5) CARCAH will maintain monthly and seasonal reconnaissance summaries detailing missions actually flown to satisfy levied requirements.

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

(1) Coordination. NMC will coordinate with the appropriate NWS field offices as needed and provide WSPOD information (Appendix 2D) to CARCAH through SCC Miami by 1430Z. Direct discussion in weather situations is also encouraged between the Navy and NMC with respect to storm or storm threat situations. Navy point of contact is the Naval Eastern Oceanography Center (NAVEASTOCEANCEN) Norfolk Command Duty Officer and the optimum time is 1330 local. The following data will be provided to CARCAH when applicable.

(a) Track and level desired. For mission altitude a second choice of level will be given in case level desired is not feasible due to probable icing or other operational constraints.

(b) Selected trackpoint (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) Succeeding day outlook (anticipated track, control point, control point time--not earlier than).

(2) Preparation. Utilizing requirements stated by NMC, 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 for WSPOD is shown in Appendix 2B.

(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 as soon as possible after the DOC requirements (including changes) are received. Negative WSPODs will not be disseminated except to cancel a previously published requirement or outlook.

(4) Responsiveness.

(a) USAF/RFC notification of reconnaissance requirements should be made early enough to allow 16 hours plus enroute 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 "resource permitting".

4. Reconnaissance Flights.

a. General Storm Tracks.

(1) Air Force tracks 01 through 11 (Appendix 2A) will normally be flown during storm or storm threat situations.

(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 drop time, 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 nonparticipating aircraft operating within controlled airspace. Mission commanders should be aware that nonparticipating 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. 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. 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 nonstorm aircraft.

(3) Any procedure 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) (Appendix 2E) or WMO TEMP DROP (dropsonde soundings) format (Appendix 2F).

(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: AF 987 TRACK 01 OB01
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: AF 968 TRACK 05 OB06
97779 ... 91///
95559 ... ETA KBIX 17/2300Z OBS 01 thru 14 to KMIA

TABLE 2-1
 REQUIREMENT FOR AIRCRAFT RECONNAISSANCE DATA

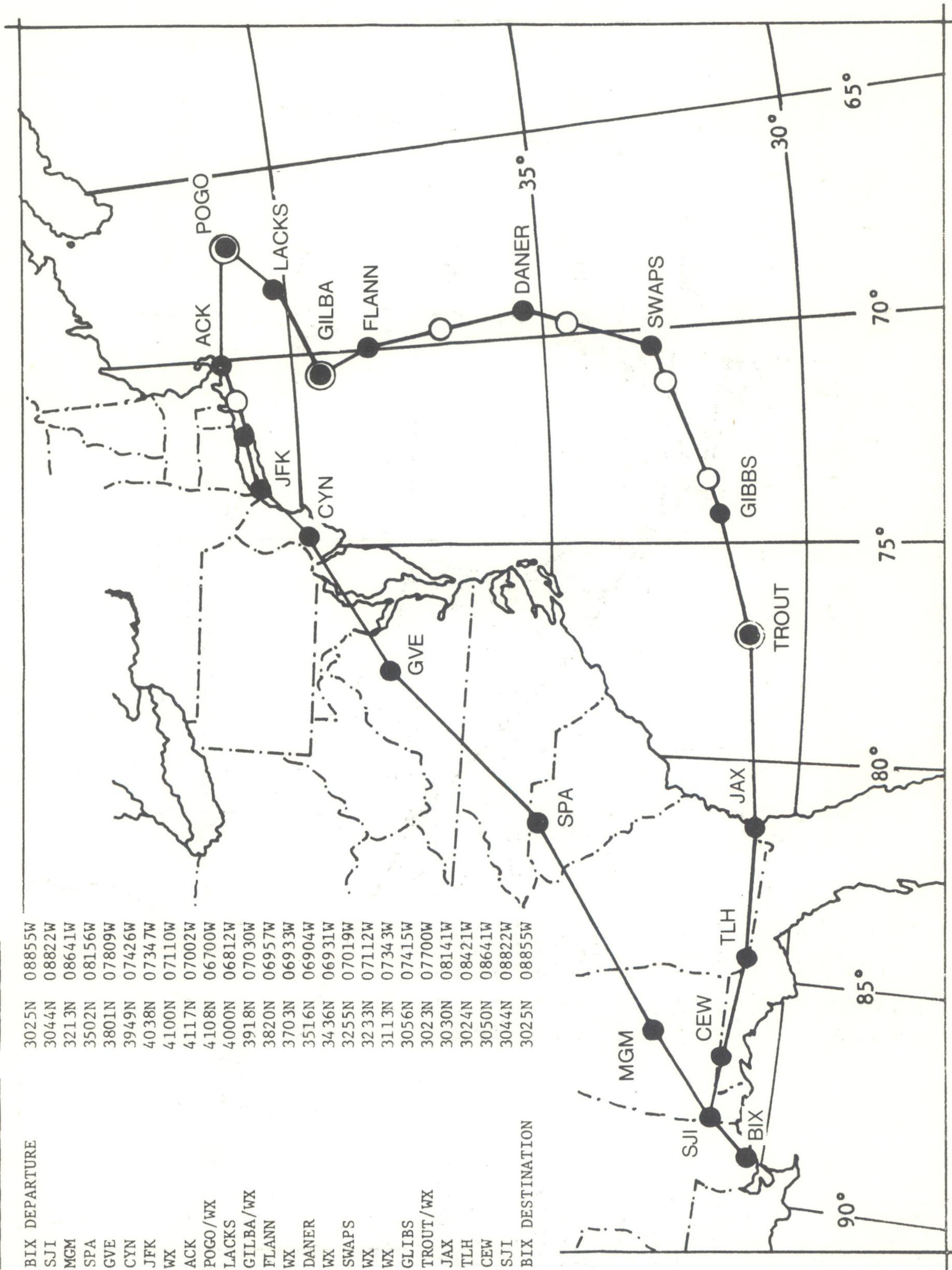
Data required	Altitudes at which data are required	Areal portion of cyclone or environment in which data are needed	Time and frequency of observations	Accuracy required
Synoptic data—pressure (heights), temperature, moisture, and winds—for national weather prediction and medium-range forecasting.	At altitudes indicated in the WSPOD.	Throughout the marine portion of area as defined in Chapter 1.	Dropsondes as specified in Plan of the Day (drop interval approximately 200 nmi (370 km)). Horizontal observations are specified on the tracks. Intermediate observations will be appended to each horizontal observation. (No intermediate observations required on tracks 01-04.)	± 5 kt (2.5 m/s) (wind speed) ± 10° (wind direction) ± 1°C ± 20 m ± 2 mb (200 Pa) Position within 20 nmi
Location and strength of radar echoes.	Any level.	All sectors.	When available.	Position within 20 nmi (37 km)
*Ocean wave heights and wave lengths, sea surface wind estimates.	Sea surface.	All quadrants.	Every horizontal observation at or below 700 mb (70 kPa).	± 10% (wave height) ± 10 ft (3 m) (wave length) 5 kt (2.5 m/s) (wind speed) 10° (wind direction)

*Ocean wave heights and wave lengths will not be reported by USAF aircraft.

CHAPTER 2
APPENDIX A

AIR FORCE TRACK 01

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	3025N 08855W
SJI	3044N 08822W
MGM	3213N 08641W
SPA	3502N 08156W
GVE	3801N 07809W
CYN	3949N 07426W
JFK	4038N 07347W
WX	4100N 07110W
ACK	4117N 07002W
POGO/WX	4108N 06700W
LACKS	4000N 06812W
GILBA/WX	3918N 07030W
FLANN	3820N 06957W
WX	3703N 06933W
DANER	3516N 06904W
WX	3436N 06931W
SWAPS	3255N 07019W
WX	3233N 07112W
WX	3113N 07343W
GLIBS	3056N 07415W
TROUT/WX	3023N 07700W
JAX	3030N 08141W
TLH	3024N 08421W
CEW	3050N 08641W
SJI	3044N 08822W
BIX DESTINATION	3025N 08855W



AIR FORCE TRACK 01

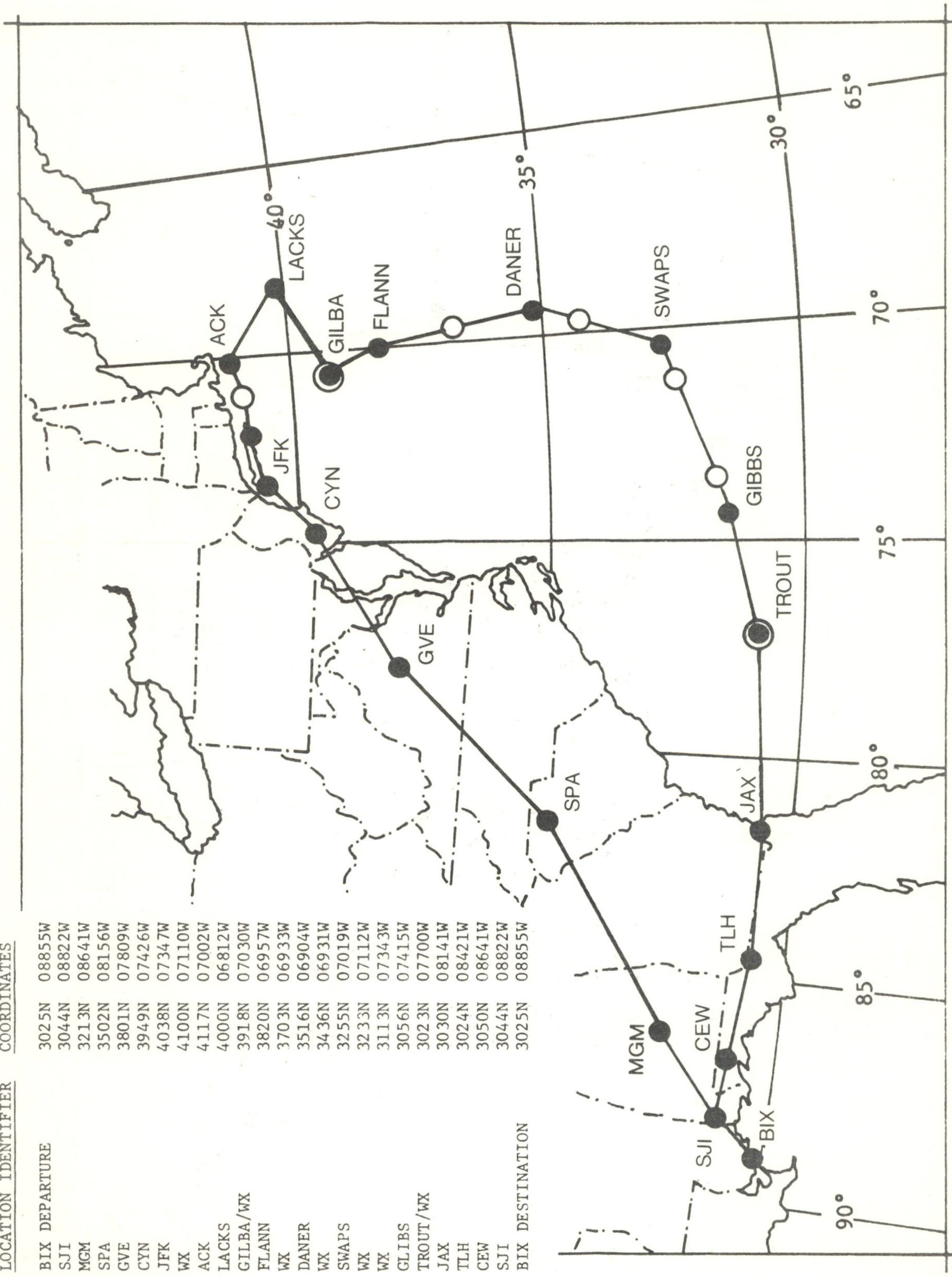
ATC Keesler 1-4473

CHAPTER 2
APPENDIX A

AIR FORCE TRACK 02

LOCATION IDENTIFIER COORDINATES

BIX DEPARTURE	3025N	08855W
SJI	3044N	08822W
MGM	3213N	08641W
SPA	3502N	08156W
GVE	3801N	07809W
CYN	3949N	07426W
JFK	4038N	07347W
WX	4100N	07110W
ACK	4117N	07002W
LACKS	4000N	06812W
GILBA/WX	3918N	07030W
FLANN	3820N	06957W
WX	3703N	06933W
DANER	3516N	06904W
WX	3436N	06931W
SWAPS	3255N	07019W
WX	3233N	07112W
WX	3113N	07343W
GLIBS	3056N	07415W
TROUT/WX	3023N	07700W
JAX	3030N	08141W
TLH	3024N	08421W
CEW	3050N	08641W
SJI	3044N	08822W
BIX DESTINATION	3025N	08855W



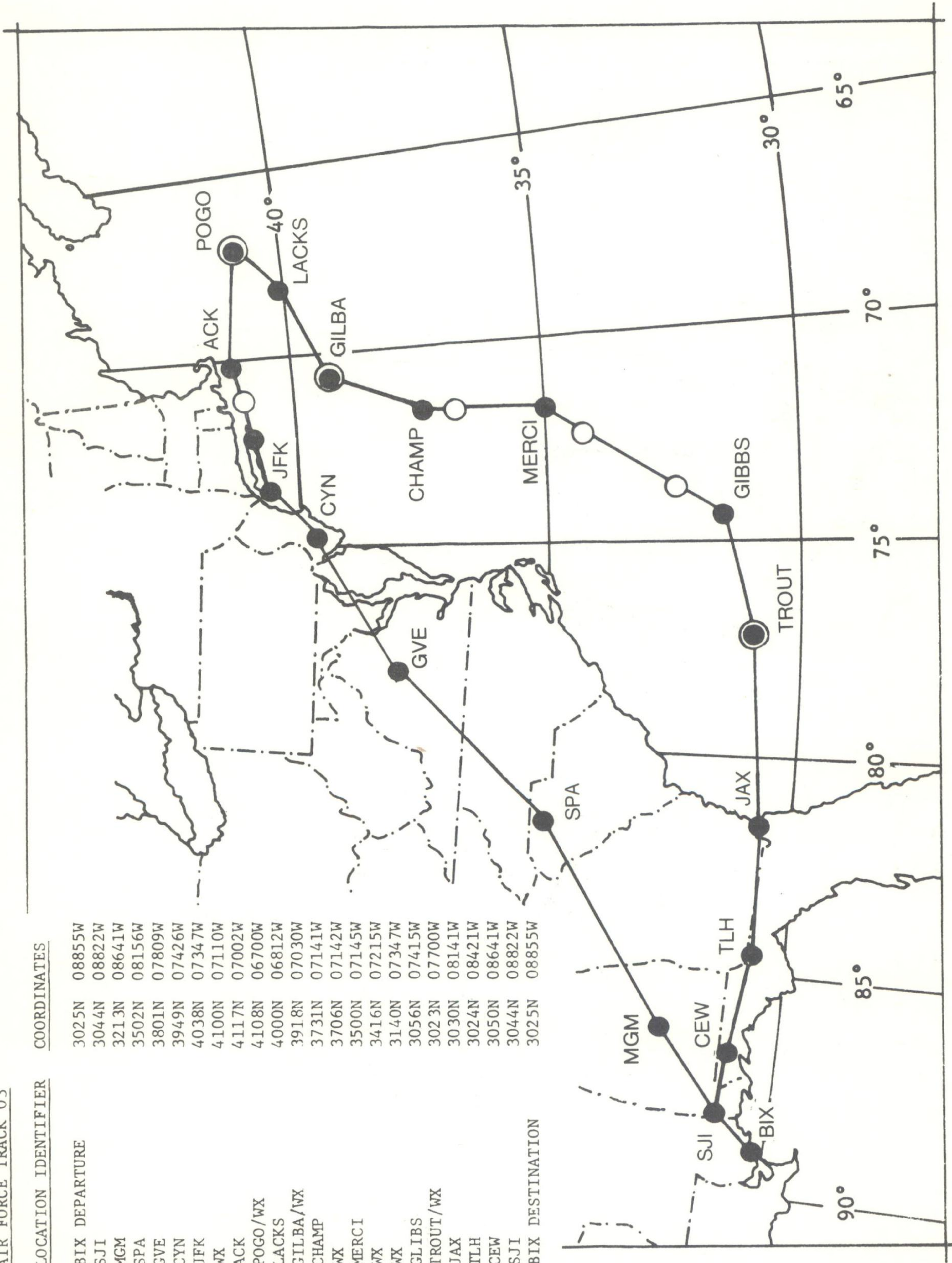
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APPENDIX A

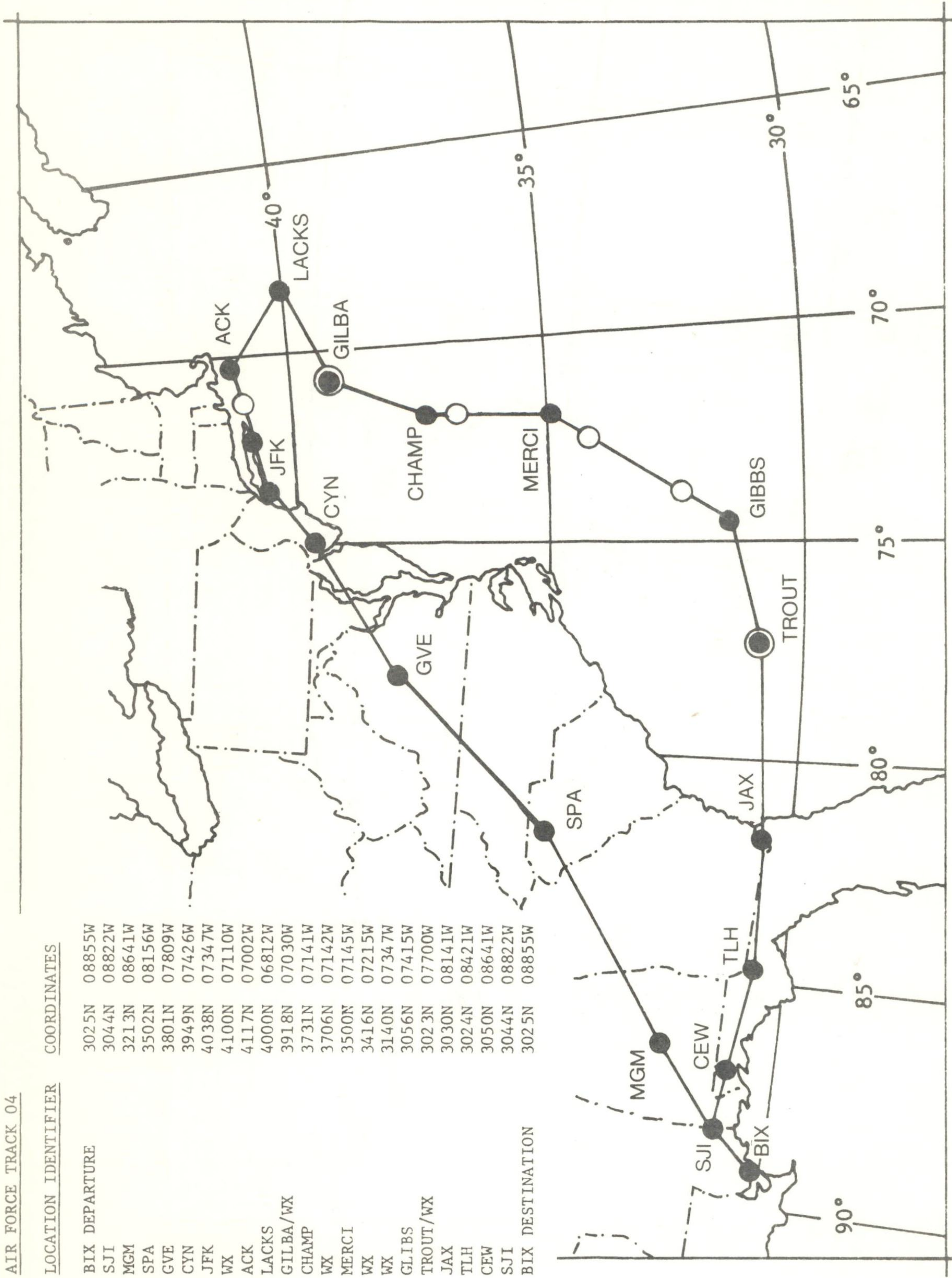
AIR FORCE TRACK 03

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	3025N 08855W
SJI	3044N 08822W
MGM	3213N 08641W
SPA	3502N 08156W
GVE	3801N 07809W
CYN	3949N 07426W
JFK	4038N 07347W
WX	4100N 07110W
ACK	4117N 07002W
POGO/WX	4108N 06700W
LACKS	4000N 06812W
GILBA/WX	3918N 07030W
CHAMP	3731N 07141W
WX	3706N 07142W
MERCI	3500N 07145W
WX	3416N 07215W
WX	3140N 07347W
GLIBS	3056N 07415W
TROUT/WX	3023N 07700W
JAX	3030N 08141W
TLH	3024N 08421W
CEW	3050N 08641W
SJI	3044N 08822W
BIX DESTINATION	3025N 08855W



AIR FORCE TRACK 03

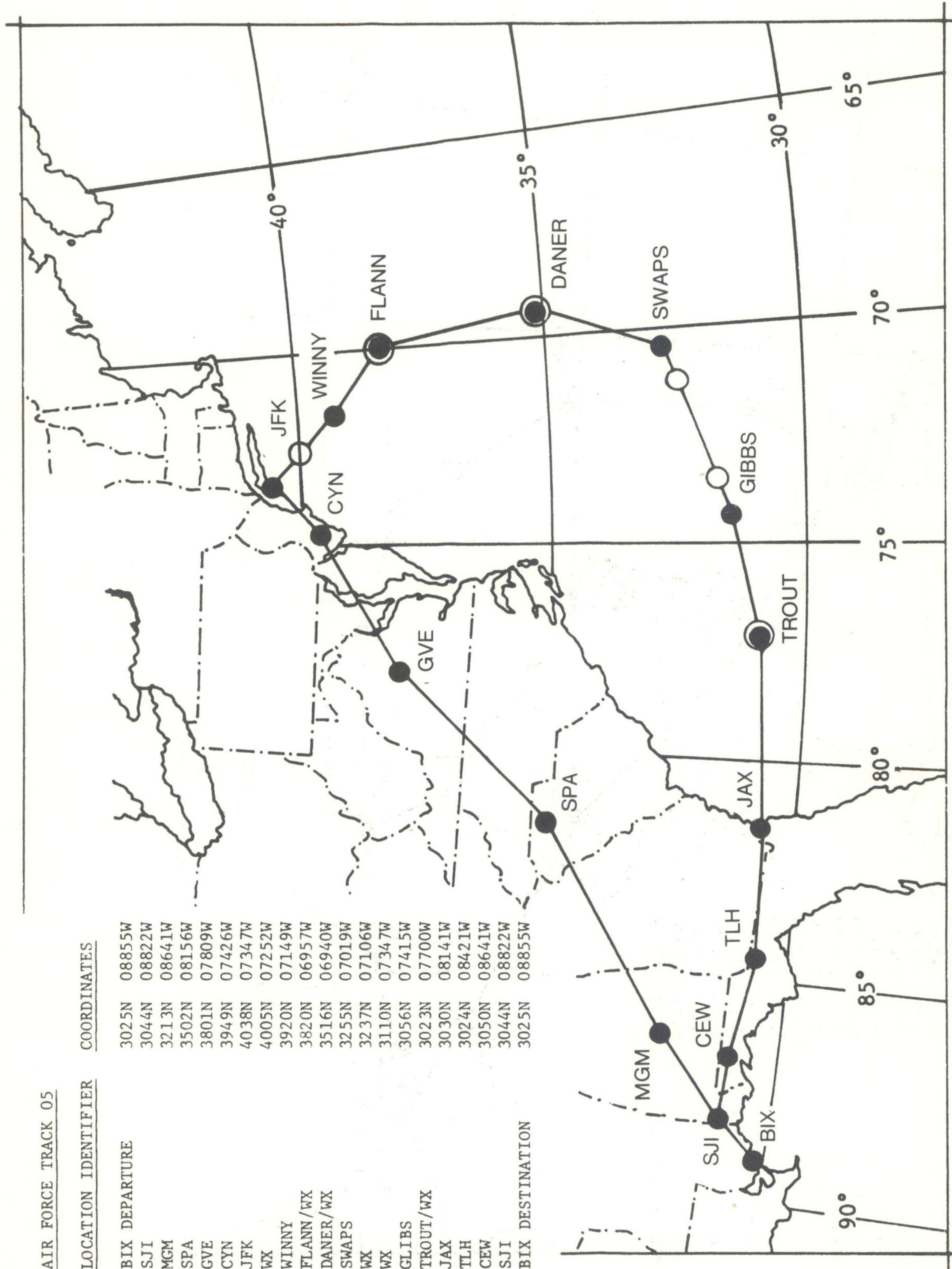
CHAPTER 2
APPENDIX A



AIR FORCE TRACK 04

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CHAPTER 2
APPENDIX A

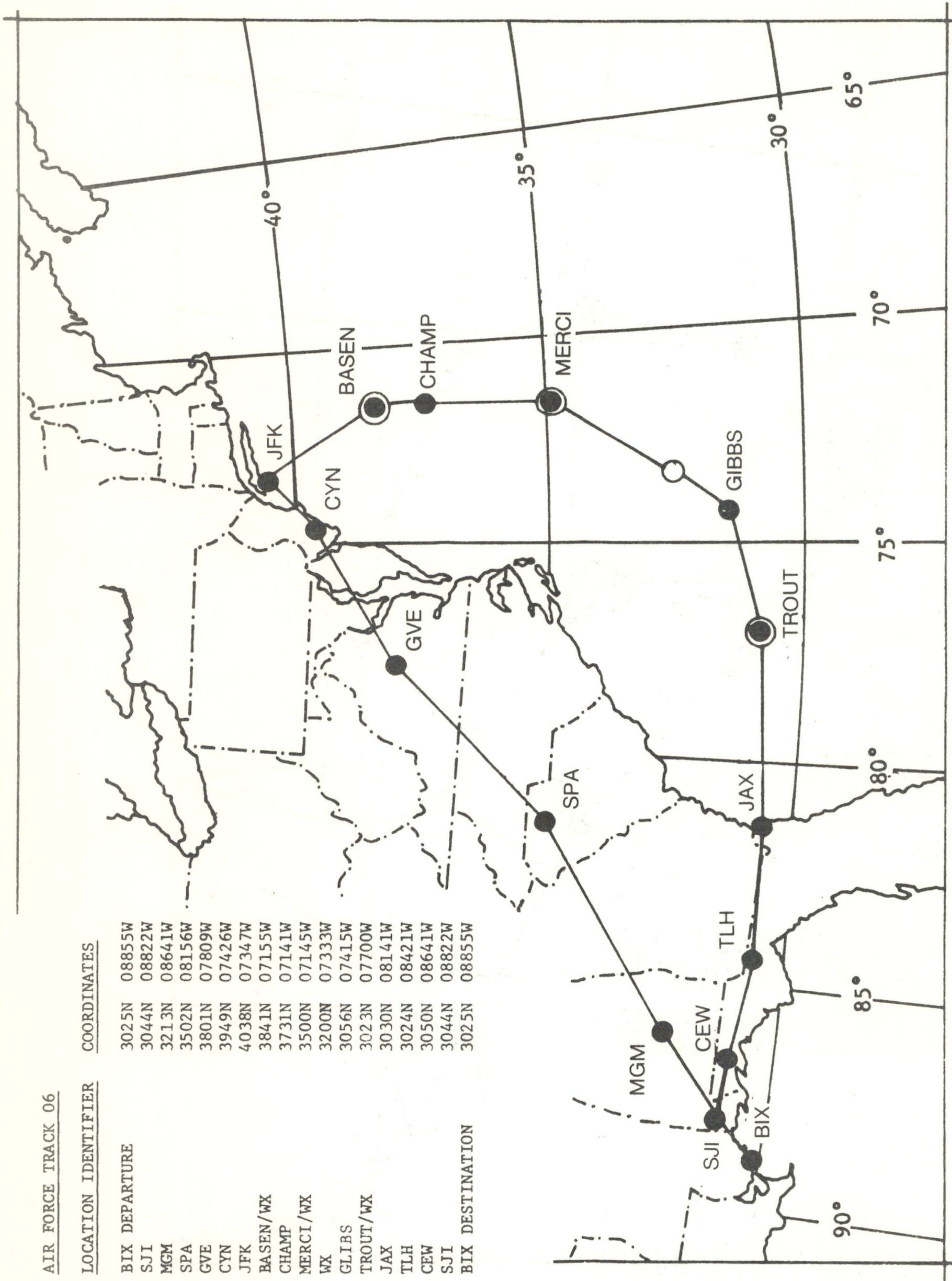


AIR FORCE TRACK 05

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	3025N 08855W
SJI	3044N 08822W
MGM	3213N 08641W
SPA	3502N 08156W
GVE	3801N 07809W
CYN	3949N 07426W
JFK	4038N 07347W
WX	4005N 07252W
WINNY	3920N 07149W
FLANN/WX	3820N 06957W
DANER/WX	3516N 06940W
SWAPS	3255N 07019W
WX	3237N 07106W
WX	3110N 07347W
GLIBS	3056N 07415W
TROUT/WX	3023N 07700W
JAX	3030N 08141W
TLH	3024N 08421W
CEW	3050N 08641W
SJI	3044N 08822W
BIX DESTINATION	3025N 08855W

AIR FORCE TRACK 05

CHAPTER 2
APPENDIX A



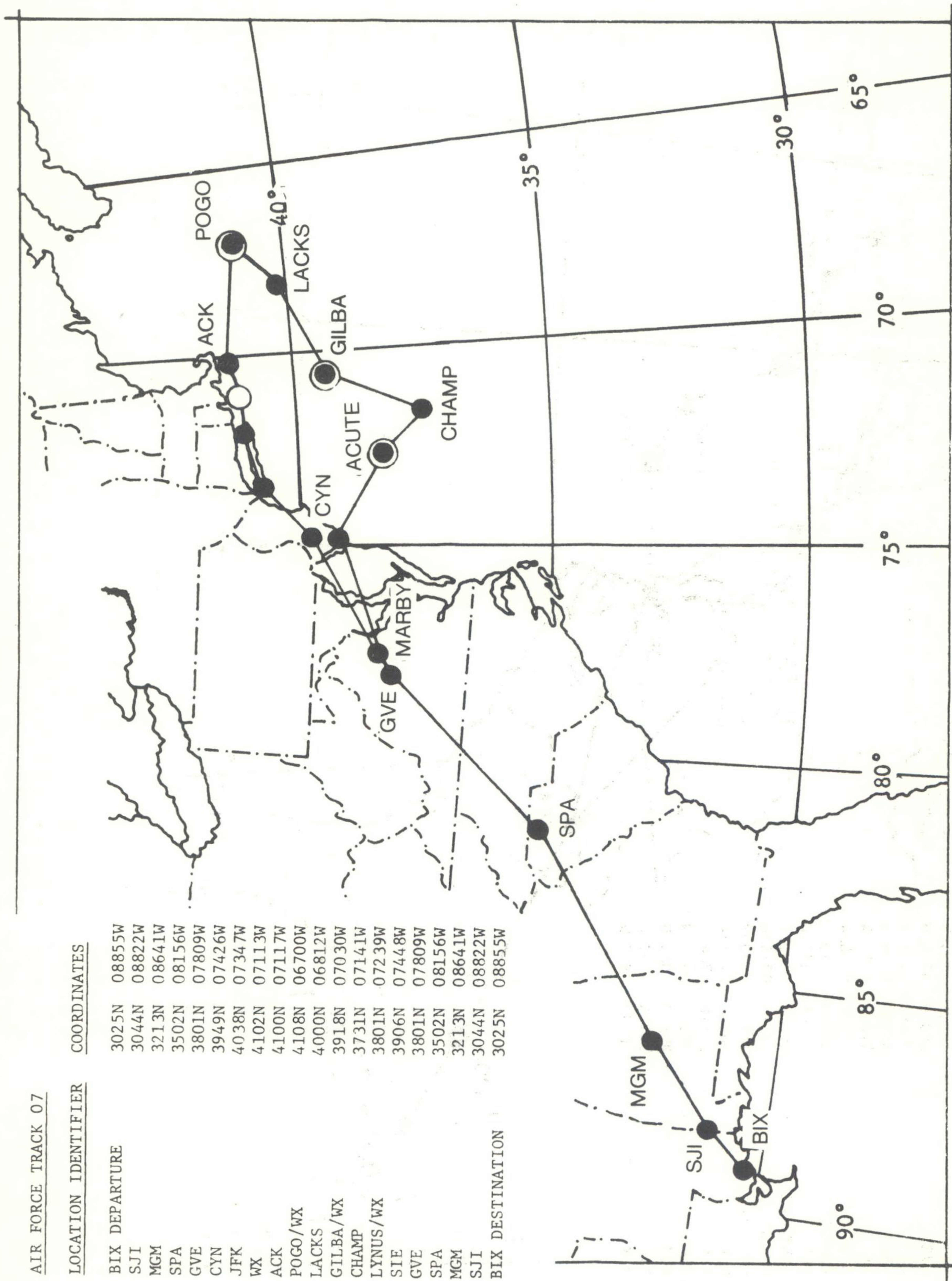
AIR FORCE TRACK 06

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CHAPTER 2
APPENDIX A

AIR FORCE TRACK 07

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	3025N 08855W
SJI	3044N 08822W
MGM	3213N 08641W
SPA	3502N 08156W
GVE	3801N 07809W
CYN	3949N 07426W
JFK	4038N 07347W
WX	4102N 07113W
ACK	4100N 07117W
POGO/WX	4108N 06700W
LACKS	4000N 06812W
GILBA/WX	3918N 07030W
CHAMP	3731N 07141W
LYNUS/WX	3801N 07239W
SIE	3906N 07448W
GVE	3801N 07809W
SPA	3502N 08156W
MGM	3213N 08641W
SJI	3044N 08822W
BIX DESTINATION	3025N 08855W

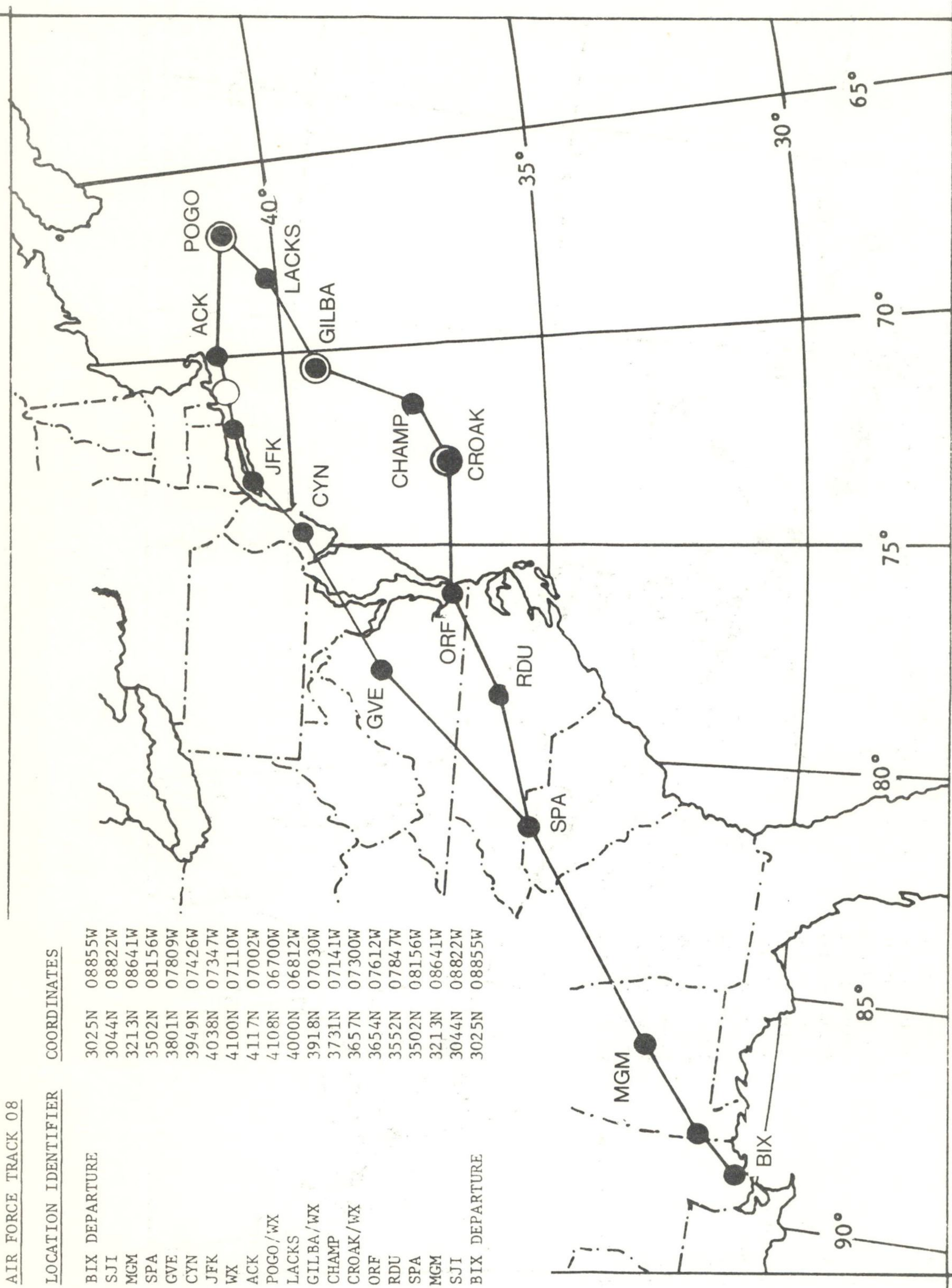


AIR FORCE TRACK 07

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APPENDIX A

AIR FORCE TRACK 08

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	3025N 08855W
SJI	3044N 08822W
MGM	3213N 08641W
SPA	3502N 08156W
GVE	3801N 07809W
CYN	3949N 07426W
JFK	4038N 07347W
WX	4100N 07110W
ACK	4117N 07002W
POGO/WX	4108N 06700W
LACKS	4000N 06812W
GILBA/WX	3918N 07030W
CHAMP	3731N 07141W
CROAK/WX	3657N 07300W
ORF	3654N 07612W
RDU	3552N 07847W
SPA	3502N 08156W
MGM	3213N 08641W
SJI	3044N 08822W
BIX DEPARTURE	3025N 08855W



AIR FORCE TRACK 08

ATC Keesler 1-4473

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APPENDIX A

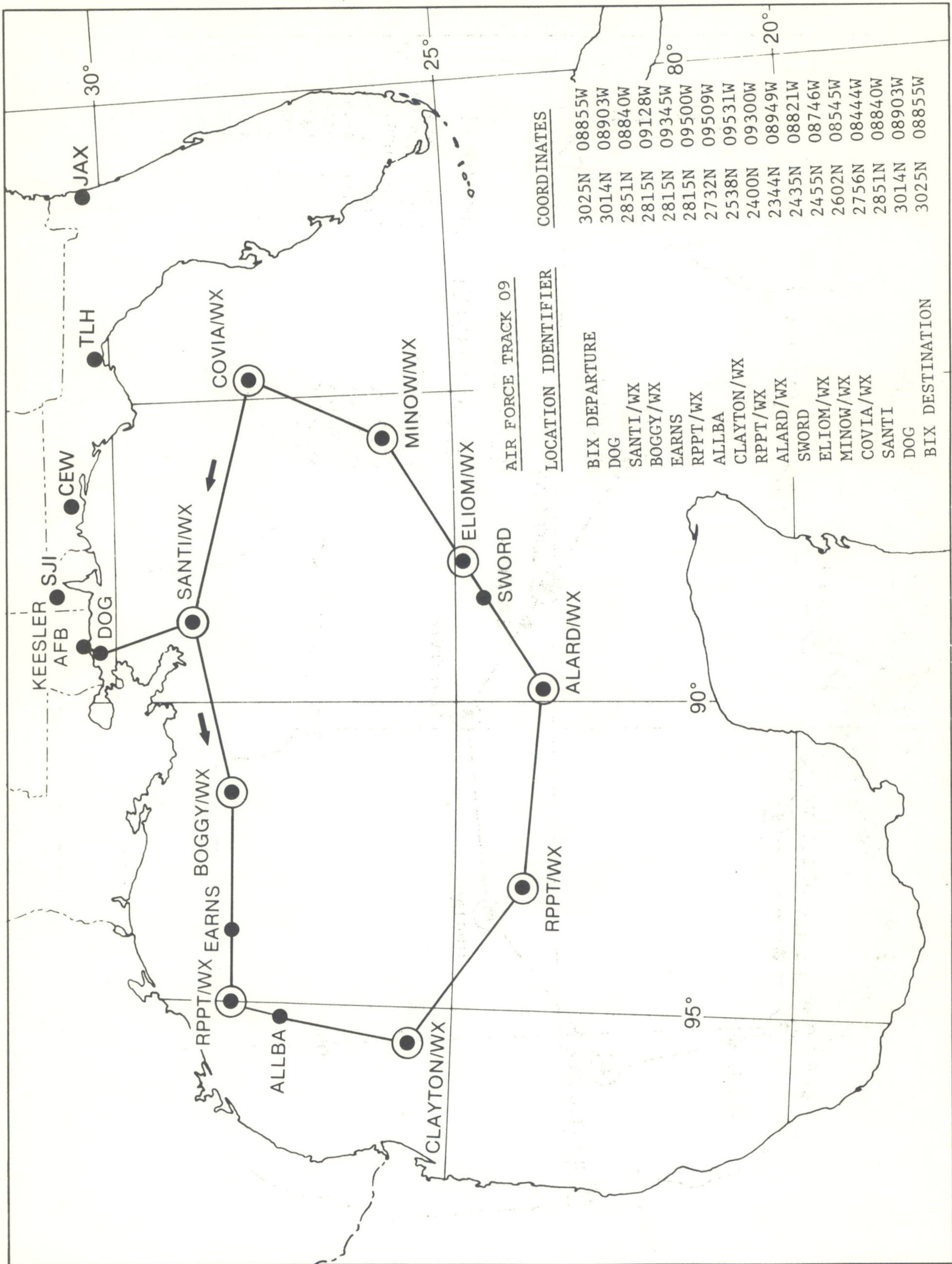


FIGURE 2A-9 AIR FORCE TRACK 09

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APPENDIX A

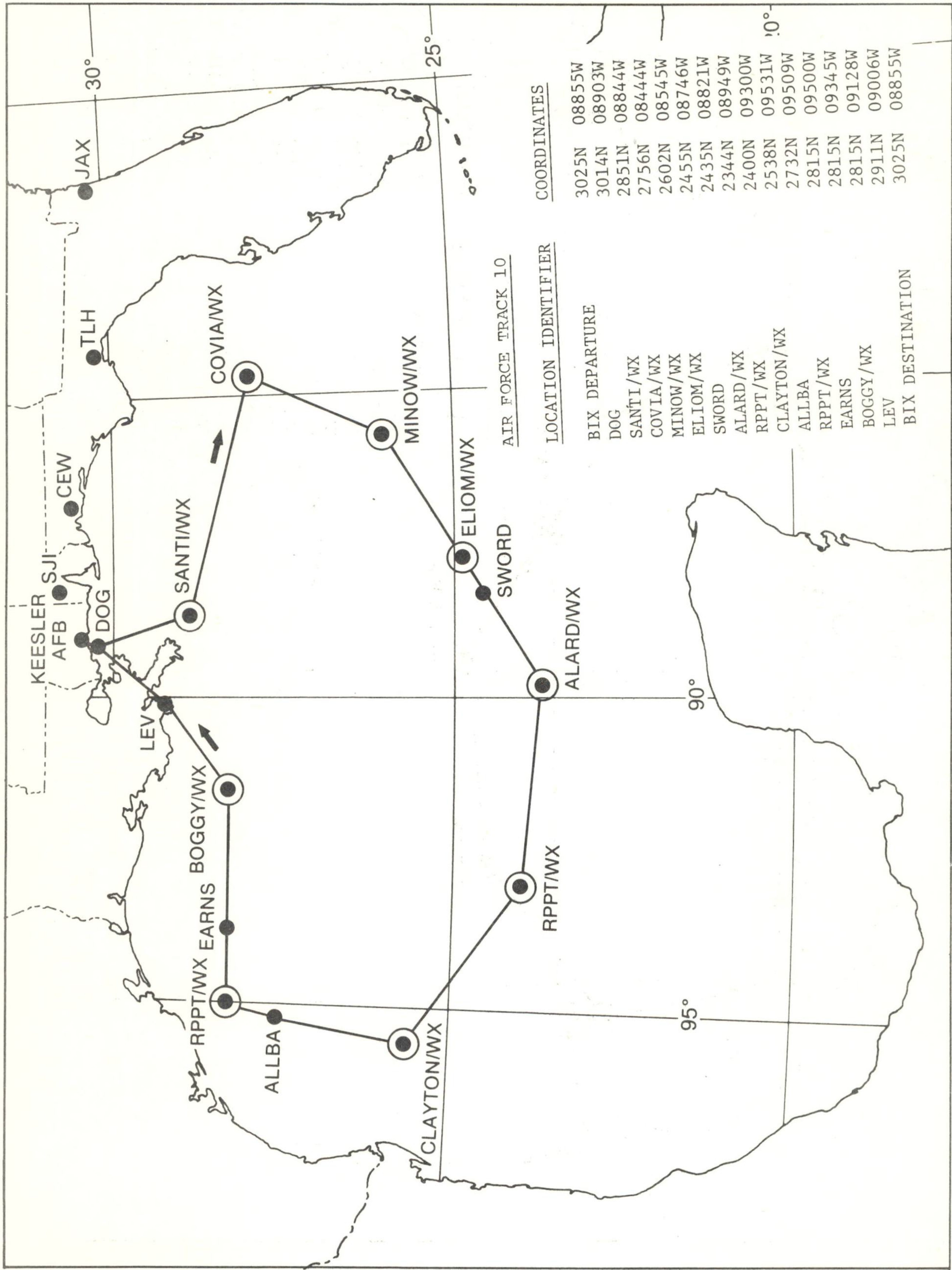


FIGURE 2A-10 AIR FORCE TRACK 10

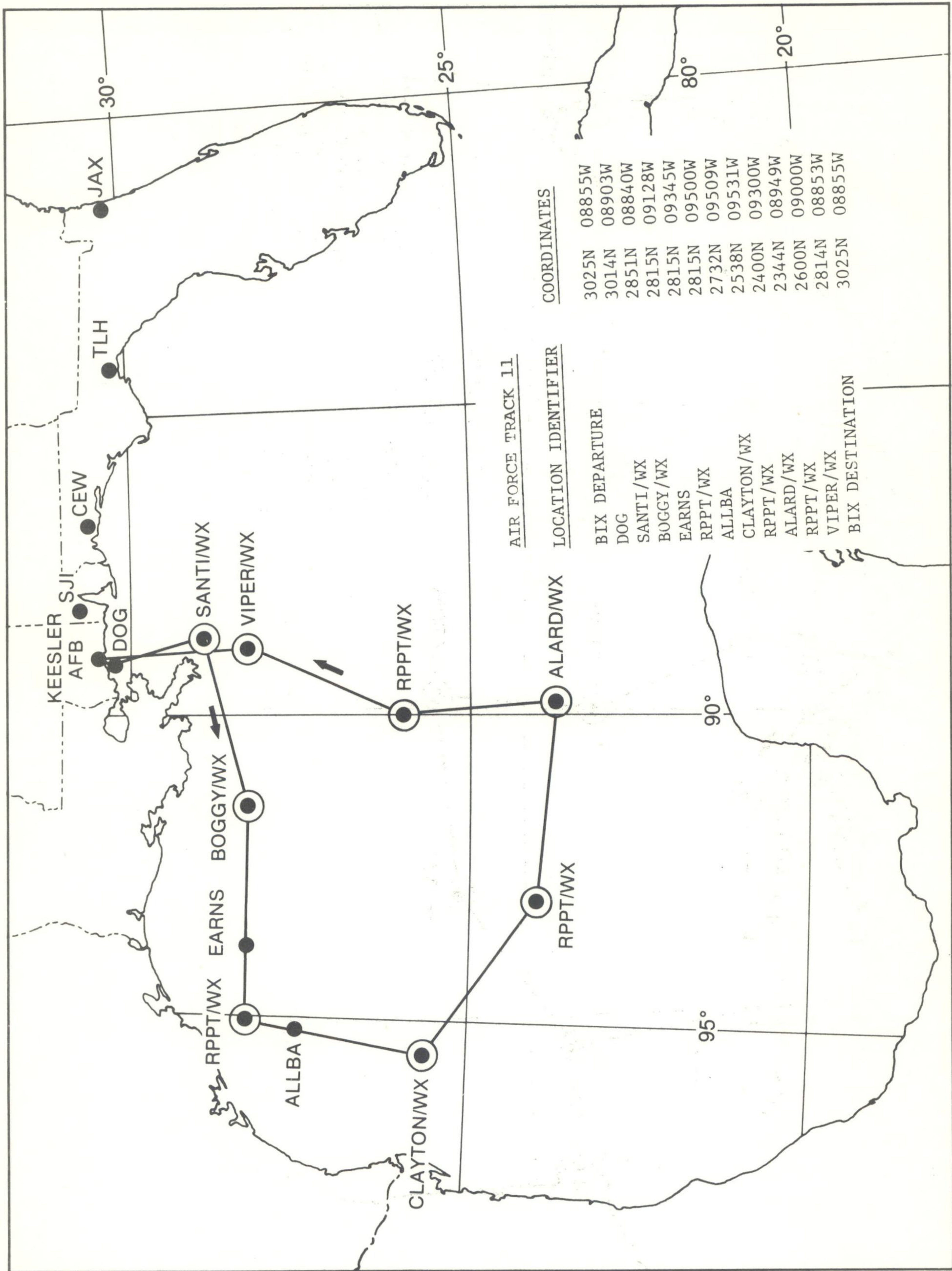


FIGURE 2A-11 AIR FORCE TRACK 11

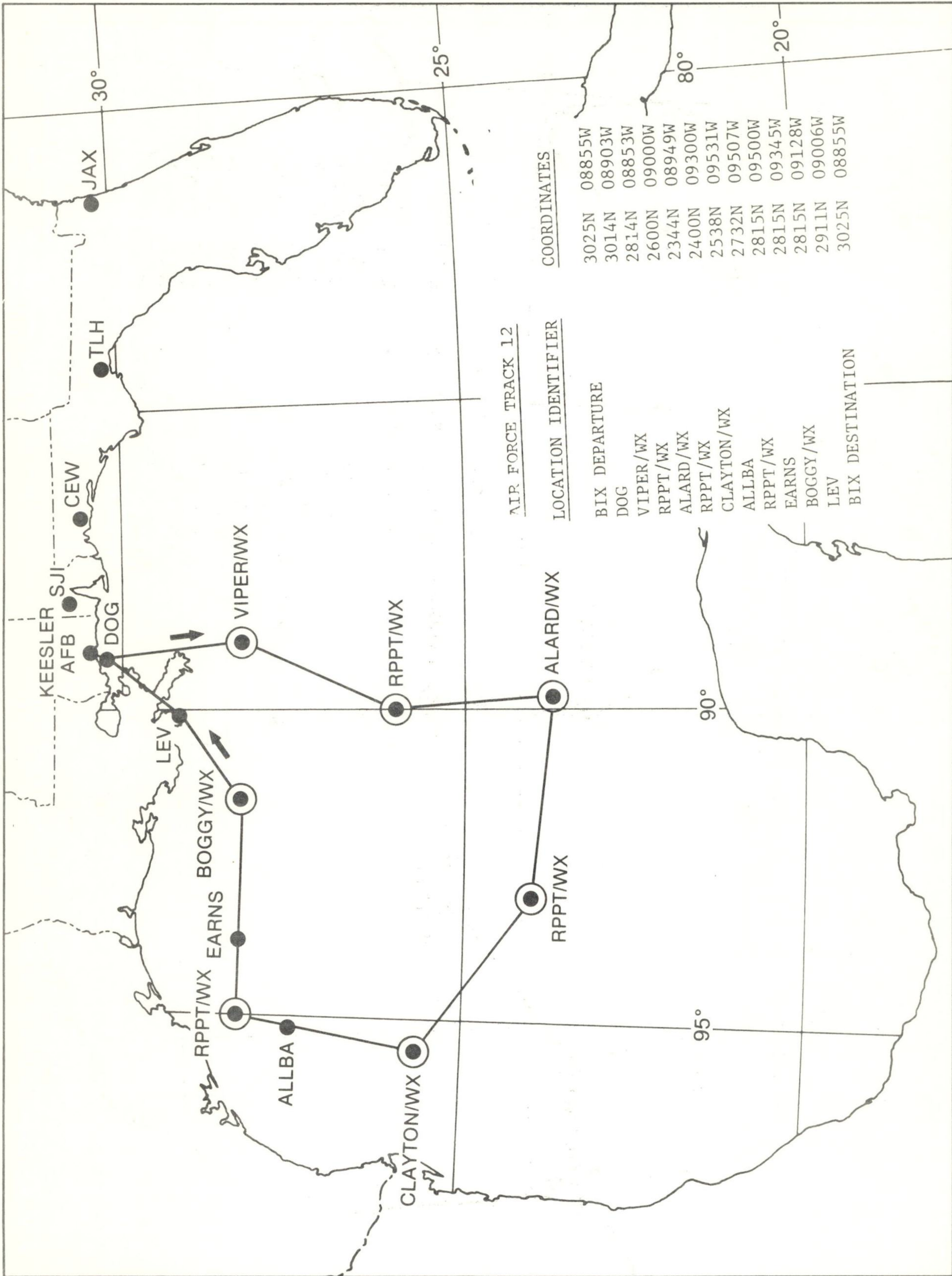


FIGURE 2A-12 AIR FORCE TRACK 12

CHAPTER 2
APPENDIX A

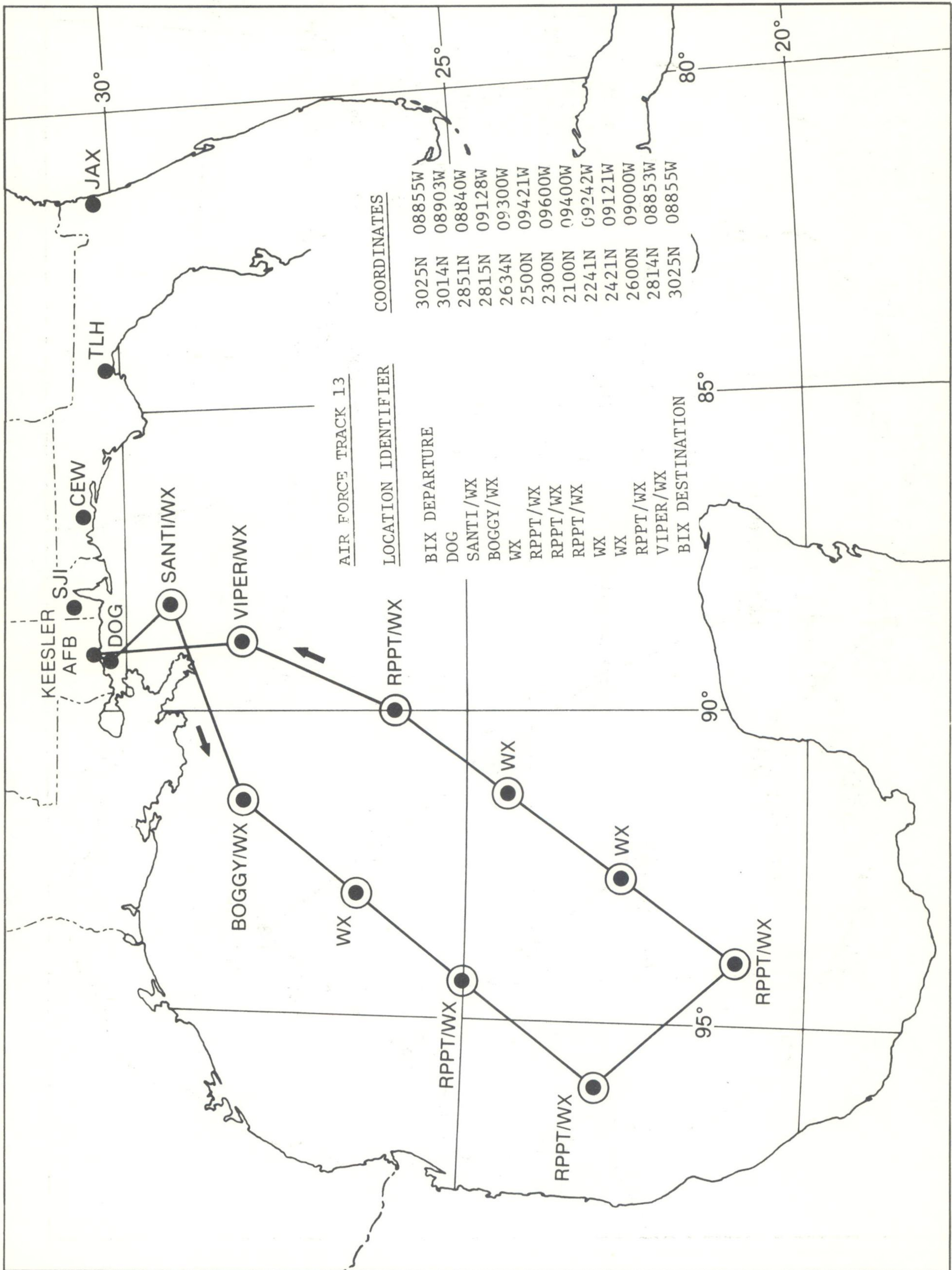


FIGURE 2A-13 AIR FORCE TRACK 13

CHAPTER 2
APPENDIX A

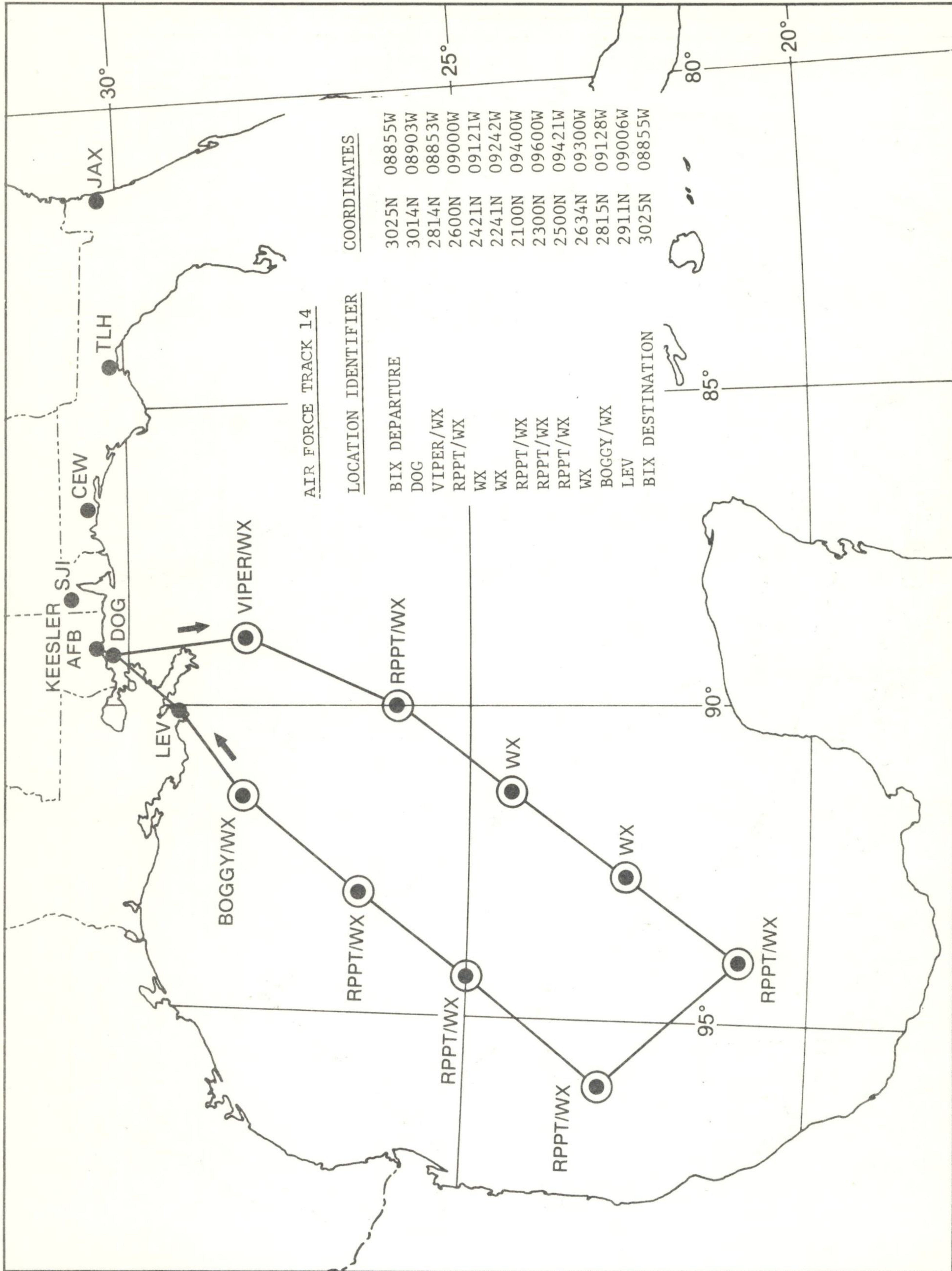


FIGURE 2A-14 AIR FORCE TRACK 14

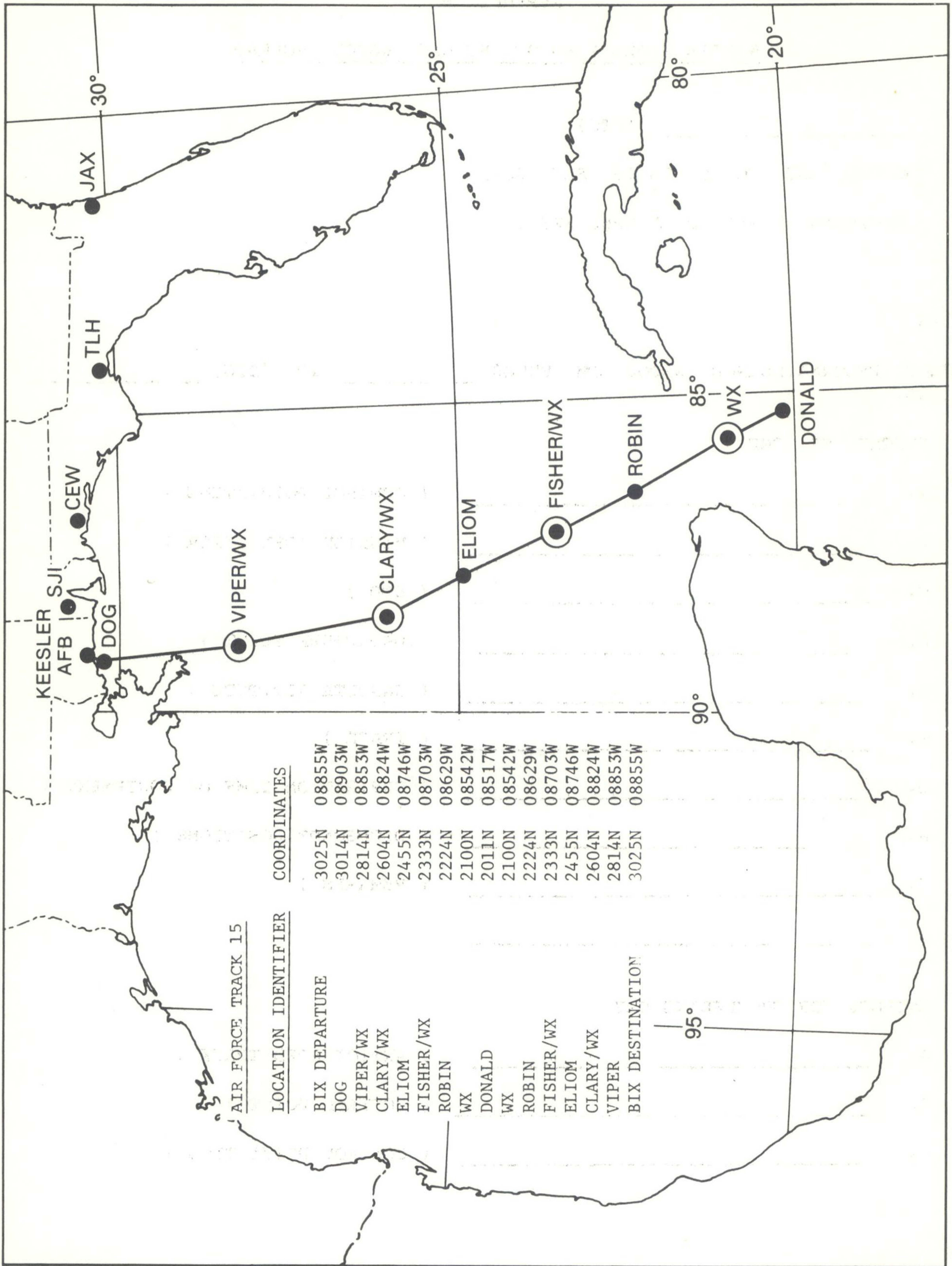


FIGURE 2A-15 AIR FORCE TRACK 15

CHAPTER 2
APPENDIX B

WINTER STORM PLAN OF THE DAY (WSPOD) FORMAT

O/R _____ (DTG)

FM OLG HQ AWS CORAL GABLES FL/CARCAH

TO (MAC/NOAA APPROVED ADDRESSEES)

BT

UNCLAS

SUBJECT RECONNAISSANCE WSPOD FM 9DTG0 _____ TO (DTG) _____
FOLLOWS:

1. FLIGHT NR ONE

- A. _____ (CONTROL POINT/TIME)
- B. _____ (MISSION IDENTIFIER)
- C. _____ (ETD)
- D. _____ (DEPARTURE POINT)
- E. _____ (ENROUTE ALTITUDE)
- F. _____ (TRACK)
- G. _____ (EXPIRATION TIME OF EQUIPMENT)
- H. _____ (DROPSONDE POSITIONS)
- I. _____ (REMARKS)

2. OUTLOOK FOR SUCCEEDING DAY

- A. _____ (ANTICIPATED TRACK)
- B. _____ (CONTROL POINT)
- C. _____ (CONTROL POINT TIME)

BT

NNNN

APPENDIX C
SAMPLE MISSION EVALUATION FORM

DATE:

TO: OL-G HQ AWS/CARCAH

FROM:

SUBJECT: MISSION _____ EVALUATION
(MISSION IDENTIFIER)

I. PUBLISHED REQUIREMENTS

1. CONTROL POINT AND TIME _____
2. FLIGHT TRACK _____
3. EXPIRATION TIME OF REQUIREMENT _____
4. MISCELLANEOUS (DROP PSNS, ALTITUDES, ETC.) _____

II. RECONNAISSANCE MISSION PERFORMANCE

1. CONTROL PT TIME: _____ ON TIME _____ LATE _____ EARLY _____ MISSED
2. FLIGHT TRACK FLOWN: _____ COMPLETELY _____ PARTIALLY _____ OTHER
3. HORIZONTAL DATA COVERAGE: COMPLETE _____ TIMELY _____ ACCURATE _____
INCOMPLETE _____ UNTIMELY _____ INACCURATE _____
4. VERTICAL DATA COVERAGE: COMPLETE _____ TIMELY _____ ACCURATE _____
INCOMPLETE _____ UNTIMELY _____ INACCURATE _____

III. OVERALL MISSION EVALUATION

OUTSTANDING _____

UNSATISFACTORY _____ FOR: COMPLETENESS _____ ACCURACY _____ TIMELINESS _____

EQUIPMENT _____ PROCEDURES _____ OTHER _____

IV. REMARKS (BRIEF BUT SPECIFIC) _____

V. REPLY BY INDORSEMENT _____ YES _____ NO

(Forecaster's Signature)

APPENDIX D
NWSOP COORDINATED REQUEST FOR
AIRCRAFT RECONNAISSANCE

I. NMC REQUEST (ACCOMPLISH ITEMS 1 AND 3 OR 2 AND 3 AND FILL IN APPROPRIATE SPACES)

_____ 1. FLIGHT IS DESIRED

A. CONTROL POINT AND CONTROL POINT TIME

B. TRACK NUMBER AND ALTITUDE

C. EXPIRATION TIME OF FLIGHT REQUEST

D. SPECIAL INSTRUCTIONS (SUCH AS DROPSONDE POSITIONS)

_____ 2. NO FLIGHT IS DESIRED OR PREVIOUSLY REQUESTED FLIGHT IS CANCELLED

_____ 3. SUCCEEDING DAY OUTLOOK

A. ANTICIPATED TRACK NUMBER _____

B. CONTROL POINT AND CONTROL POINT TIME _____

II. SCC MIAMI/CARCAH COORDINATION

1. SCC MIAMI FORECASTER INITIALS _____

2. NMC FORECASTER INITIALS _____

3. CARCAH DUTY OFFICER INITIALS _____

4. DATE AND TIME _____

III. SCC MIAMI DISTRIBUTION: PASS ALL AIRCRAFT RECON REQUESTS, CHANGES OR CANCELLATIONS TO CARCAH IMMEDIATELY.

CHAPTER 2
APPENDIX E

NOTES

1. At the time of the observation the aircraft observing platform is considered to be located on the axis of a right vertical cylinder with a radius of 30 nautical miles bounded by the earth's surface and the top of the atmosphere. Present weather, cloud amount and type, turbulence, and other subjective elements are reported as occurring within the cylinder. Flight level winds, temperature, dew point, and geopotential values are sensed or computed and reported as occurring at the center of the observation circle. Radar echoes, significant weather changes, distant weather, and icing are phenomena that may also be observed/reported. Code groups identifying these phenomena may be reported as necessary to adequately describe met conditions observed.
2. An intermediate observation is only reported at the specific request of a customer. The intermediate observation is reported following Section One (or Section Two if appended to Section One) in the order that it was taken. Section Three data are observed/measured at a flight lvl close to the flight lvl of the Section One data to which they are attached.
3. Plain language remarks may be added as appropriate. These remarks follow the last encoded portion of the horizontal or vertical observation and will clearly convey the intended message. Vertical observations will not include meteorological remarks. These remarks must begin with a letter or word - E.G. "Remarks 700MB FL TEMP" vice "700MB FL TEMP". Remarks may be abbreviated so long as the intended msg is not misunderstood. For instance, "700MB HSS 113" or "WND 40830" will not convey as much meaning as "700MB HSS 3113 METERS" or "SFC WND 080DEG 30KTS". The last report plain language remarks are mandatory, i.e., "LAST REPORT. OBS 01 thru 08 to RJTY, OBS 09 and 10 to RPMK".
4. The hundreds digit of longitude is omitted for longitudes from 100° to 180° .
5. If the radar/radio altimeter is inoperative, the aircraft is overland, or if the geopotential system adjustment is not within established limits, the pressure altitude is entered for $h_a h_a h_a$ (in decameters) in lieu of absolute altitude.
6. $T_T, T_d T_d$. When encoding negative temperatures, 50 is added to the absolute value of the temperature with the hundreds figure, if any, being omitted. A temperature of -50°C is given as 00, the distinction between -50°C and 0°C being made from i_d . Missing or unknown temperatures are reported as //. When the dew point is colder than -49.4°C , the actual value will be reported as a plain language remark - E.G. DEW POINT -52°C .
7. When two or more types of w co-exist, the type with the higher code figure will be reported. Code Figures 1, 2 and 3 are reported based on the total cloud amount through a given altitude, above or below the aircraft, and when other figures are inappropriate. The summation principle applies only when two or more cloud types share a given altitude.
8. When j is reported as a 9, HHH is encoded as /// and pressure altitude is entered in $h_a h_a h_a$.
9. If the number of cloud layers reported exceeds 3, k_n in the first l-group reports the total number of cloud layers. The second l-group reports the additional number of layers being reported exclusive of those previously reported. k_n will be reported as a solidus whenever it is impossible to determine that clouds exist due to darkness or other reasons. In those cases where a cloud layer(s) is discernible but a descriptive cloud picture of the observation circle is not possible, k_n will be encoded as a solidus. An appropriate remark should be included, i.e., clouds below. When clouds are present in indefinite layers (chaotic sky), 9 is reported for k_n and the total amount of cloud covering the sky is reported by the first N_s with /'s reported for the remainder. The sequence in which cloud amounts are encoded depends upon type of cloud, cloud base, and vertical extent of the cloud. The cloud with the largest numerical value of cloud type code (C) is reported first, regardless of coverage, base, or vertical extent. Among clouds of the same cloud type code sharing a common base, the cloud of greatest vertical extent is reported first. The summation principle is not used; each layer is treated as though no other clouds were present. The total amount of clouds through one altitude shared by several clouds will not exceed 8 oktas. When k_n is coded as a solidus, N_s are coded as 9. Remarks such as "Clear Above" or "As Below" will be made to indicate the presence or absence of cloud data when such data are not completely descriptive of cloud data within the observation circle.
10. Due to limitations in the ability to distinguish sea state features representative of wind speeds above 130 knots, surface wind speeds in excess of 130 knots will not be encoded. Wind speeds of 100 to 130 knots inclusive will be encoded by deleting the hundreds figure and adding 50 to dd. For wind speeds above 130 knots, dd is reported without adding 50 and ff is encoded as // with a plain language remark added, I.E., -sfc wind above 130 knots.
11. Significant weather changes which have occurred since the last observation or in the preceding hour (whichever period is shorter) along the track are reported for W_s .
12. When aircraft encounters icing in level flight, the height at which the icing occurred will be reported for $h_i h_i$. The $H_i H_i$ will be reported as //.

CHAPTER 2
APPENDIX E
CODE TABLES

TABLE 1 XXX

- 222 Sec One Observation without radar capability
- 555 Sec Three (Intermediate) observation with or without radar capability
- 777 Sec One Observation with radar capability

TABLE 2 i_d

- 0 No dew point capability/acft below 10,000 meters
- 1 No dew point capability/acft at or above 10,000 meters
- 2 No dew point capability/acft below 10,000 meters and flight lvl temp -50°C or colder
- 3 No dew point capability/acft at or above 10,000 meters and flight lvl temp -50°C or colder
- 4 Dew point capability/acft below 10,000 meters
- 5 Dew point capability/acft at or above 10,000 meters
- 6 Dew point capability/acft below 10,000 meters and flight lvl temp -50°C or colder
- 7 Dew point capability/acft at or above 10,000 meters and flight lvl temp -50°C or colder

TABLE 3 Q

- | | | |
|---|----------------------------------|----------|
| 0 | $0^{\circ} - 90^{\circ}$ W | Northern |
| 1 | 90° W - 180° W | Northern |
| 2 | $180^{\circ} - 90^{\circ}$ E | Northern |
| 3 | $90^{\circ} - 0^{\circ}$ E | Northern |
| 4 | Not Used | |
| 5 | $0^{\circ} - 90^{\circ}$ W | Southern |
| 6 | $90^{\circ} - 180^{\circ}$ W | Southern |
| 7 | $180^{\circ} - 90^{\circ}$ E | Southern |
| 8 | $90^{\circ} - 0^{\circ}$ E | Southern |

TABLE 4 B

- 0 None
- 1 Light turbulence
- 2 Moderate turbulence in clear air, infrequent
- 3 Moderate turbulence in clear air, frequent
- 4 Moderate turbulence in cloud, infrequent
- 5 Moderate turbulence in cloud, frequent
- 6 Severe turbulence in clear air, infrequent
- 7 Severe turbulence in clear air, frequent
- 8 Severe turbulence in cloud, infrequent
- 9 Severe turbulence in cloud frequent

TABLE 5 f_c

- 0 Clear
- 1 Clouds, tops less than 10,000 ft
- 2 Clouds, tops 10,000 ft to 18,000 ft
- 3 Clouds, tops over 18,000 ft
- 4 Clouds, bases less than 10,000 ft
- 5 Clouds, bases 10,000 ft to 18,000 ft
- 6 Clouds, bases above 18,000 ft
- 7 Between layers, no clouds flt lvl
- 8 In and out of clouds
- 9 In clouds all the time (continuous IMC)
- / Impossible to determine due to darkness or other cause

TABLE 6 d_t

- 0 Spot Wind
- 1 Average Wind
- / No wind reported

TABLE 7 d_a

- 0 Winds obtained using doppler radar or inertial systems
- 1 Winds obtained using other navigation equipment and/or techniques
- / Navigator unable to determine wind or wind not compatible

TABLE 8 w

- 0 Clear (less than 1/8 cloud at any level)
- 1 Scattered (1/8 to 4/8 cloud coverage)
- 2 Broken (5/8 to 7/8 cloud coverage)
- 3 Overcast/undercast
- 4 Fog, thick dust or haze
- 5 Drizzle
- 6 Rain (continuous or intermittent precip - from stratiform clouds)
- 7 Snow or rain and snow mixed
- 8 Shower(s) (continuous or intermittent precip - from cumuliform clouds)
- 9 Thunderstorm(s)
- / Unknown for any cause including darkness

TABLE 9 j

- 0 Sea level pressure in whole millibars (thousands fig if any omitted)
- 1 Altitude 200 mb surface in geopotential decameters (thousands fig if any omitted)
- 2 Altitude 850 mb surface in geopotential meters (thousands fig omitted)
- 3 Altitude 700 mb surface in geopotential meters (thousands fig omitted)
- 4 Altitude 500 mb surface in geopotential decameters
- 5 Altitude 400 mb surface in geopotential decameters
- 6 Altitude 300 mb surface in geopotential decameters
- 7 Altitude 250 mb surface in geopotential decameters (thousands fig if any omitted)
- 8 D - Value in geopotential decameters; if negative 500 is added to HHH
- 9 No absolute altitude available or geopotential data not within ± 30 meters/4 mb accuracy requirements.

TABLE 10 N_s

- 0 None
- 1 1 okta or less, but not zero (1/8 or less sky covered)
- 2 2 oktas (or 2/8 of sky covered)
- 3 3 oktas (or 3/8 sky covered)
- 4 4 oktas (or 4/8 of sky covered)
- 5 5 oktas (or 5/8 of sky covered)
- 6 6 oktas (or 6/8 of sky covered)
- 7 7 oktas or more but not 8 oktas
- 8 8 oktas or sky completely covered
- 9 Sky obscured or cloud amount can not be estimated

TABLE 11 C

- 0 Cirrus (Ci)
- 1 Cirrocululus (Cc)
- 2 Cirrostratus (Cs)
- 3 Alto cumulus (Ac)
- 4 Altostratus (As)
- 5 Nimbostratus (Ns)
- 6 Stratocumulus (Sc)
- 7 Stratus (St)
- 8 Cumulus (Cu)
- 9 Cumulonimbus (Cb)
- / Cloud type unknown due to darkness or other analogous phenomena

TABLE 12 $h_s h_s H_t H_t h_i h_i H_i H_i$

- 00 Less than 100
- 01 100 ft
- 02 200 ft
- 03 300 ft
- etc, etc
- 49 4,900 ft
- 50 5,000 ft
- 51-55 Not used
- 56 6,000 ft
- 57 7,000 ft
- etc, etc
- 79 29,000ft
- 80 30,000 ft
- 81 35,000 ft
- 82 40,000 ft
- etc, etc
- 89 Greater than 70,000 ft
- // Unknown

TABLE 13 d_w

- | | | |
|---|-----------|------------------|
| 0 | No report | |
| 1 | NE | 7 NW |
| 2 | E | 8 N |
| 3 | SE | 9 all directions |
| 4 | S | |
| 5 | SW | |
| 6 | W | |

TABLE 14 W_s

- 0 No change
- 1 Marked wind shift
- 2 Beginning or ending of marked turbulence
- 3 Marked temperature change (not with altitude)
- 4 Precipitation begins or ends
- 5 Change in cloud forms
- 6 Fog or ice fog bank begins or ends
- 7 Warm front
- 8 Cold front
- 9 Front, type not specified

TABLE 15 $S_b S_e S_s$

- 0 No report
- 1 Previous position
- 2 Present position
- 3 30 nautical miles
- 4 60 nautical miles
- 5 90 nautical miles
- 6 120 nautical miles
- 7 150 nautical miles
- 8 180 nautical miles
- 9 More than 180 nautical miles
- / Unknown

CHAPTER 2
APPENDIX E

CODE TABLES (CONTINUED)

TABLE 16 w_d

- 0 No report
- 1 Signs of hurricane
- 2 Ugly threatening sky
- 3 Duststorm or sandstorm
- 4 Fog or ice fog
- 5 Waterspout
- 6 Cirrostratus shield or bank
- 7 Altostratus or altocumulus shield or bank
- 8 Line of heavy cumulus
- 9 Cumulonimbus heads or thunderstorms

TABLE 17 l_r

- 7 Light
- 8 Moderate
- 9 Severe
- / Unknown or contrails

TABLE 18 l_t

- 0 None
- 1 Rime ice in clouds
- 2 Clear ice in clouds
- 3 Combination rime and clear ice in clouds
- 4 Rime ice in precipitation
- 5 Clear ice in precipitation
- 6 Combination rime and clear ice in precip
- 7 Frost (icing in clear air)
- 8 Nonpersistent contrails (*less than 1/4 nautical miles long*)
- 9 Persistent contrails

TABLE 19 S_r, E_w, E_1

- | | |
|--------|----------------------|
| 0 ONM | 5 50NM |
| 1 10NM | 6 60-80NM |
| 2 20NM | 7 80-100NM |
| 3 30NM | 8 100-150NM |
| 4 40NM | 9 Greater than 150NM |
| | / Unknown |

TABLE 20 O_e

- 0 Circular
- 1 NNE - SSW
- 2 NE - SW
- 3 ENE - WSW
- 4 E - W
- 5 ESE - WNW
- 6 SE - NW
- 7 SSE - NNW
- 8 S - N
- / Unknown

TABLE 21 c_e

- 1 Scattered Area
- 2 Solid Area
- 3 Scattered Line
- 4 Solid Line
- 5 Scattered, all quadrants
- 6 Solid, all quadrants
- / Unknown

TABLE 22 i_e

- 2 Weak
- 5 Moderate
- 8 Strong
- / Unknown

TABLE 23 V_i

- 1 Inflight visibility 0 to and including 1 nautical mile
- 2 Inflight visibility greater than 1 and not exceeding 3 nautical miles
- 3 Inflight visibility greater than 3 nautical miles

RECCO SYMBOLIC FORM

SECTION ONE (MANDATORY)

9XXX9 GGggi_d YQL_aL_aL_a L_oL_oL_oBf_c h_ah_ah_ad_td_a
ddfff TTT_dT_dw /iHHH

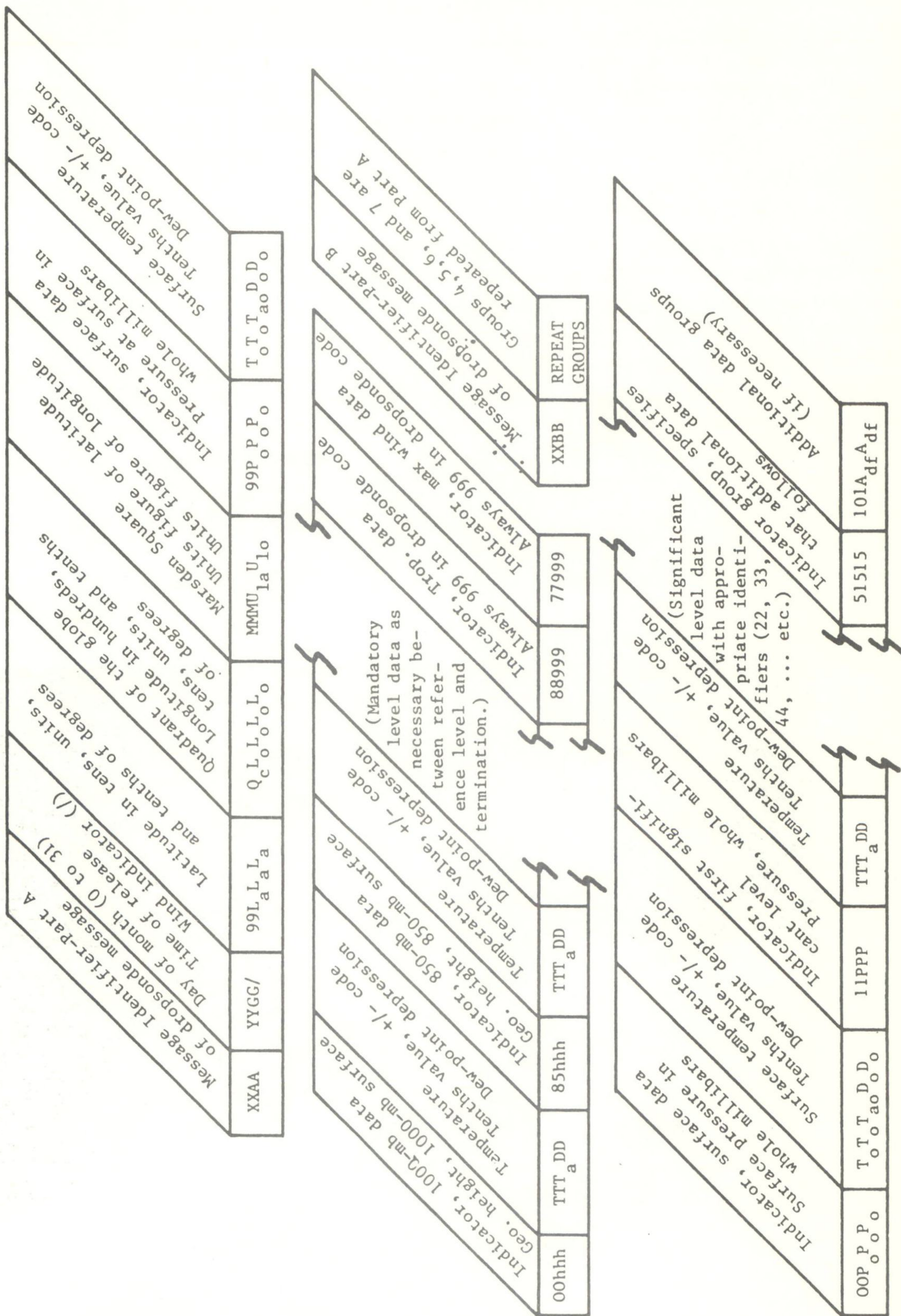
SECTION TWO (ADDITIONAL)

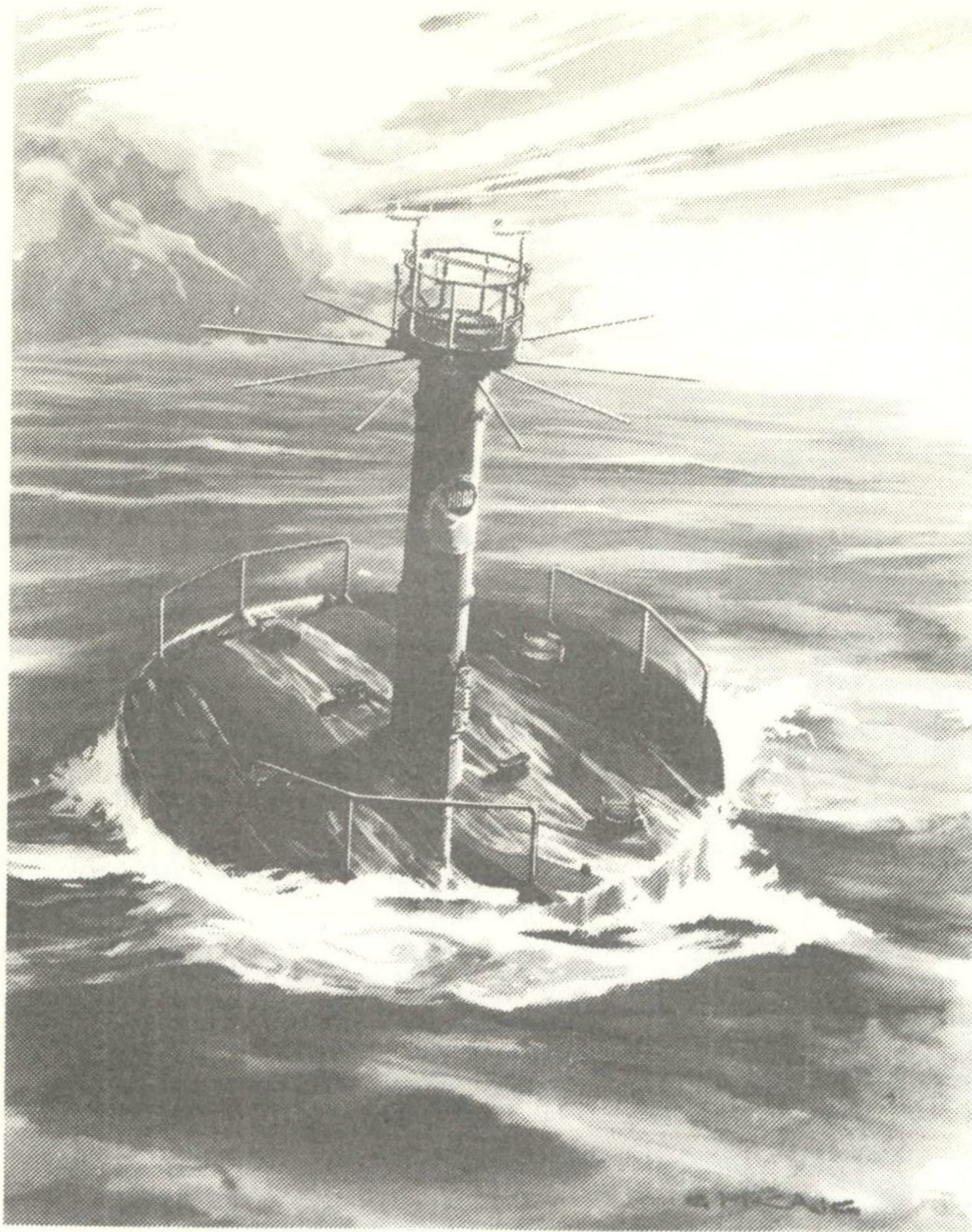
lk_nN_sN_sN_s Ch_sh_sH_tH_t 4ddff
6W_sS_sW_dd_w 7I_rI_tS_bS_e 7h_ih_i H_iH_i 8d_rd_rS_rO_e
8E_wE₁c_ei_e 9V_iT_wT_wT_w

SECTION THREE (INTERMEDIATE)

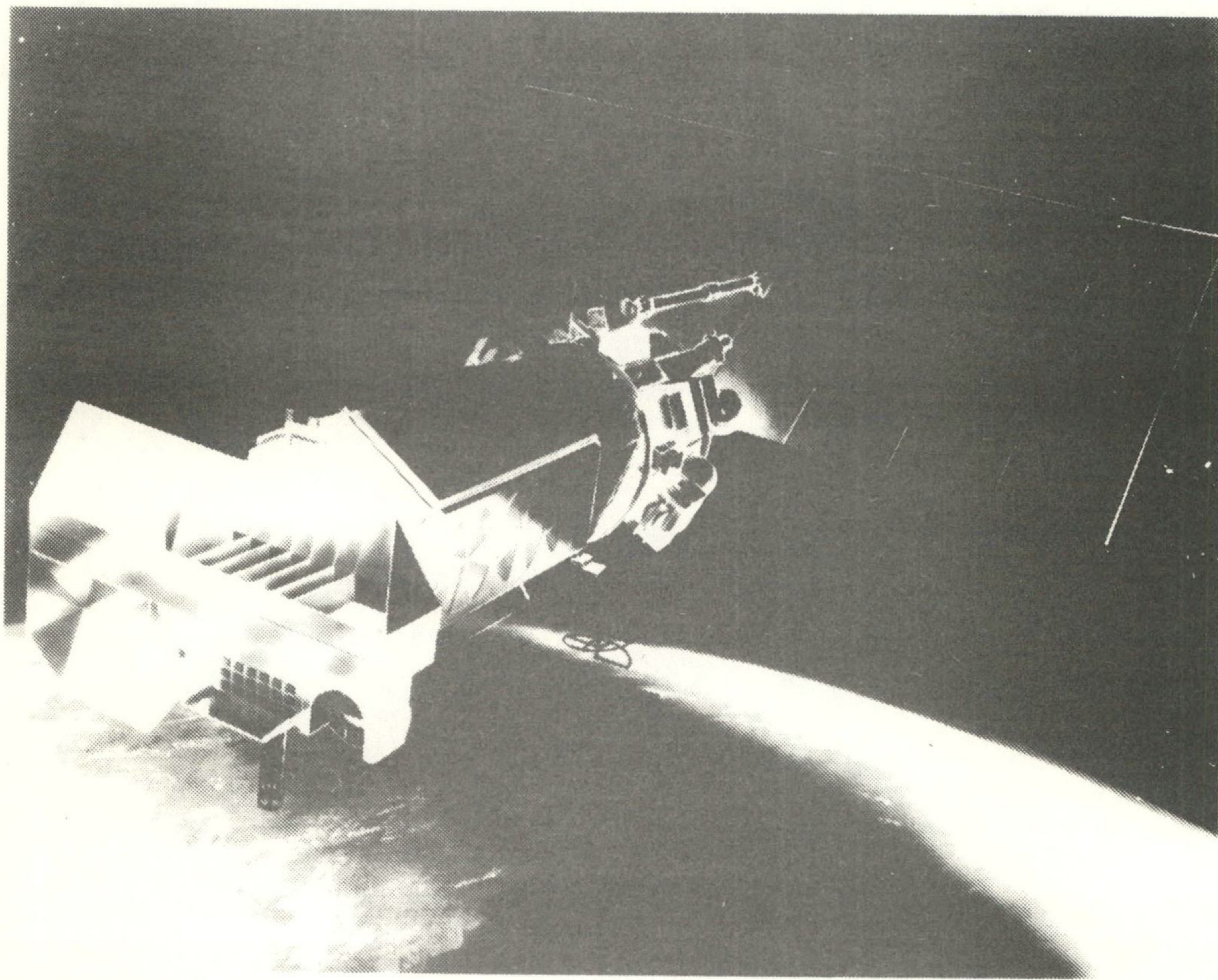
9XXX9 GGggi_d YQL_aL_aL_a L_oL_oL_oBf_c h_ah_ah_ad_td_a
ddfff TTT_dT_dw /iHHH

CHAPTER 2
APPENDIX F
THE SYMBOLIC FORM OF CODED DROPSONDE SOUNDINGS





DEEP OCEAN MOORED BUOYS REPORT HOURLY DATA THROUGH GOES.



POLAR ORBITING SATELLITES, NOAA-6 AND NOAA-7, VIEW EVERY PORTION OF THE EARTH'S SURFACE FOUR TIMES DAILY FROM ABOUT 540 MILES

CHAPTER 3
OTHER OBSERVATIONS

1. General. In addition to aerial reconnaissance data, the observational system used in support of the National Winter Storms Operations Plan includes land surface, ship, radar, buoy, upper air, and satellite data. The routine operations of these various data sources are detailed in the following series of Federal Handbooks and Plans:

- Federal Meteorological Handbook No. 1, Surface Observations
- Federal Meteorological Handbook No. 2, Synoptic Observations
- Federal Meteorological Handbook No. 4, Radiosonde Code
- Federal Meteorological Handbook No. 7, Weather Radar Observations
- National Weather Service Weather Radar Manual
- Operations of the National Weather Service
- Federal Plan for Environmental Data Buoys
- The GOES/SMS User's Guide and Operational Amendments

Procedures for obtaining special or nonroutine 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 several agencies involved.

The only observational programs which will be covered in any detail here are the two data sources (described in paragraph 2 below) 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 Earth Satellite Service (NESS).

(1) Geostationary Operational Environmental Satellite (GOES). The GOES system consists of two operational satellites located over the equator at 75W (GOES East) and 135W (GOES West). The principal GOES products (see Table 3-1) are one-half hourly pictures with implanted grids automatically applied to all sectors. During the daylight hours, one-half, one, and two-mile (0.9, 1.8, and 3.7 km) resolution fixed standard sectors are produced, and during the night equivalent one and two-mile (1.8 and 3.7 km) IR (infrared) standard sectors are produced. Additionally, certain IR pictures will be enhanced at specified times to emphasize various features, and floating sectors at one-half, one, and two-mile (0.9, 1.8, and 3.7 km) resolution may be produced as desired to augment standard sector coverage. Geographical coverage of standard sectors are indicated in the GOES/SMS User's Guide.

(2) NOAA Polar-Orbiting Satellites. NOAA-6 and NOAA-7 will provide data for direct read-out (Automatic Picture Transmission) [APT]. These two NOAA satellites will also provide data that are received, processed, and disseminated via NWS facsimile circuits. In some instances, the GOES distribution system will be utilized to disseminate data via the SFSSs to the WSFOs.

(3) Satellite Field Service Stations (SFSS's) and Synoptic Analysis Branch (SAB).

(a) Support Concept. Under the NESS support concept, satellite imagery in support of the Winter Storms Plan is distributed by the Central Data Distribution Facility at Camp Springs, Maryland, to the SFSS's, the SAB, and WSFO's.

1. NESS SAB. The SAB operates 24 hours to provide satellite data support to the National Meteorological Center (NMC). The SAB meteorologists provide satellite information to the NMC meteorologists concerning present locations and intensities of winter storms and the projected speed, direction, and future intensities of these storms. The possibility of turbulence, icing, and precipitation amounts are also discussed.

2. Satellite Field Services Stations. Satellite support to the NWS field offices is provided by the MIA SFSS, MKC SFSS, NEW SFSS, and DCA SFSS to their collocated NWS SCC's. In addition, the following support products are available to the meteorological community:

a. Satellite Interpretation Messages (SIM). SIM's are available through the FAA Request/Reply, RAWARC, and Service "C" teletype circuits. All WSFO's receive these automatically as transmitted from the SFSS's. However, other users such as those WSO's which are collocated with FAA-FSS may also have access to these SIM's by using the standard Request/Reply teletypewriter capabilities of the FAA-FSS. The heading and issue times for the SIM's are as follows:

TBXX6 KWBC - Eastern Region - 0200Z, 0800Z, 1200Z, 2000Z
TBXX6 KMKC - Central and Southern Region - 0200Z, 0800Z, 1300Z, 2000Z
TBXX7 KNEW - Gulf of Mexico - 0320Z, 0820Z, 1120Z, 1400Z, 1700Z, 2000Z,
2320Z

(Times subject to change)

SIM's may be updated as required by weather conditions.

b. Satellite cloudtop and tropopause (SCAT) messages are prepared by DCA SFSS, and contain information on cloudtop heights and temperatures and tropopause heights over areas of interest throughout the eastern region. The heading for SCAT messages is TBXX10 KWBC. Issue times are 0530Z, 1130Z, 1730Z, and 2330Z.

c. The DCA SFSS prepares and issues a daily message on snow and ice cover within its area of responsibility. 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. The message heading is TBXX11 KWBC and is issued approximately 2130Z daily.

(b) NESS Station Contact:

Miami SFSS (305)350-4310 and 4460 FTS: 350-4310 and 4460	0630-1630 EST 1820-0230 EST
Kansas City SFSS (816)374-2102 and 2103 FTS: 758-2102 and 2103	24h/day
Washington SFSS (301)763-8424 and 8425 FTS: 763-8424 and 8425	24h/day
Satellite Analysis Branch (301)763-8444 FTS: 763-8444	24h/day
San Francisco SFSS (415)876-9122 and 9123 FTS: 470-9122 and 9123	24h/day
Anchorage SFSS (907)271-3473 FTS: Seattle Opr 399-0150 Anchorage 271-3473	24h/day
New Orleans SFSS (504)649-5130	24h/day

b. Department of Defense Meteorological Satellite Program (DMSP). The 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. DMSP data capabilities in the area of concern are provided in Table 3-1 to this chapter. Special requests for DMSP support will be addressed to OL-G, AWS.

3. Environmental Data Buoy Observations.

a. General. Environmental data buoys in the Gulf of Mexico and Great Lakes, and off the U. S. east and west coasts obtain data on meteorological and oceanographic parameters for operational and research purposes. (See Figure 3-1 for location of buoys.) The status and capability of data buoys can be obtained from the Data Systems Division, NOAA Data Buoy Office (NDBO), NSTL Station, MS 39529, telephone (601)688-2836 or FTS 494-2836.

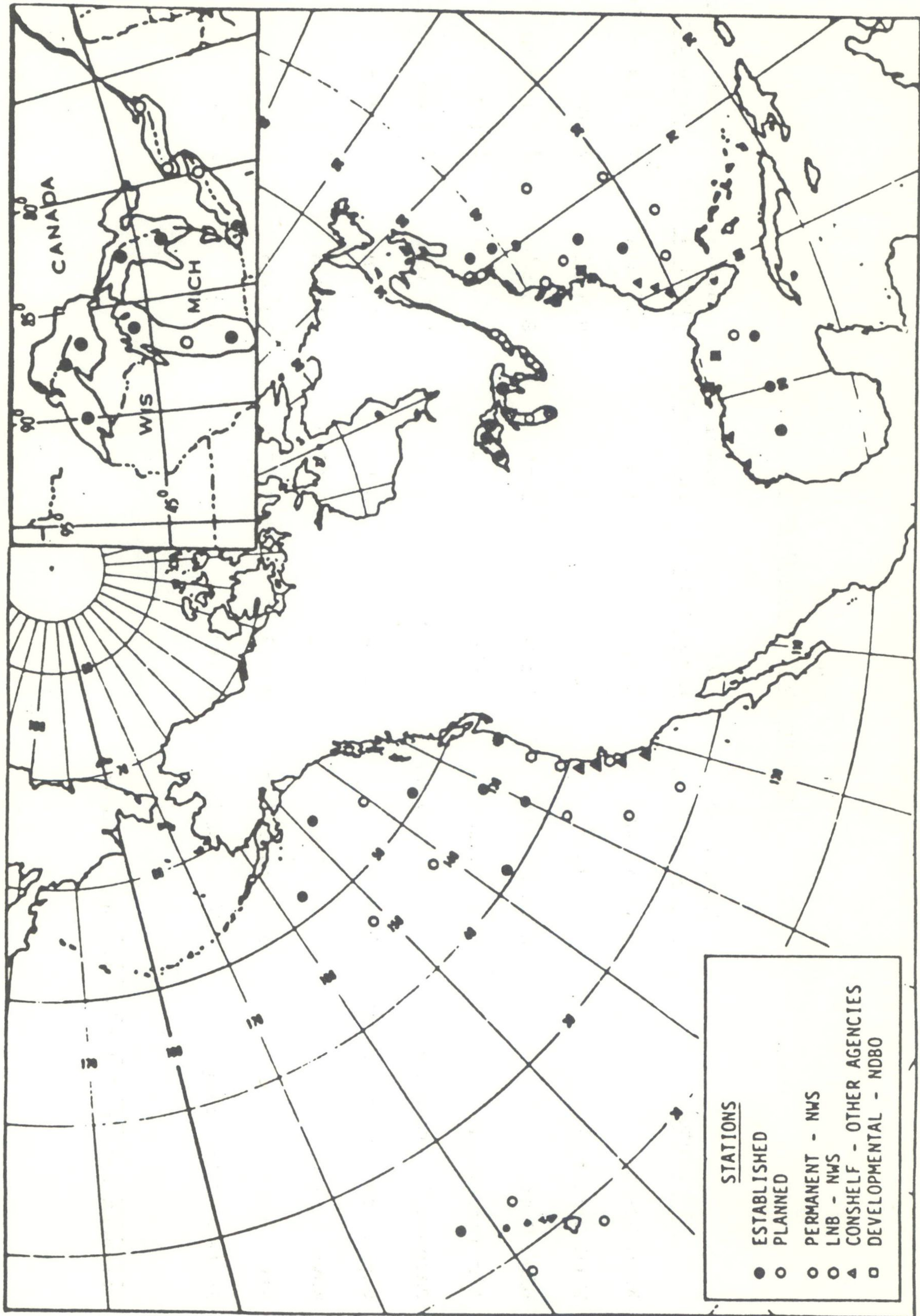
b. Procedures. Environmental data buoys routinely acquire, store, and transmit data every hour. Data obtained operationally include sea-level pressure, wind direction and speed, air temperature, sea-surface temperature, and wave height spectral data. A description of the data from a typical moored buoy payload is provided in Table 3-2.

c. Communications. Buoy data are transmitted by UHF communications via the GOES satellite to NESS and then are relayed on to NMC, Suitland, Maryland, for processing and dissemination. Data are formatted into WMO FM24V synoptic code.

TABLE 3-1
SATELLITES AND SATELLITE DATA AVAILABILITY FOR NATIONAL WINTER STORMS OPERATIONS PLAN

<u>Satellite</u>	<u>Type of Data</u>	<u>Local Time</u>	<u>Remarks</u>
GOES East - 75.0°W GOES West - 135.0°W 2 spacecraft (standby)	VISSR	Every 30 minutes (24 h/day) (Limited scan for short-interval viewing available)	<ol style="list-style-type: none"> 1/4-, 1-, and 2-mi (0.9, 1.8 and 3.7 km) resolution visible standard sectors covering western United States, midwest, and eastern United States (daylight). 2. 1- and 2-mi (1.8 and 3.7 km) equivalent IR standard sectors for the entire United States (night). 3. Equivalent IR-enhanced imagery. 4. Floating sectors at 1/4-, 1-, and 2-mi (0.9, 1.8 and 3.7 km) resolution (visible and equivalent IR). 5. Full disc IR (day and night). 6. Movie loops. 7. Wind analysis.
NOAA-7	GAC & LAC (stored)	1430/0230	<ol style="list-style-type: none"> 1. Mapped digitalized data (cloud cover imagery). 2. Sea-surface temperature analysis. 3. Moisture analysis. 4. Soundings.
NOAA-6	APT (direct) TOVS AVHRR	0730/1930	
DMSP	LF/TF LS/TS	0700/1900	<ol style="list-style-type: none"> 1. Unmapped imager (all data types). 2. Mapped imagery (IS/TS data only).
GAC - Global Area Coverage (recorded reduced resolution data for Central Processing) LAC - Local Area Coverage (recorded high resolution data, limited amount) TOVS - TIROS Operational Vertical Sounder HRPT - High Resolution Picture Transmission (1.1 km) APT - Automatic Picture Transmission (4 km) AVHRR - Advanced Very High Resolution Radiometer VISSR - Visible and Infrared Spin Scan Radiometer			<p>LF - Light Fine (Visual scanning Radiometer 0.3 nmi (556 m)) TF - Thermal Fine (Infrared Scanning Radiometer 0.3 nmi (556 m)) LS - Flight Smooth (Visual Scanning Radiometer 1.5 nmi (2.8 km)) TS - Thermal Smooth (Infrared Scanning Radiometer 1.5 nmi (2.8 km))</p>

NDBO BUOY LOCATIONS



4/22/81

Figure 3-1. NOAA Data Buoy Locations

TABLE 3-2
MOORED BUOY PAYLOAD DATA

<u>Parameter</u>	<u>Reporting Range</u>	<u>Reporting Resolution</u>	<u>Sample Interval</u>	<u>Sample Period</u>	<u>Total System Accuracy</u>
Wind Speed	0 to 80 m/s	1 m/s	1 s	8.5 min	± 1 m/s or 10%
Wind Direction	0 to 360°	10°	1 s	8.5 min	± 10°
Wind Gust	0 to 80 m/s	1 m/s	1 s	8.5 min*	± 1 m/s or 5%
Air Temperature	-15° to 50°C	0.5°C	90 s	90 s	± 1°C
Barometric Pressure	900 to 1100 mb	0.1 mb	4 s	8.5 min	± 1 mb absolute
Significant Wave Height	0 to 20 m	0.5 m	0.67 s	20 min	± 0.5 m
Wave Period	2 to 30 s	1 s	0.67 s	20 min	± 1 s
Wave Spectra	0.01 to 0.5 Hz	0.005 Hz	0.67 s	20 min	--
Surface Water Temp	-15° to 50°C	0.5°C	1 s	1 s	± 1°C

*Highest 8-second window average retained.

CHAPTER 4

COMMUNICATIONS

1. 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.

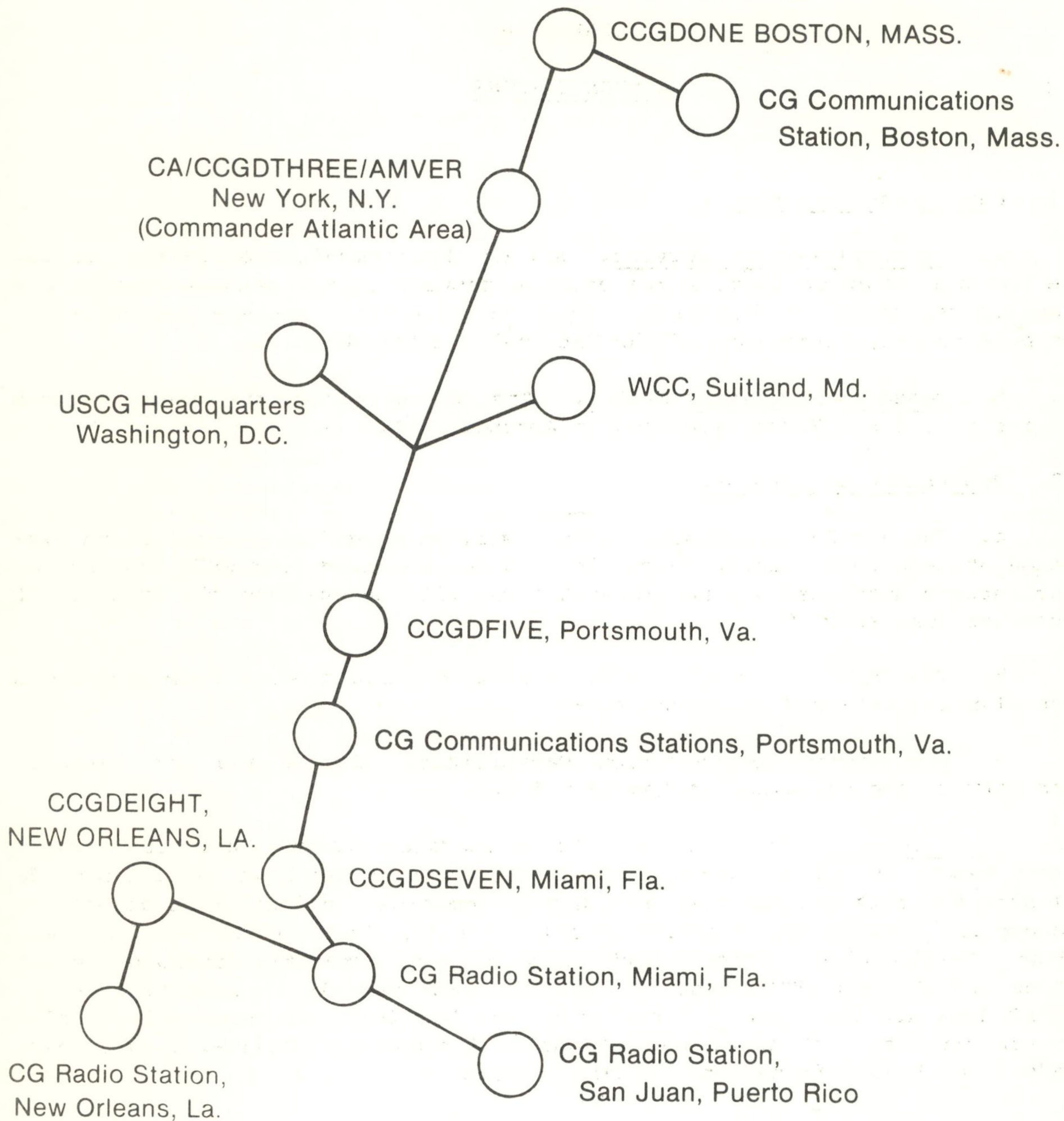
2. Department of Defense.

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 Network (AWN) will be used for the exchange of data between NOAA and DOD.

b. The USAF National 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. The Coast Guard operates numerous activities which routinely report or collect meteorological data. Those units which will provide data inputs for this program are Coast Guard communication facilities at Boston, Massachusetts; Portsmouth, Virginia; Miami, Florida; New Orleans, Louisiana; and San Juan, Puerto Rico. These facilities collect Automatic Merchant Vessel Reporting (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 AND RESCUE CIRCUIT (SARLANT) GT 7990

CHAPTER 4

APPENDIX A

AIRCRAFT RECONNAISSANCE COMMUNICATIONS

1. General. Except for aircraft-to-satellite data link equipped aircraft, weather reconnaissance observations will be transmitted using HF single sideband 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 Communicatins. The USAF aeronautical station contact will depend upon aircraft location and radio propagation conditions. Initial frequencies are as published in appropriate enroute flight publications. After initial contact, aeronautical stations will provide a discrete 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 Miami Weather monitor through any aero station.

SECONDARY

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

CHAPTER 4
APPENDIX B
RECONNAISSANCE ORGANIZATION COMMUNICATION CAPABILITIES

<u>STATION</u>	<u>ADDRESS</u>	<u>TELETYPE</u>	<u>TELEPHONE</u>
CARCAH/MIAMI Monitor	OL-G, AWS Coral Gables, FL	A B C	AV 894-3430 CO 305-666-4612 FTS 350-5547 AV 894-1150 (phone patch only)
Mather Weather Monitor	Det 7, 24 WS Mather AFB, CA	B	AV 828-4377
Hickam Weather Monitor	Det 4, 1 WW Hickam AFB, HI	B	AV 315-449-1279
National Hurricane Center	Nat'l. Hurricane Center Coral Gables, FL	A B C	CO 305-667-3108 FTS 350-5547
Alternate National Hurricane Center	WSFO Washington, DC	A C	CO 301-899-3152 FTS-763-8300
	WSFO New Orleans, LA	A C	CO 504-522-7330 FTS 682-6891
Eastern Pacific Hurricane Center	WSFO Redwood City, CA	C	CO 415-876-9381 FTS 463-7767
Central Pacific Hurricane Center	WSFO Honolulu, HI	C	CO 808-836-3419
Naval Eastern Oceanography Center, Norfolk	NAVEASTOCEANCEN Norfolk, VA	B	AV 690-7750
Naval Western Oceanography Center, Pearl Harbor	NAVWESTOCEANCEN Pearl Harbor, HI	B	AV 315-430-0111 (ask for 471-0004)
RFC	RFC Miami, FL	A	CO 305-526-2936
Det 5, AWS	Det 5, AWS Keesler AFB, MS		AV 868-2544
AF Global Weather Central	AFGWC Offutt AFB, NE	B	AV 271-2586 FTS 866-2586
CINCLANTFLT OAC	CINCLANTFLT OAC Ronkonkoma, NY	C	AV 938-1694
ARTCC Miami	ARTCC Miami, FL	C	AV 894-1910
53 WRS	53 WRS Keesler AFB, MS		AV 868-4540 CO 601-377-4540
920 WRG	920 WRG Keesler AFB, MS		AV 868-4318 CO 601-377-4318

A - GT7072
B - COMEDS
C - AFTN

CHAPTER 5

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 the 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, DC 20301

Department of the Army
ATTN: DAMI-TST-I
Washington, DC 20310

Commander, Naval Oceanography Command
NSTL Station
Bay St. Louis, MS 39529

Military Airlift Command/PA
Scott AFB, IL 62225

Office of Public Affairs
National Oceanic and Atmospheric Administration
Washington, D. C. 20230

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

Commandant (G-BPA)
Headquarters, U.S. Coast Guard
Washington, DC 20593

Commandant, Marine Corps
Headquarters, U.S. Marine Corps
Washington, DC 20380

Headquarters, Aerospace Rescue and Recovery Service
ARRS/DO
Scott AFB, IL 62225

Headquarters, Air Force Reserve
AFRES/DO
Robins AFB, GA 31098

Headquarters, Air Weather Service
AWS/DO
Scott AFB, IL 62225



Extreme snowfall accumulation is shown in
Hamburg, New York as a result of winter storms.

CHAPTER 6

DEFINITIONS

1. Blizzard Warning. A blizzard warning is a headline carried in NWS forecasts and special weather statements that serves notice to the public of a high probability for the occurrence of blizzard conditions (wind speeds of 35 mph or more, considerable falling and/or blowing snow causing poor visibilities frequently less than one-fourth mile).

2. Freezing Rain (or Drizzle). The freezing of rain or drizzle on objects as it strikes them. Winter storm warnings should be reserved for occasions when significant, and possibly damaging, accumulations of ice are expected. However, even small amounts are extremely dangerous to traffic when encountered unexpectedly, and these conditions frequently require the issuance of a travelers' advisory.

3. Heavy Snow Warning. A heavy snow warning is a headline carried in NWS forecasts and special weather statements that serves notice to the public of a high probability for the occurrence of heavy snow (four inches or more accumulation in 12 hours or six or more accumulation in 24 hours).

4. Reconnaissance Aircraft Sortie. A flight which meets the requirements of the winter storm plan of the day.

5. Sleet (one form of ice pellet). Generally, solid grains of ice which form from the freezing of raindrops or the refreezing of largely melted snowflakes. Sleet, like small hail, usually bounces when hitting a hard surface. Heavy sleet is a fairly rare event in which the ground is covered to a depth of significance to motorists and others.

6. Winter Storm Plan of the Day. A coordinated mission plan that tasks operational weather reconnaissance requirements during the next 05Z to 05Z day; describes reconnaissance flights committed to satisfy operational requirements, and identifies possible reconnaissance requirements for the succeeding 24-hour period.

7. Winter Storm Warning. A winter storm warning is a headline carried in NWS forecasts and special weather statements that serves notice to the public of a high probability for the occurrence of severe winter weather. The warning is issued for the same events (except for blizzard conditions) that serve as a basis for the issuance of a winter storm watch. An exception may be made in two special situations: one is the heavy snowfall that often occurs along the lee of the Great Lakes; the other is locally heavy orographic snowfall in mountainous terrain. When these conditions cannot be directly connected to a synoptic-scale winter storm, the term "Heavy Snow Warning" may be used as a headline in forecasts. The term "Winter Storm Warning" will still be used in these areas for heavy snows produced by synoptic-scale storm systems.

8. Winter Storm Watch. A winter storm watch is a headline carried in NWS forecasts and special weather statements to cover the possible occurrence of the following weather elements, either separately or in combination: blizzard conditions, heavy snow (or light in areas where snow is relatively rare), accumulations of freezing rain or freezing drizzle, and/or heavy sleet.

9. Winter Weather Advisories. Stockmen's and Travelers' Advisories are used to describe conditions which do not constitute a serious enough hazard to warrant a warning for the general public but, nevertheless, pose a significant threat to specified users. They are highlighted in forecasts and statements.

10. Area of Concern. The geographic area of concern covers the Gulf of Mexico extending about 150 miles inland along the U.S. Gulf Coast. In the Atlantic, the area of concern ranges from latitudes 30°N to 48°N , west of longitude 65°W , extending about 150 miles inland along the eastern coast of the United States.

11. Mission Identifier. The nomenclature assigned to winter storm aircraft reconnaissance missions for weather data identification. It comprises an agency-aircraft indicator followed by a Chief, Aerial Reconnaissance Coordination, All Hurricanes (CARCAH) assigned mission-system indicator.

CHAPTER 7

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 Bulletin
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
DOC	Department of Commerce
DOD	Department of Defense
DMSP	Defense Meteorological Satellite Program
DRSP	Direct Readout Scanning Radiometer
ESSA	Environmental Survey Satellite
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FAA	Federal Aviation Administration
FSS	Flight Service Station
FTS	Federal Telecommunications System
GOES	Geostationary Operational Environmental Satellite
HF	High Frequency
ICMS	Interdepartmental Committee for Meteorological Services
kPa	Kilopascal
METEO	Cable Address for Ships
MSD	Meteorological Services Division
NASA	National Aeronautics and Space Administration
NAVEASTOCEANCEN	Naval Eastern Oceanography Center
NAVOCEANCOM	Naval Oceanography Command
NAWAS	National Warning System
NDBO	NOAA Data Buoy Office
NESS	National Earth Satellite Service
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NSSFC	National Severe Storms Forecast Center
NSSL	National Severe Storms Laboratory
NWS	National Weather Service
OSV	Ocean Station Vessel
OWS	Ocean Weather Station

Pa	Pascal
PIREP	Pilot Report
RAREP	Radar Report
RAWARC	Internal RAREP Teletypewriter Circuit (NWS)
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 Bulletin
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)
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

CHAPTER 8

METRIC CONVERSION FACTORS

LENGTH

<u>From</u>	<u>Approximate Factor</u>	<u>To/From</u>	<u>Approximate Factor</u>	<u>To</u>
inches	2.5	centimeters	0.4	inches
feet	30.5	centimeters	0.03	feet
feet	0.3	meters	3.3	feet
yards	0.9	meters	1.1	yards
st. miles	1.6	kilometers	0.6	st. miles
n. miles	1.85	kilometers	0.54	n. miles

AREA

sq. in.	6.5	sq. cm.	0.16	sq. in.
sq. ft.	0.09	sq. m.	11.1	sq. ft.
sq. ft.	0.8	sq. m.	1.2	sq. yd.
sq. st. mi.	2.6	sq. km.	0.4	sq. st. mi.
acres	0.4	hectares	2.4	acres

MASS

ounce	28.0	grams	0.035	ounce
pound	0.45	kilogram	2.2	kilogram
short ton	0.9	metric ton	1.1	short ton

VOLUME

fl. oz.	30.0	milliliter	0.03	fl. oz.
qt.	0.95	liters	1.06	qt.
cu. in.	16.0	milliliter	0.06	cu. in.
cu. ft.	0.03	cu. meters	35.0	cu. ft.
cu. yd.	0.76	cu. meters	1.3	cu. yd.

TEMPERATURE

Fahrenheit	0.56 after sub- tracting 32	Celsius	1.8 then add 32	Fahrenheit
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FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

INTERDEPARTMENTAL COMMITTEE FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH (ICMSSR)

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- o Automated Weather Information Systems
- o Radiological, Gaseous and Particulate Transport Models
- o Weather Radar Systems

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- o Cooperative Backup Among Operational Processing Centers
- o Dissemination of NMC Products
- o Hurricane Operations
- o Marine Environmental Predictions
- o Meteorological Codes
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- o Operational Processing Centers
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- o Winter Storms Operations
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