

U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES
AND SUPPORTING RESEARCH



**National Winter Storms
Operations Plan**

FMC-P13-1985



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

3907

NATIONAL WINTER STORMS
OPERATIONS PLAN

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Washington, D. C.
October 1985

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CHANGE LOG

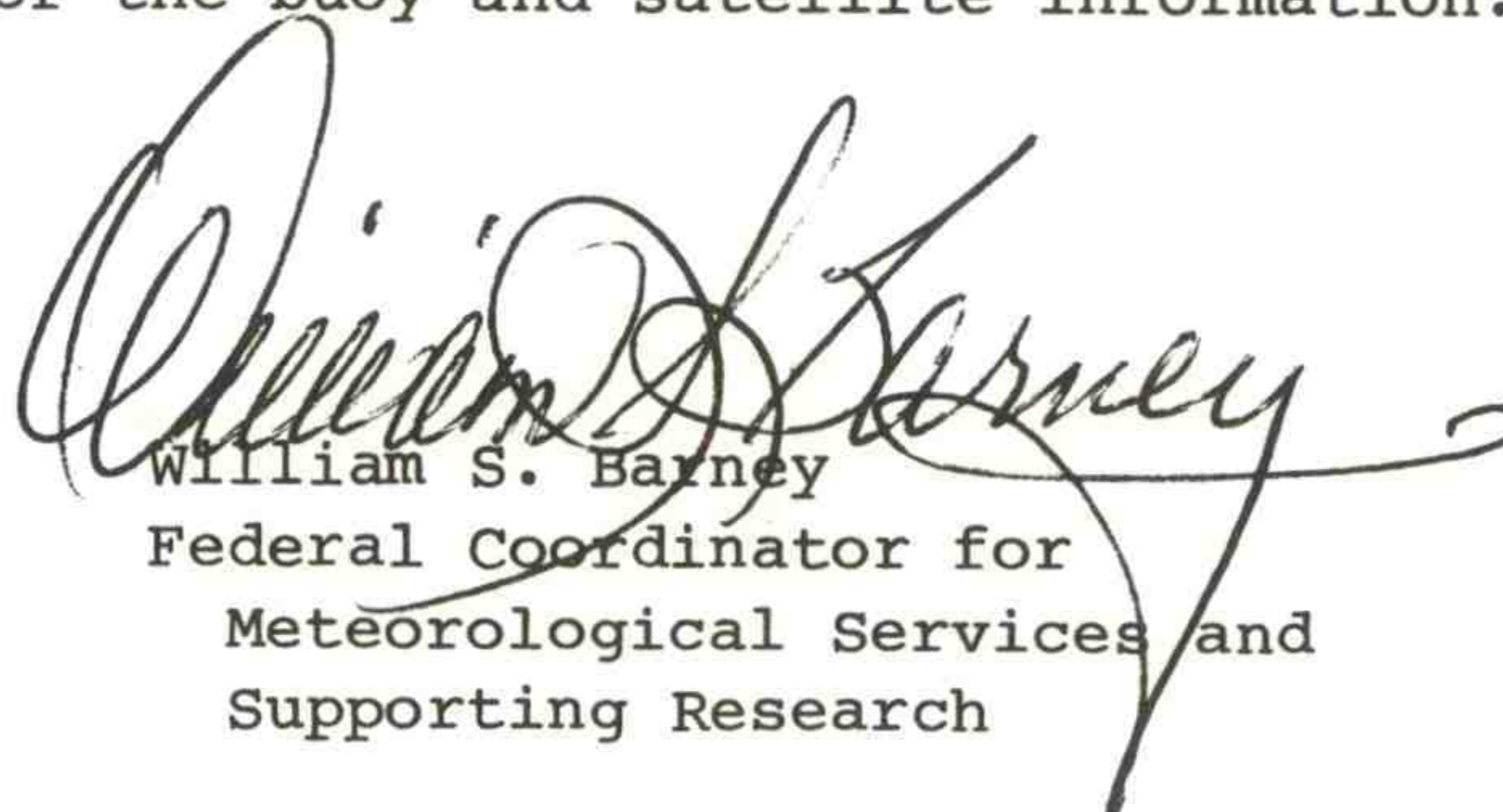
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FOREWORD

In a memorandum dated October 23, 1969, the Chairman, Interdepartmental Committee for Meteorological Services (ICMS), established a Working Group under the purview of the Committee on Basic Services (CBS) 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 weather observations for use in warning of severe winter storms along the Gulf and East Coasts.

This document is the 15th edition of the Plan and represents a general update of the previous edition published in October 1984. Aerial reconnaissance tracks along the East and Southern Coasts are included as well as an update of the buoy and satellite information.



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

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CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

1. General

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."

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.

2. Responsibilities

a. The Department of Commerce (DOC) will:

(1) Provide basic surface, upper air, and radar observations from its network of stations making such observations.

(2) Provide additional observations, when required, making available all reports to any requesting agency.

(3) Provide basic analyses and forecasts through the National Meteorological Center (NMC), Camp Springs, Maryland.

(4) 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.

(5) Provide advice on aircraft reconnaissance requirements forwarded through the National Hurricane Center (NHC) 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.

(6) 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.

(7) Coordinate with the National Aeronautics and Space Administration (NASA) to obtain pertinent meteorological data from NASA research and development experimental satellites.

(8) Coordinate with the DOD Services to obtain pertinent meteorological data from the Defense Meteorological Satellite Program.

(9) Provide data in the form of satellite pictures for selected situations to authorized research facilities.

(10) Furnish aircraft from Office of Aircraft Operations to support the operational reconnaissance and research objectives of the National Winter Storms Program.

(a) 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.

(b) Secondary objective is to provide data that will permit analyses and a better understanding of the structure and dynamics of these winter storm systems.

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

(12) Provide dissemination of weather observation data to appropriate agencies.

(13) 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.

b. The Department of Defense (DOD) will:

(1) 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.

(2) Furnish to the National Weather Service: (1) aircraft reconnaissance observations that are within its capabilities and in accordance with established reconnaissance priorities established in ARRSR 55-6; and (2) special observations detailed in Chapter 3 of this Plan.

(3) Designate CARCAH as the point of contact for coordination with NMC and Miami WSFO for aircraft reconnaissance required in support of this Plan.

(4) Provide weather reconnaissance data monitor services to evaluate and disseminate reconnaissance reports.

(5) Provide USAF aeronautical station communications to relay reconnaissance reports from the aircraft to the weather monitors.

(6) Provide warnings to all DOD facilities and military units of weather factors which threaten to inhibit their operations or to damage their installations.

c. The Federal Aviation Administration (FAA) will provide for:

(1) Air traffic control (ATC) services as appropriate to support this Plan.

(2) Dissemination of PIREPs.

(3) Hourly weather and special weather observations at selected terminal and flight service station locations.

d. The U. S. Coast Guard will:

(1) Provide surface observations to NWS from its coastal facilities and vessels.

(2) Interrogate surface ships of opportunity for special weather observations through the Automated Mutual-Assistance Vessel Rescue (AMVER) system.

(3) Provide personnel, vessel, and communication support to the NOAA Data Buoy Office for development, deployment, and operation of environmental data buoy systems.

(4) Provide communication circuits for relay of weather observations to NWS.

(5) Provide coastal broadcast facilities at selected locations for dissemination of forecasts and warnings.



WEATHER INSTRUMENTED USAF WC-130 AIRCRAFT
USED FOR WINTER STORM RECONNAISSANCE

CHAPTER 2

AIRCRAFT RECONNAISSANCE

1. General. All Department of Commerce (DOC) winter storm reconnaissance needs will be requested and provided in accordance with the procedures of this chapter. As outlined in the USAF/NOAA MOU, 16 March 1976, DOC has identified and DOD maintains aircraft to support up to one reconnaissance sortie per day. In times of National emergency or war, some or all DOD reconnaissance resources may not be available to fulfill DOC needs.

2. Responsibilities.

a. DOD is responsible for providing operational aircraft for winter storm synoptic tracks in response to DOC needs.

b. DOC is responsible for aircraft operation which will be used when 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 Environmental Research Laboratories. All such flights will be assigned by CARCAH in the WSPOD.

3. Operational Control of Aircraft. Operational control of aircraft flying winter storm reconnaissance missions will remain with the operating agencies of DOC or DOD as appropriate.

4. Reconnaissance Planning and Flight Notification.

a. Requirements. NMC will forward sortie/alert needs to CARCAH through the WSFO 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 DOD and DOC assets. NMC will be responsible for requesting all reconnaissance flights and will provide information as specified in paragraph 4.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 will be identified by NMC through CARCAH and the WSPOD.

b. Change to Requirements. Changes to mission requirements will be accepted by CARCAH 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 normally 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. Delays exceeding 13.5 hours may be accepted in extraordinary circumstances.

(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.

(4) 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 Weather Service Forecast Office, New Orleans, approximately 2.5 hours prior to scheduled aircraft departure time. Any changes to the WSPOD must 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 (control point) within the interval from 30 minutes 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 (control point) 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 substandard. Requirements levied as resources permitting will not be assessed for timeliness. These assessments should be mailed to:

OL G HQ 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 (WSPOD).

(1) Coordination. NMC will coordinate with the appropriate NWS field offices as needed and provide WSPOD information (Appendix 2D) to CARCAH through the WSFO 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. Specify an alternate altitude to be flown in case the 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 DOD and DOC 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 or control reconnaissance aircraft. 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) 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 20 (Appendix 2A) normally will be flown during storm or storm threat situations. NOTE: Due to current equipment limitations, it may not be possible to complete all dropsonde requirements for tracks 16-20.

(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 DOD/DOC 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.

(1) Air traffic control (ATC) will provide air traffic control separation between all aircraft operating on storm missions and between storm mission aircraft and nonparticipating aircraft operating on Instrument Flight Rules (IFR) within controlled airspace. Mission commanders should be aware that nonparticipating aircraft may be operating near storm areas; thus, adherence to ATC clearance is mandatory for safety purposes.

(2) When storm aircraft cannot maintain assigned altitudes due to turbulence, ATC should be advised. Normal vertical separation of 1,000 feet at FL 290 and below and 2,000 feet above FL 290 will be provided by ATC to aircraft operating in the storm area. Unless otherwise coordinated with ATC, the altitudes between storm-mission aircraft may be used by ATC for nonparticipating aircraft.

(3) The U.S. Navy (CINCLANTFLT OAC) will review the WSPOD for each proposed flight to determine if clearance into a particular area will be required. The reconnaissance unit flying the mission will contact the appropriate clearance agencies prior to entry into any restricted airspace.

(4) Any procedure desired by storm-mission commanders which is outside the above parameters must be coordinated with the appropriate ATC center.

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: AF987 TRACK 01 0B01
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: NOAA2 TRACK 05 OB06
97779 ... 91///
95559 ... ETA KMIA 17/2300Z OBS 01 thru 06 to KMIA

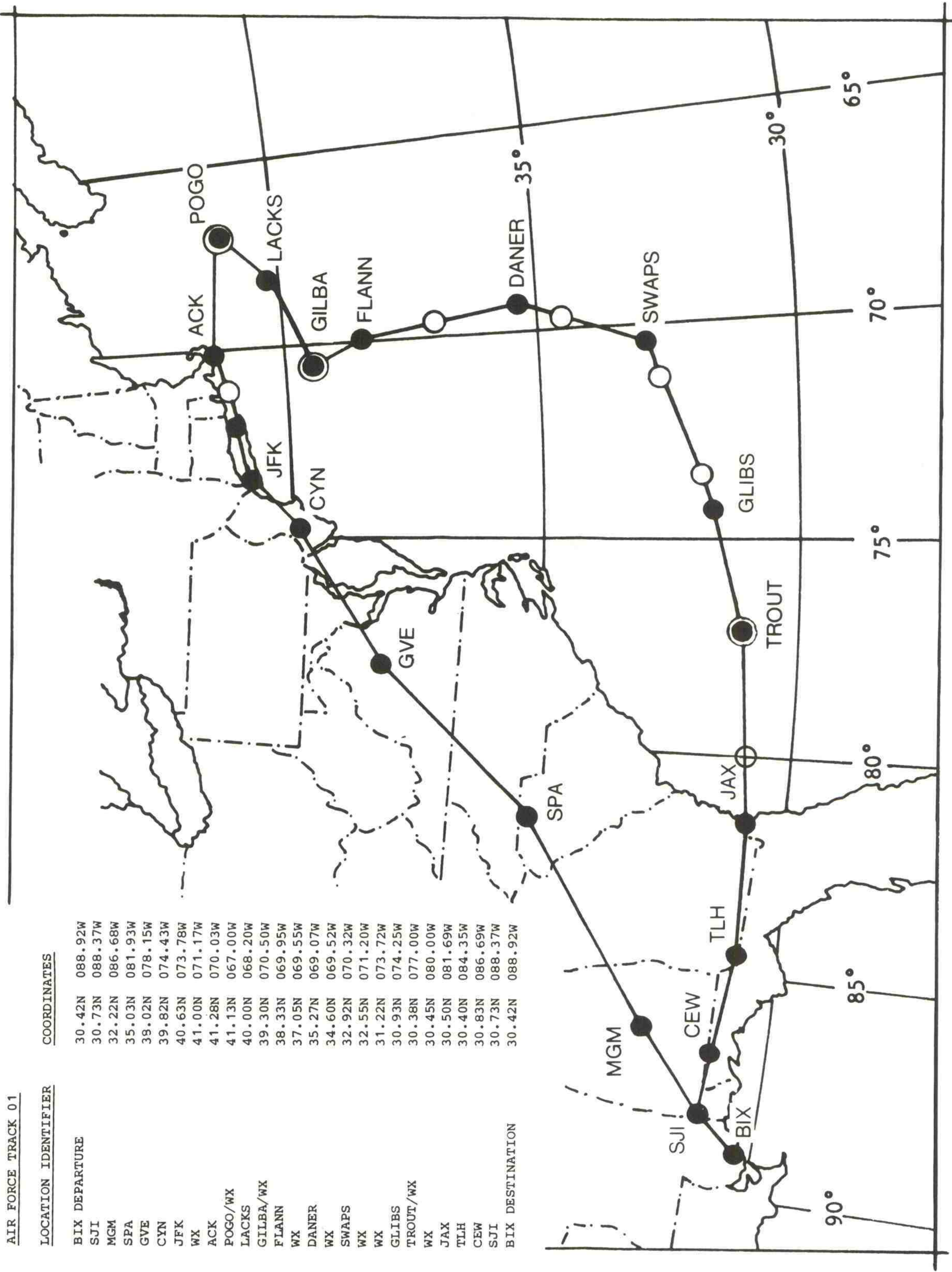
TABLE 2-1
 REQUIREMENT FOR AIRCRAFT RECONNAISSANCE DATA

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 01-08.)	<p>± 5 kt (2.5 m/s) (wind speed)</p> <p>± 10° (wind direction)</p> <p>± 1°C</p> <p>± 20 m</p> <p>± 2 mb (200 Pa)</p> <p>Position within 20 nmi</p>
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).	<p>± 10% (Wave height)</p> <p>± 10 ft (3 m) (wave length)</p> <p>5 kt (2.5 m/s) (wind speed)</p> <p>10° (wind direction)</p>

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

**Includes dropwindsondes. If a sonde fails or vertical data are otherwise unobtainable at a specified position, make another release as soon as possible.

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APPENDIX A



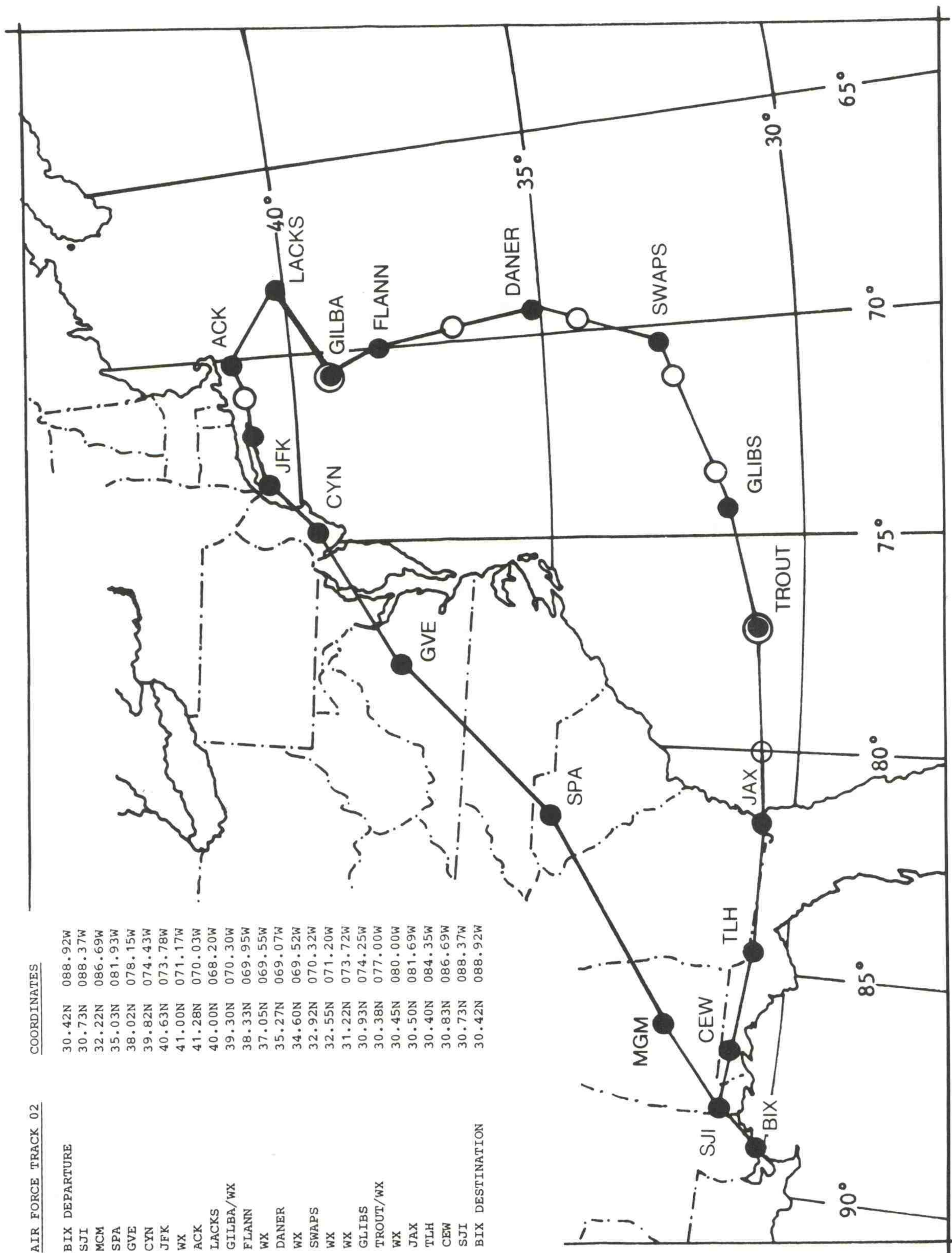
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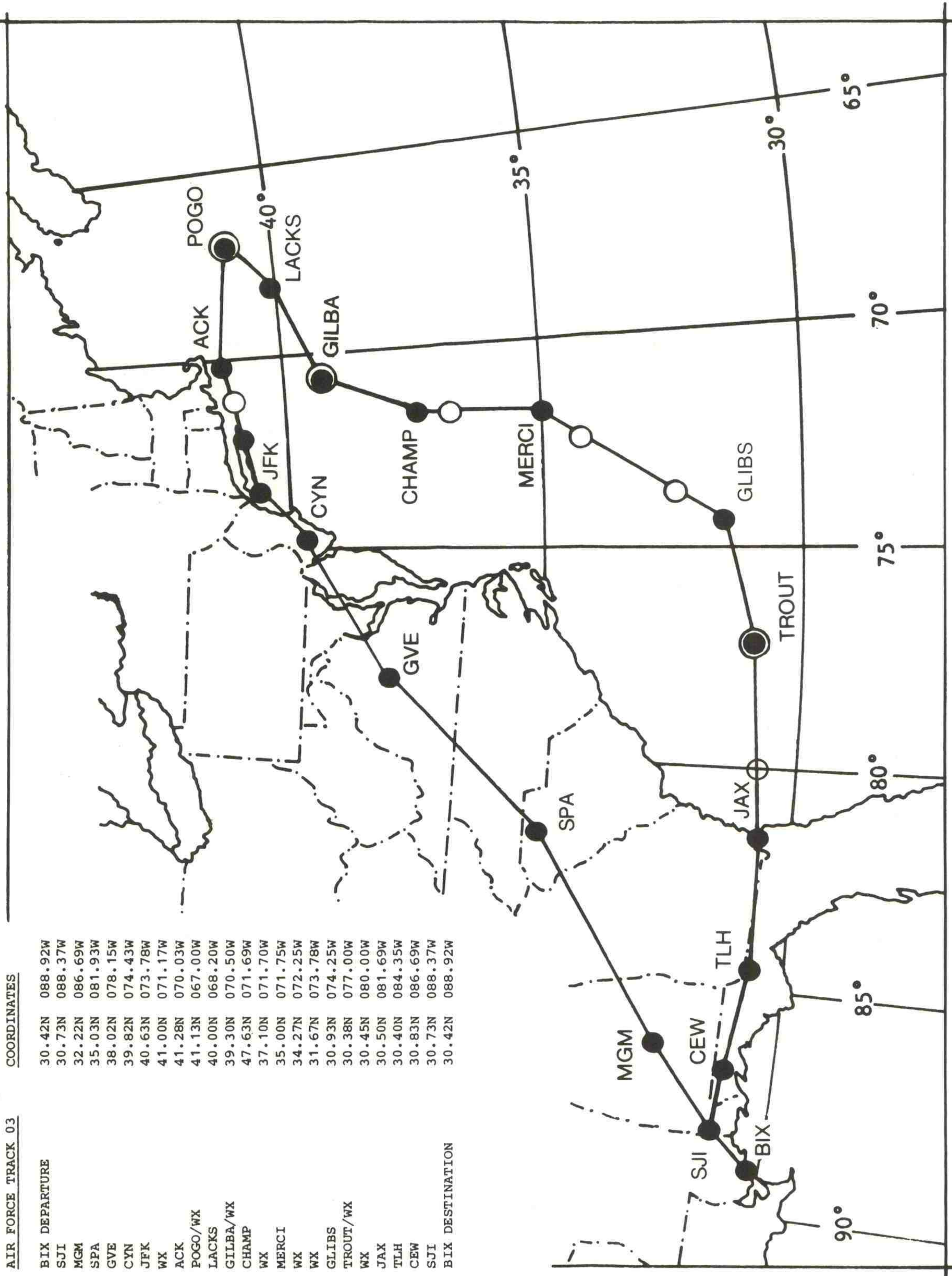
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SJI	30.73N 088.37W
MCM	32.22N 086.69W
SPA	35.03N 081.93W
GVE	38.02N 078.15W
CYN	39.82N 074.43W
JFK	40.63N 073.78W
WX	41.00N 071.17W
ACK	41.28N 070.03W
LACKS	40.00N 068.20W
GILBA/WX	39.30N 070.30W
FLANN	38.33N 069.95W
WX	37.05N 069.55W
DANER	35.27N 069.07W
WX	34.60N 069.52W
SWAPS	32.92N 070.32W
WX	32.55N 071.20W
WX	31.22N 073.72W
GLIBS	30.93N 074.25W
TROUT/WX	30.38N 077.00W
WX	30.45N 080.00W
JAX	30.50N 081.69W
TLH	30.40N 084.35W
CEW	30.83N 086.69W
SJI	30.73N 088.37W
BIX DESTINATION	30.42N 088.92W

COORDINATES



AIR FORCE TRACK 02

ATC Keesler 1-4473



COORDINATES

BIX DEPARTURE	COORDINATES
BIX DEPARTURE	30.42N 088.92W
SJI	30.73N 088.37W
MGM	32.22N 086.69W
SPA	35.03N 081.93W
GVE	38.02N 078.15W
CYN	39.82N 074.43W
JFK	40.63N 073.78W
WX	41.00N 071.17W
ACK	41.28N 070.03W
POGO/WX	41.13N 067.00W
LACKS	40.00N 068.20W
GILBA/WX	39.30N 070.50W
CHAMP	47.63N 071.69W
WX	37.10N 071.70W
MERCI	35.00N 071.75W
WX	34.27N 072.25W
WX	31.67N 073.78W
GLIBS	30.93N 074.25W
TROUT/WX	30.38N 077.00W
WX	30.45N 080.00W
JAX	30.50N 081.69W
TLH	30.40N 084.35W
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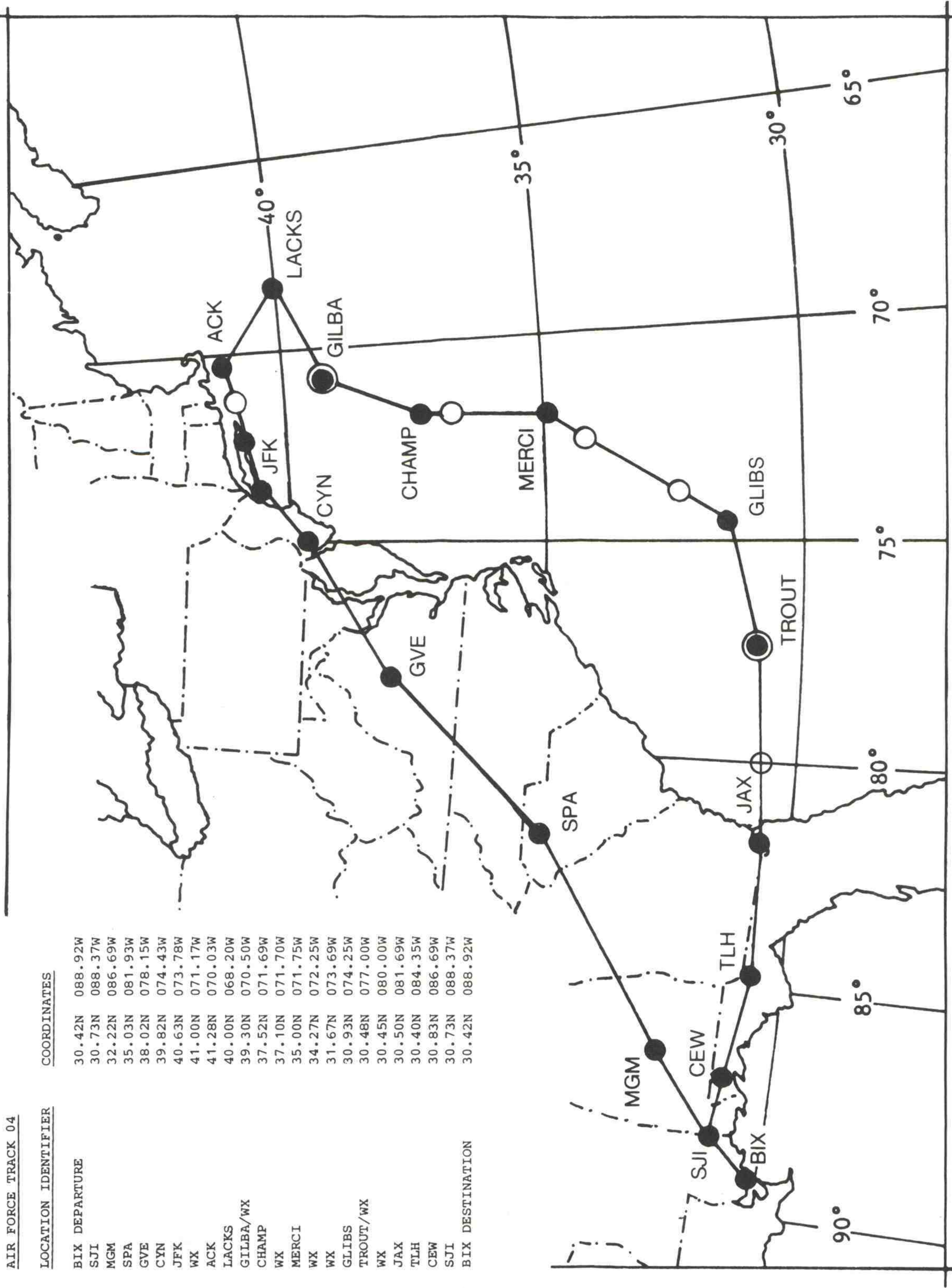
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AIR FORCE TRACK 04

LOCATION IDENTIFIER

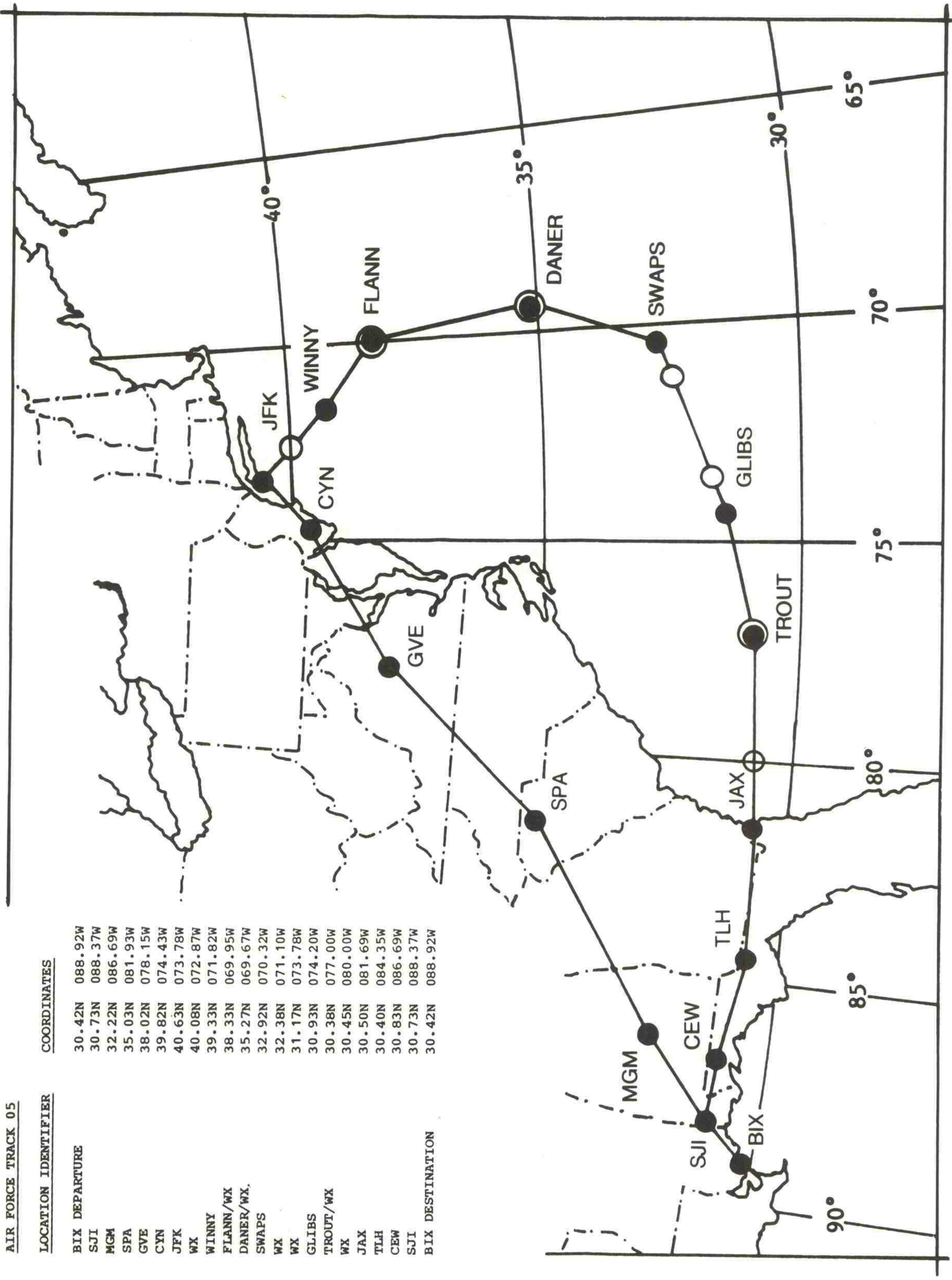
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GVE	38.02N 078.15W
CYN	39.82N 074.43W
JFK	40.63N 073.78W
WX	41.00N 071.17W
ACK	41.28N 070.03W
LACKS	40.00N 068.20W
GILBA/WX	39.30N 070.50W
CHAMP	37.52N 071.69W
WX	37.10N 071.70W
MERCI	35.00N 071.75W
WX	34.27N 072.25W
WX	31.67N 073.69W
GLIBS	30.93N 074.25W
TROUT/WX	30.48N 077.00W
WX	30.45N 080.00W
JAX	30.50N 081.69W
TLH	30.40N 084.35W
CEW	30.83N 086.69W
SJI	30.73N 088.37W
BIX DESTINATION	30.42N 088.92W



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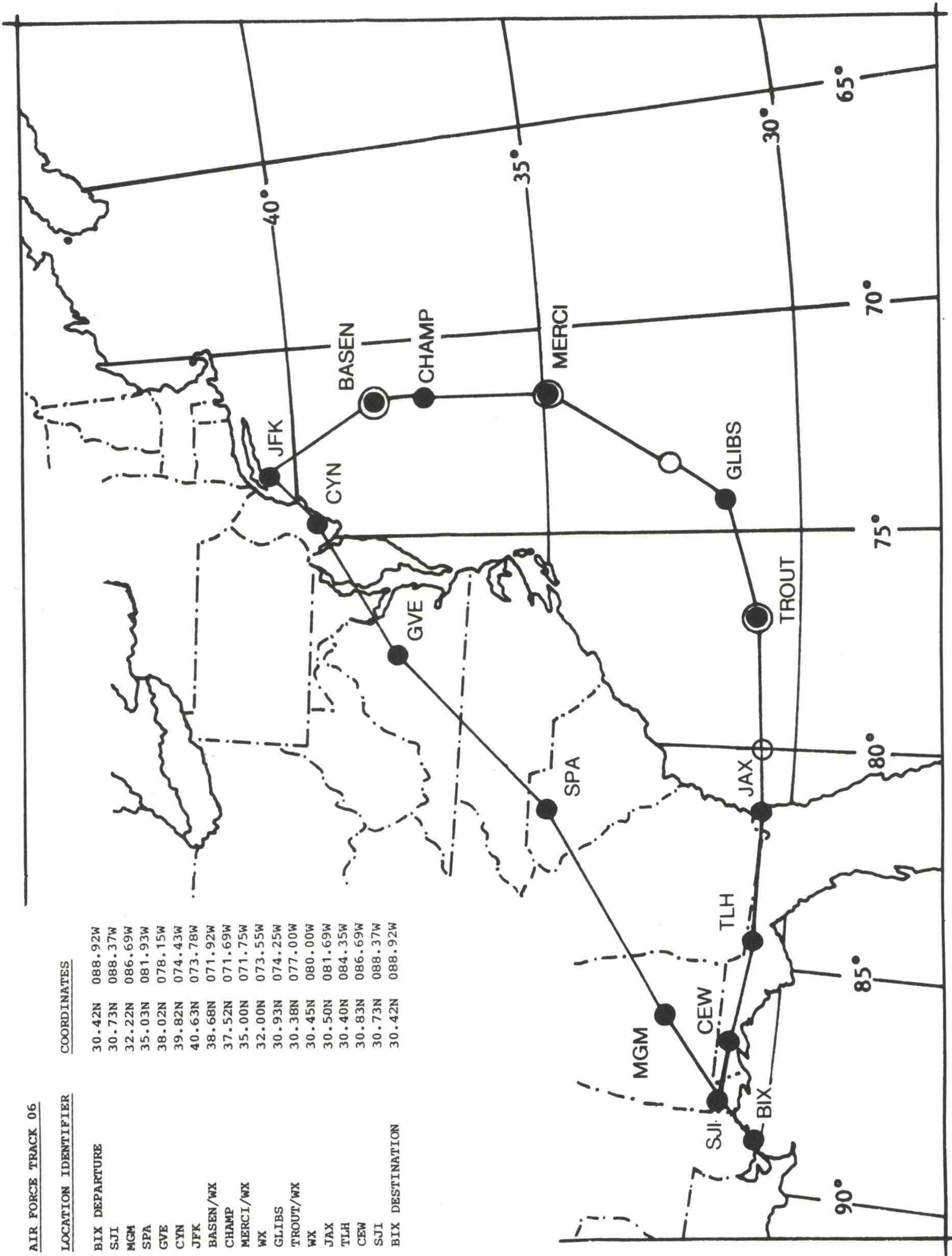
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AIR FORCE TRACK 05

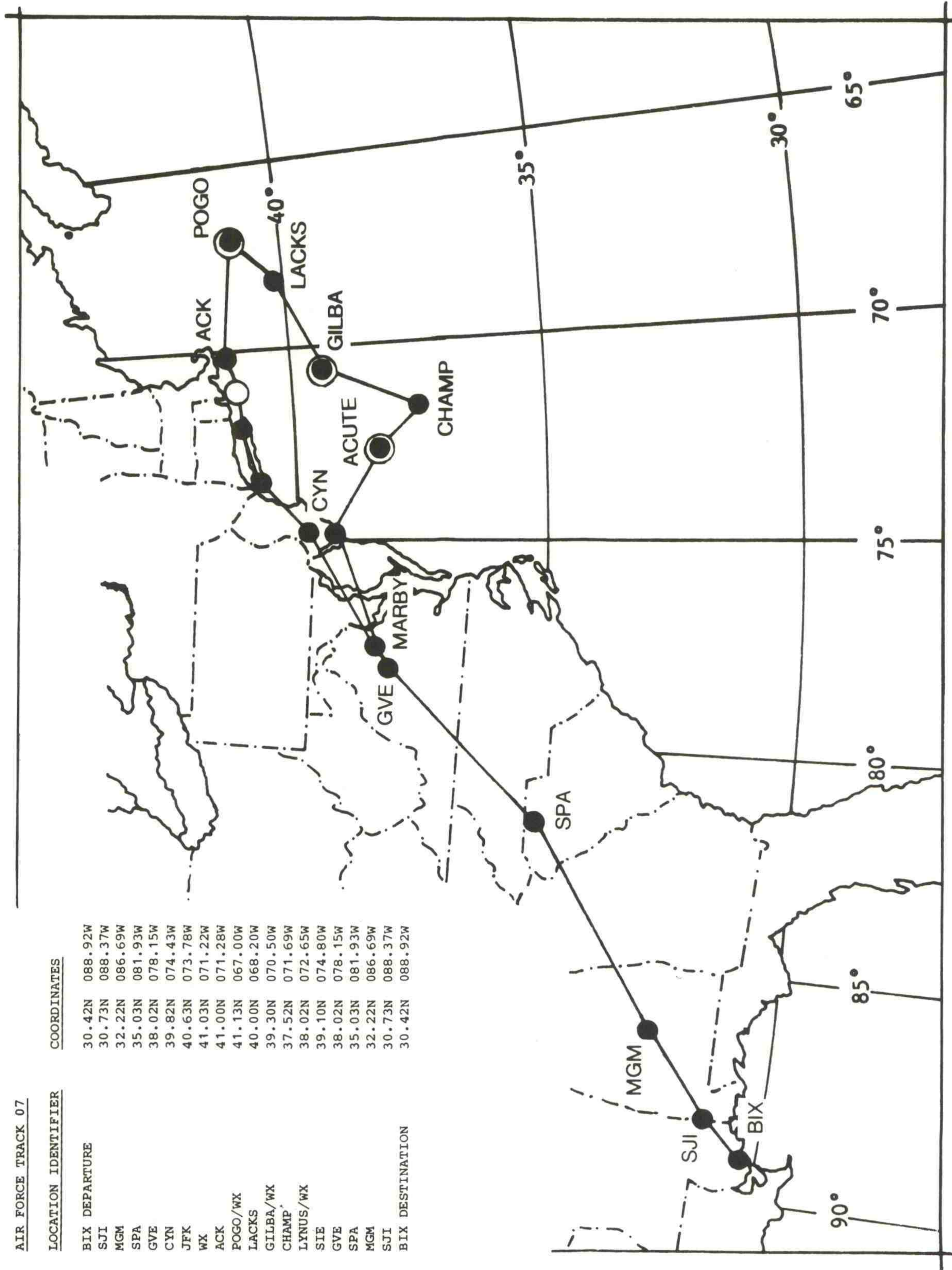
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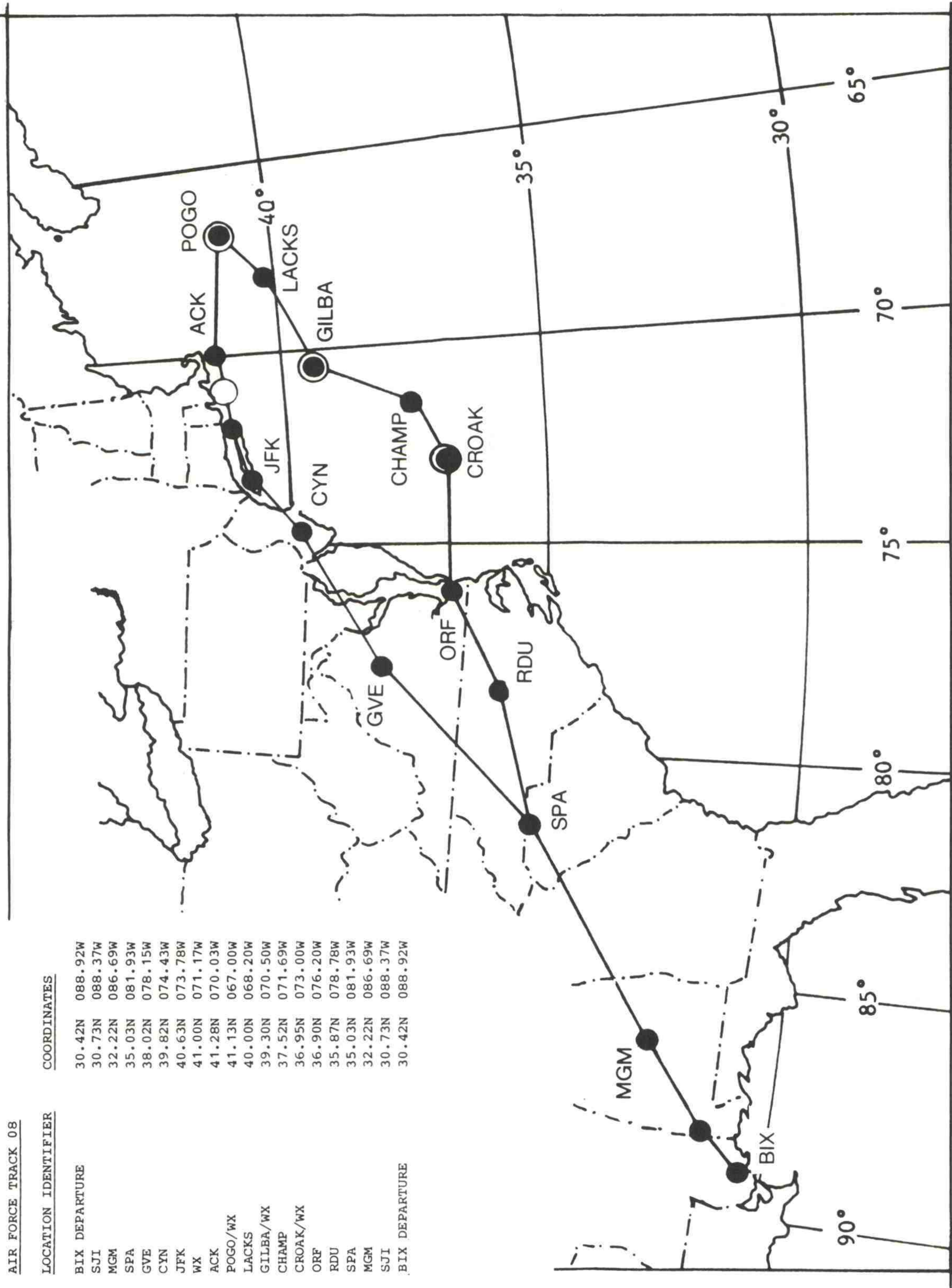
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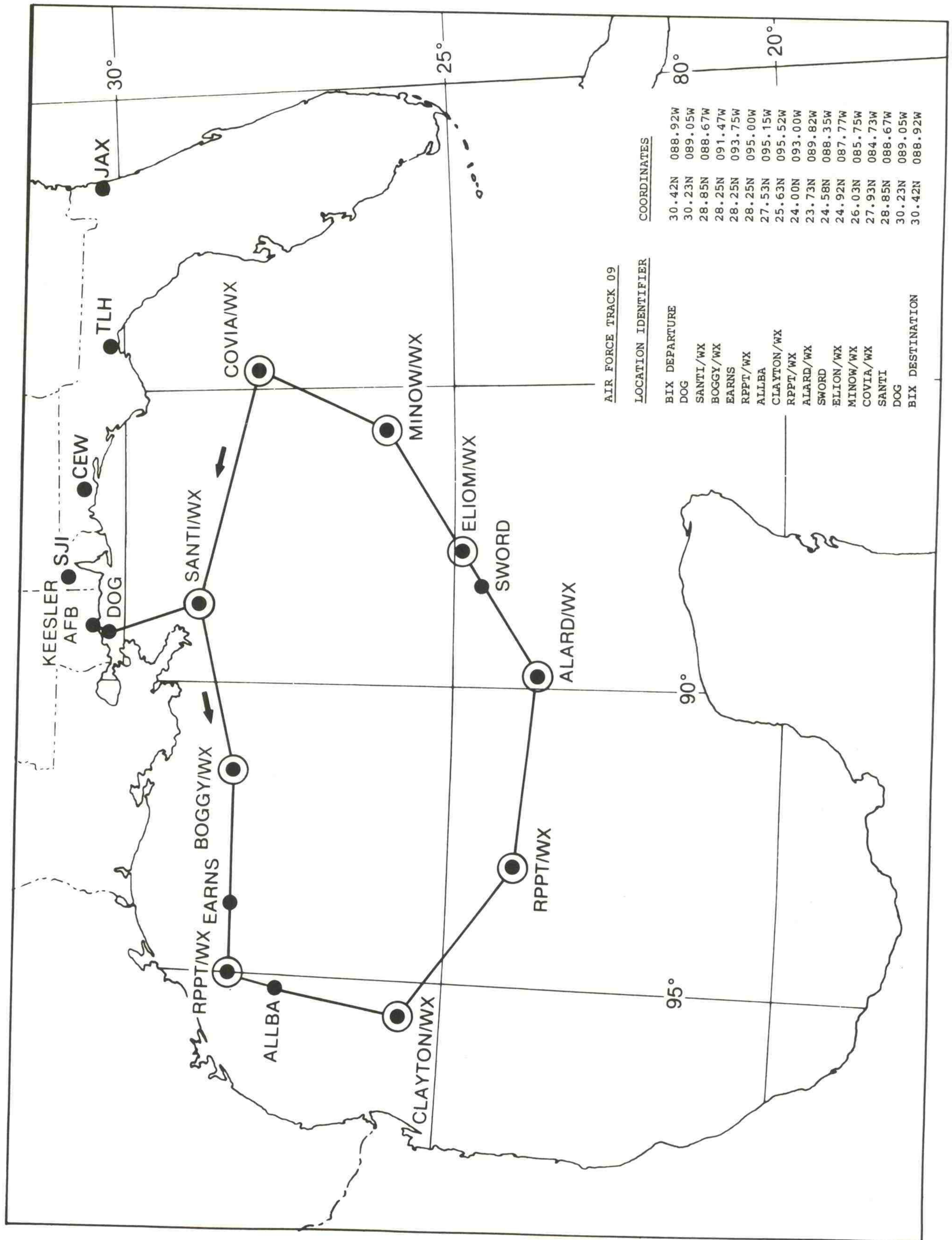
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AIR FORCE TRACK 08

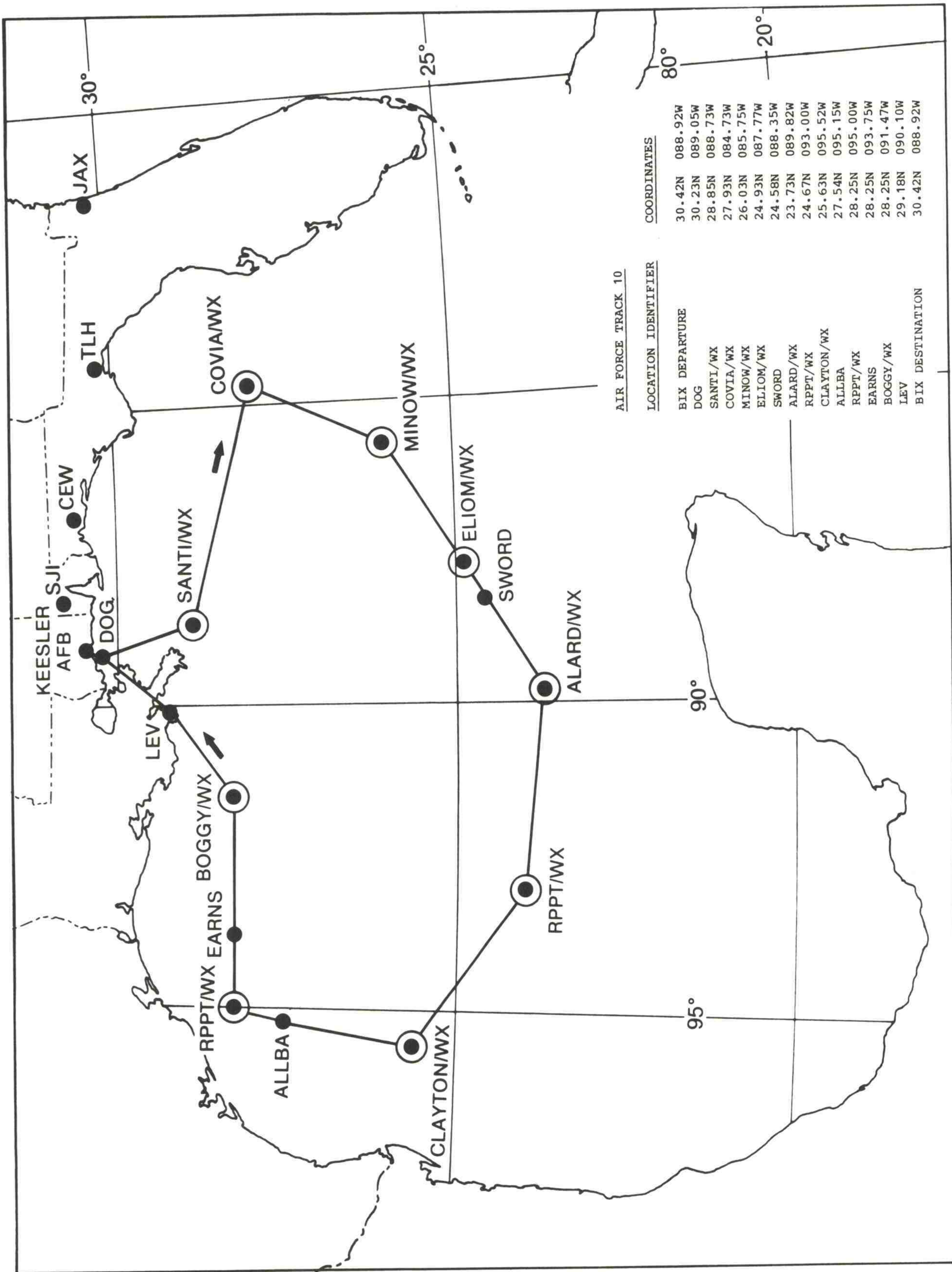
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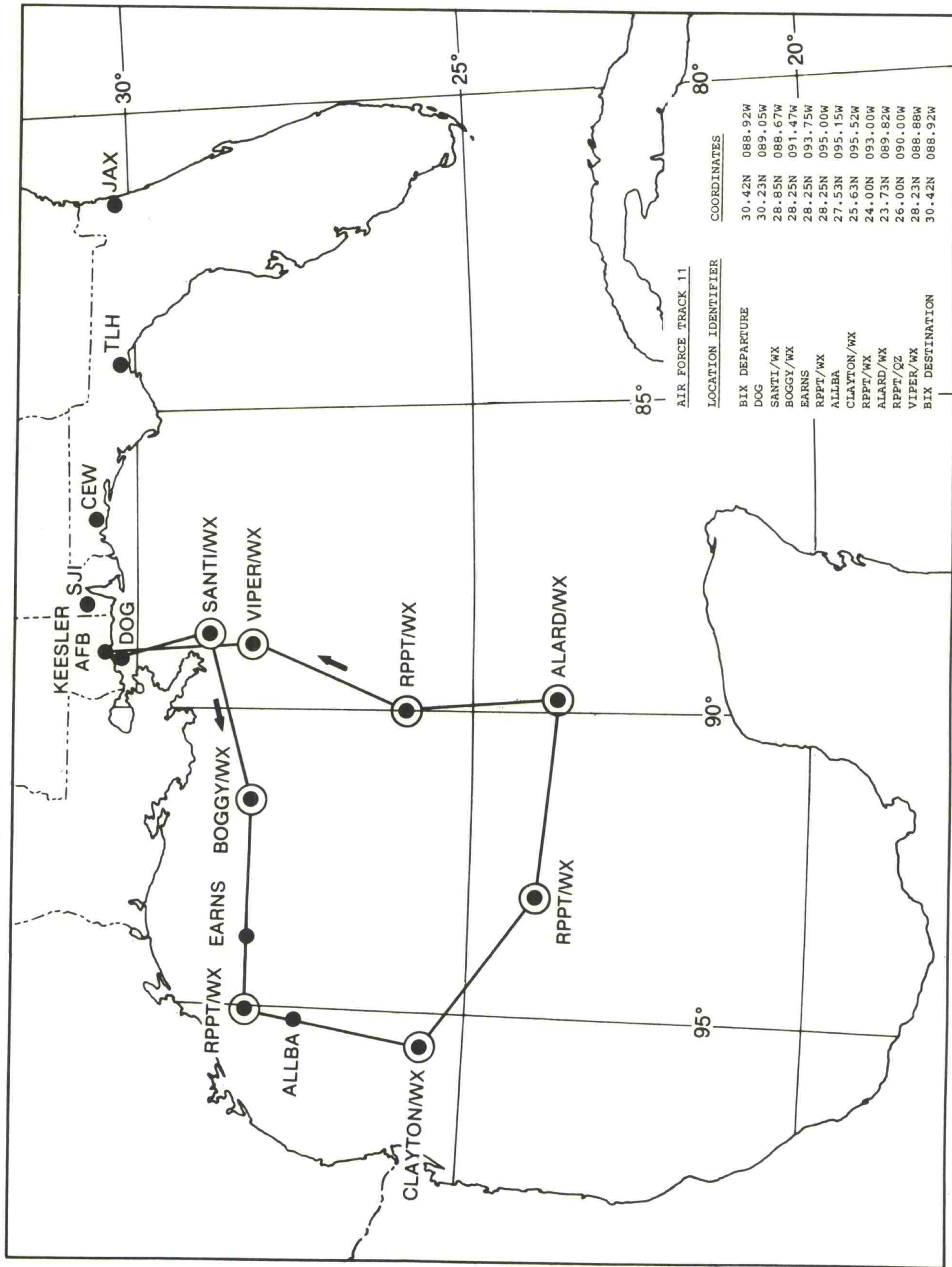
AIR FORCE TRACK 9

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APPENDIX A



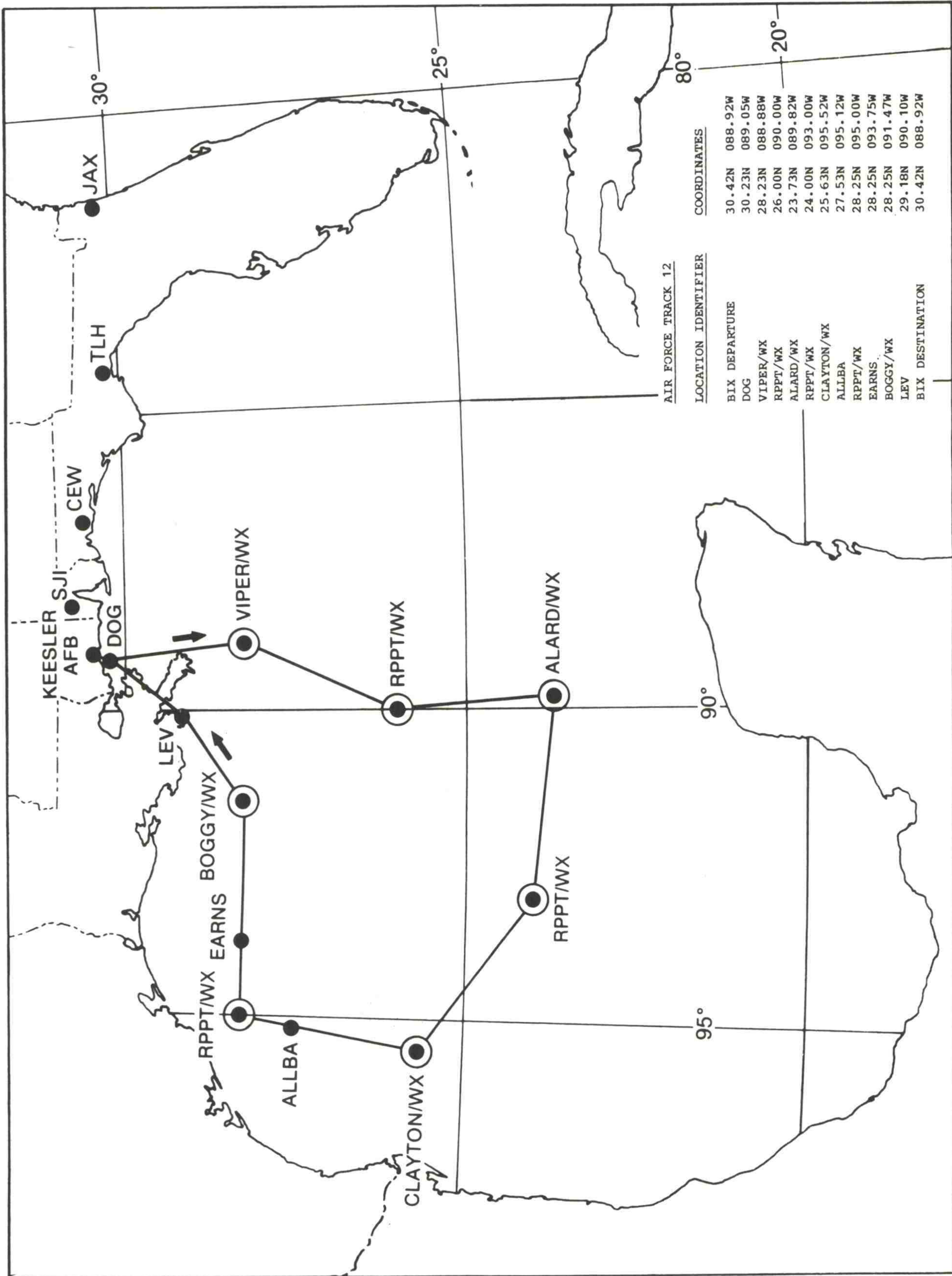
AIR FORCE TRACK 10

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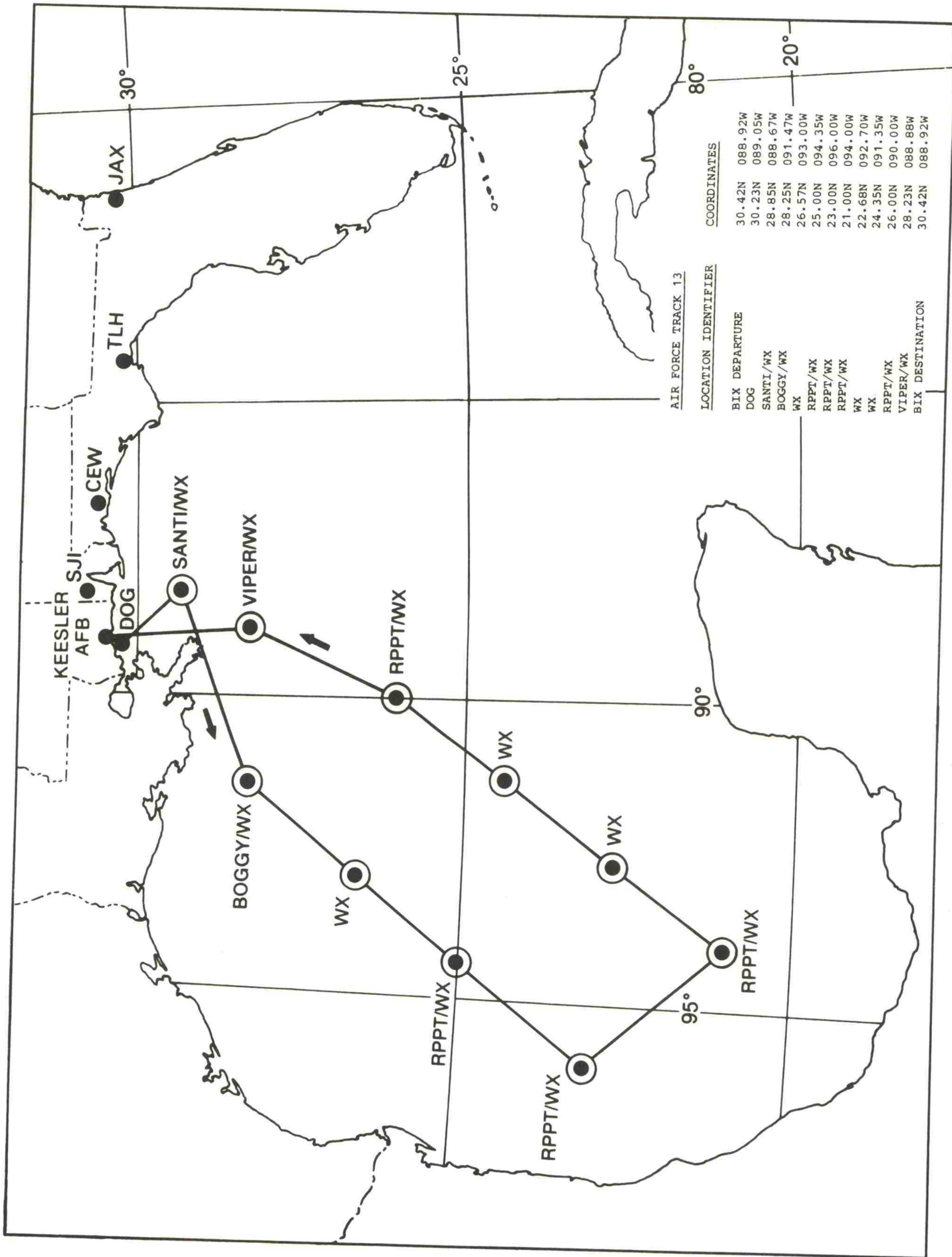
AIR FORCE TRACK 11

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APPENDIX A



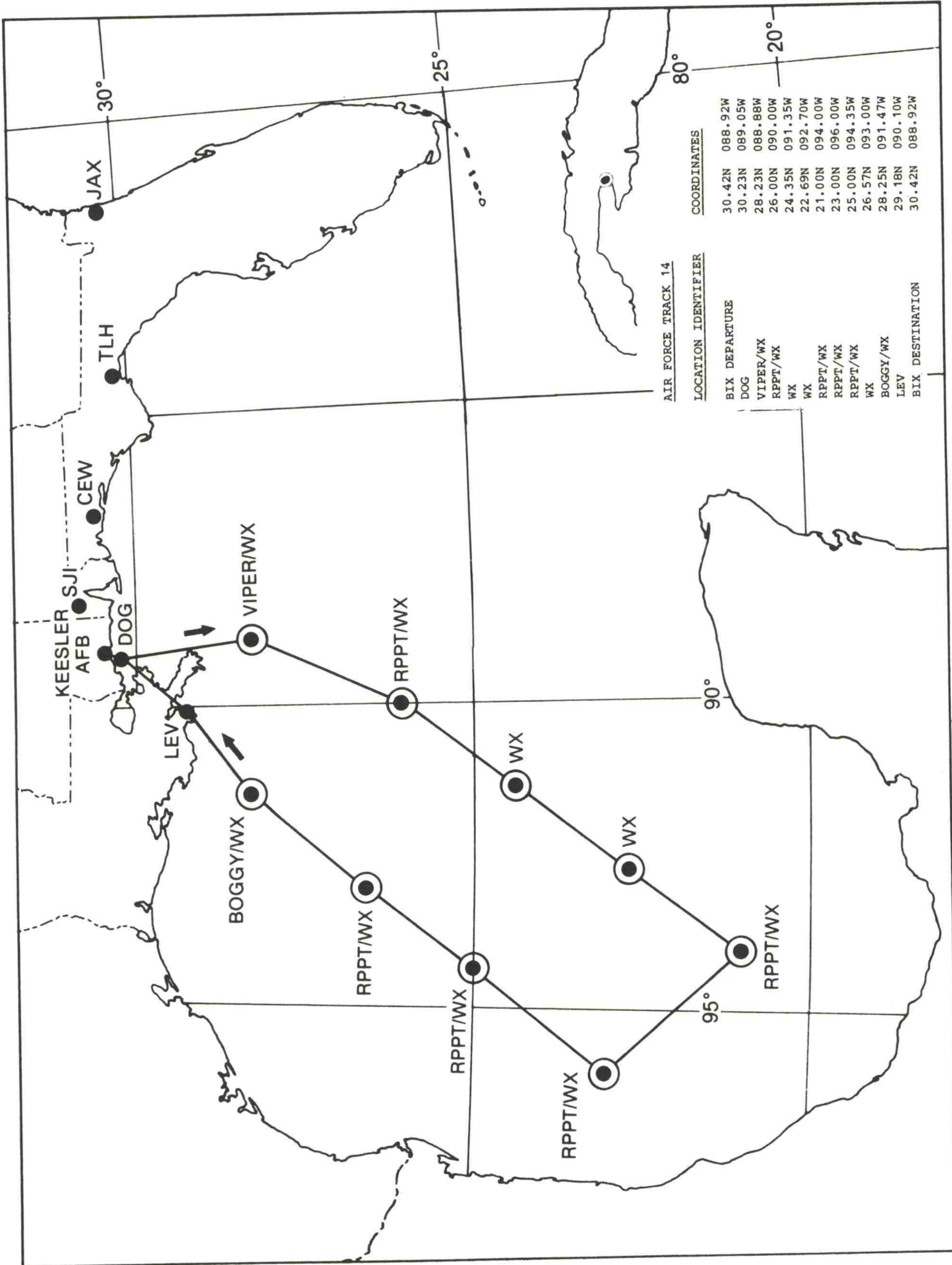
AIR FORCE TRACK 12

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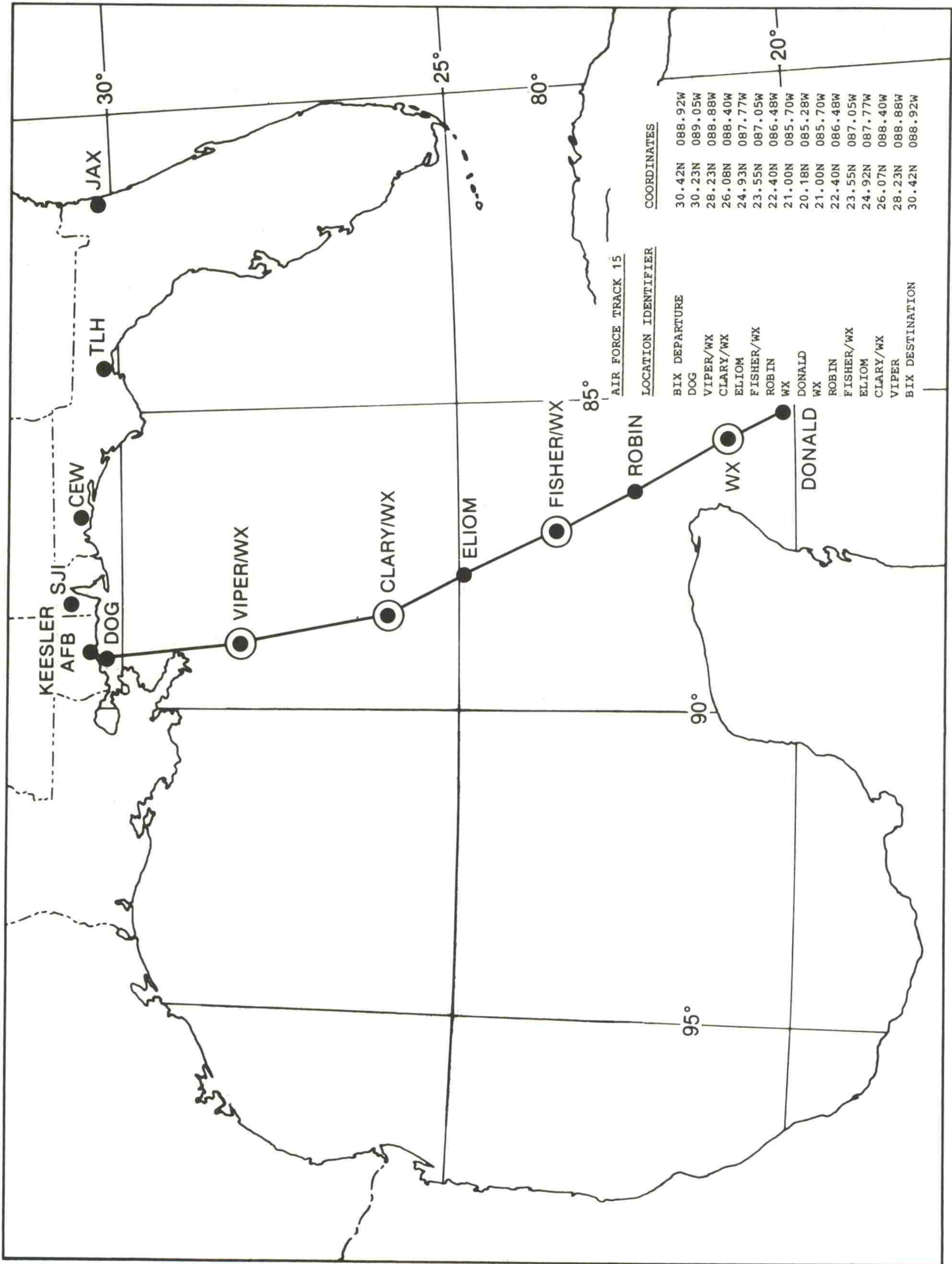
AIR FORCE TRACK 13

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AIR FORCE TRACK 14

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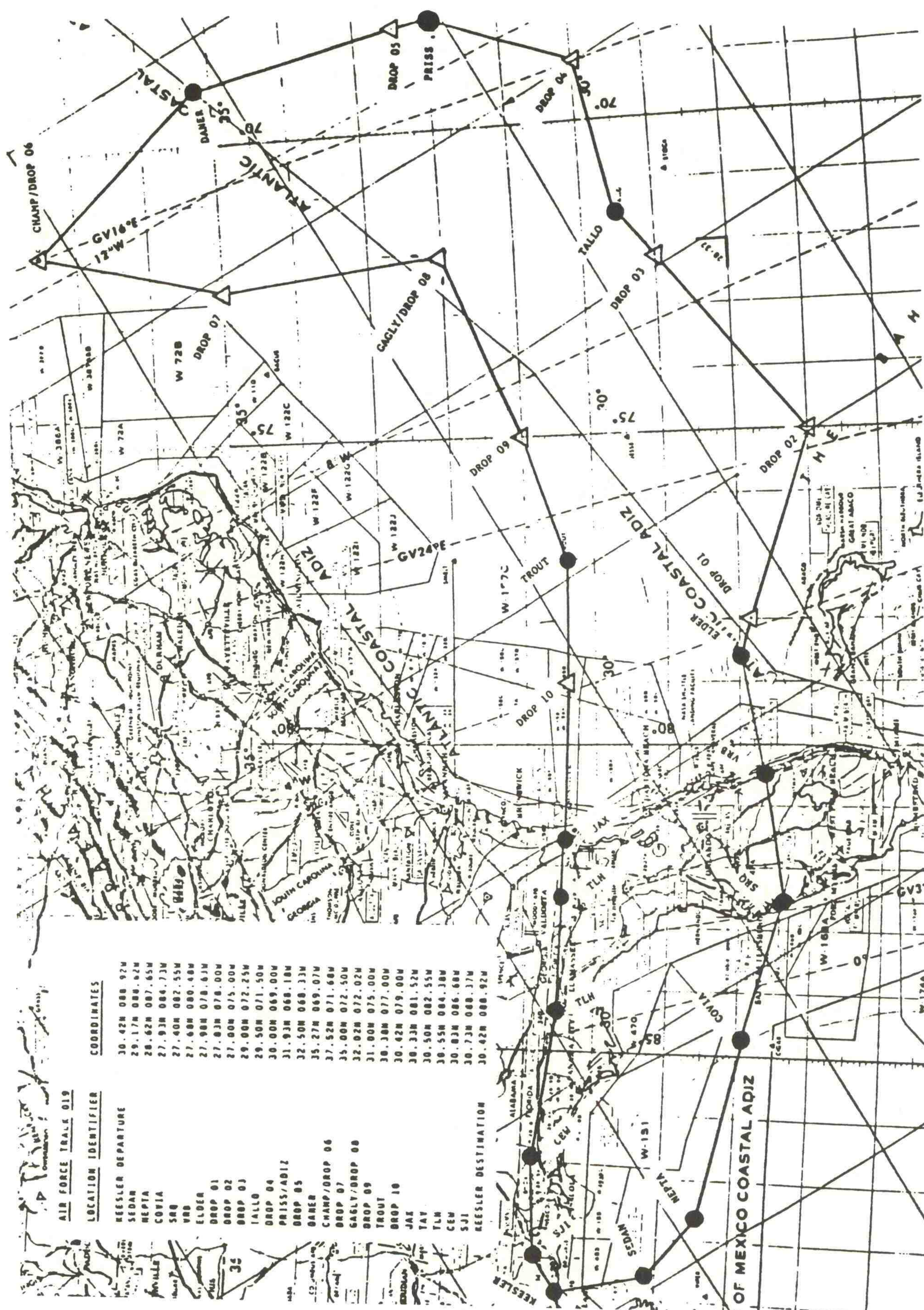


AIR FORCE TRACK 15



LOCATION IDENTIFIER	COORDINATES
KEESLER DEPARTURE	30.42N 088.92W
SEDAN	29.17N 088.62W
REPTA/DROP 01	28.62N 087.65W
COVIA/DROP 02	27.93N 084.73W
SR0	27.40N 082.55W
BSY	25.67N 080.18W
ZBV	25.70N 079.30W
DROP 03	24.00N 078.00W
DROP 04	26.00N 075.00W
DROP 05	29.00N 075.00W
JESSE	29.50N 075.07W
TALLO/DROP 06	29.50N 071.50W
LIMMI/DROP 07	31.67N 069.97W
CATCH	31.98N 070.05W
SWAPS	32.92N 070.32W
UNARMED/DROP 08	33.88N 070.62W
BACUS/DROP 09	34.43N 073.85W
ERV	36.23N 076.13W
650	36.05N 079.98W
SPA	35.03N 081.93W
MGM	32.22N 086.32W
SJI	30.73N 088.37W
KEESLER DESTINATION	30.42N 088.92W

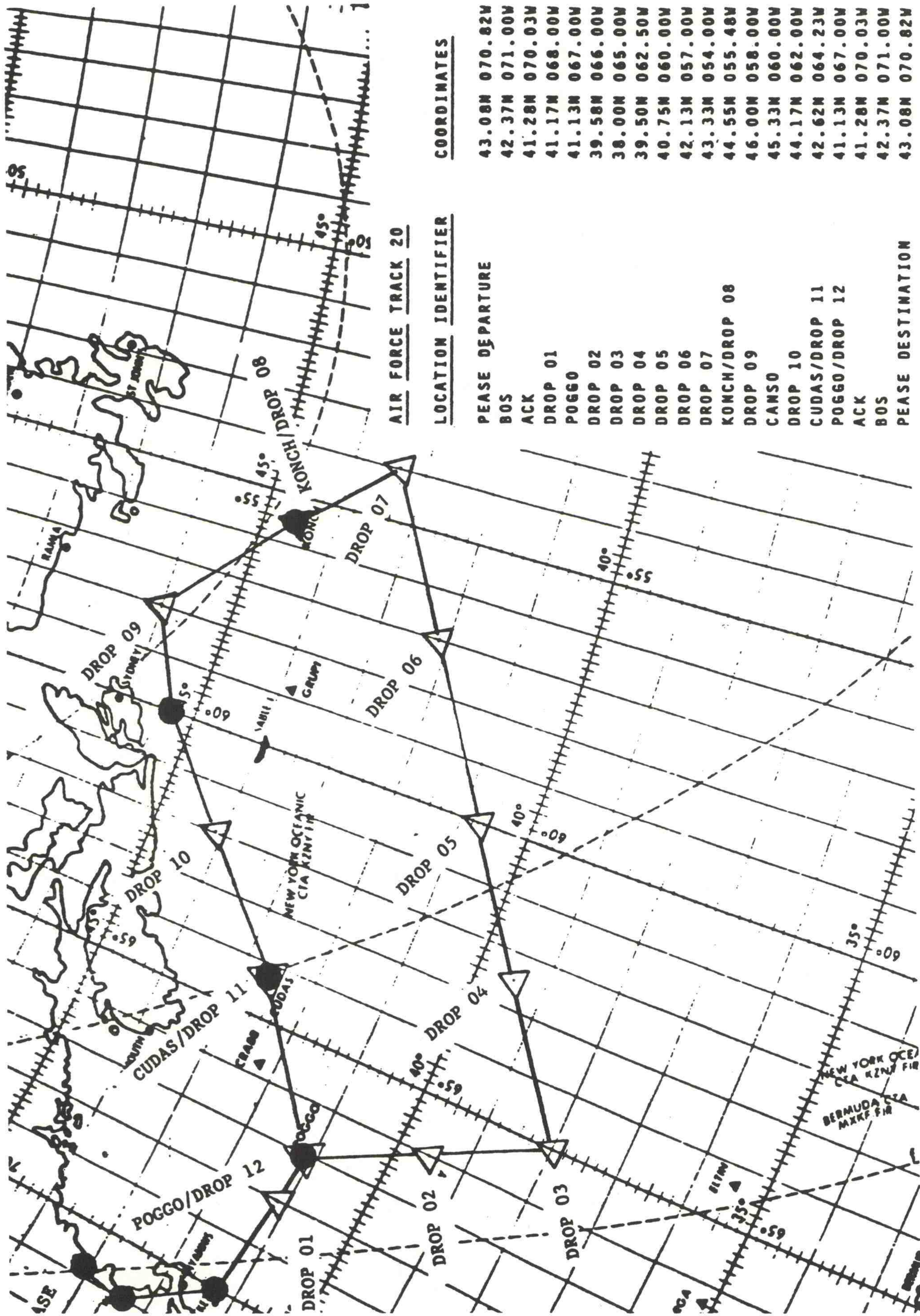
AIR FORCE TRACK 18



AIR FORCE TRACK 019

LOCATION IDENTIFIER

LOCATION IDENTIFIER	COORDINATES
REESLER DEPARTURE	30.42N 088.92W
SEDAN	29.17N 088.62W
NEPTA	28.62N 087.65W
COVIA	27.93N 084.73W
SRB	27.40N 082.55W
VRB	27.68N 080.48W
ELDER	27.98N 078.63W
DROP 01	27.83N 078.00W
DROP 02	27.00N 075.00W
DROP 03	29.00N 072.25W
TALLO	29.50N 071.50W
DROP 04	30.00N 069.00W
PRISS/ADIZ	31.93N 068.18W
DROP 05	32.50N 068.33W
BARER	35.27N 069.07W
CHAMP/DROP 06	37.52N 071.68W
DROP 07	35.00N 072.50W
CACLY/DROP 08	32.02N 072.02W
DROP 09	31.00N 075.00W
TROUT	30.38N 077.00W
DROP 10	30.42N 079.00W
JAX	30.33N 081.52W
TAY	30.50N 082.55W
TLN	30.55N 084.38W
CEW	30.82N 086.68W
SJI	30.73N 088.37W
REESLER DESTINATION	30.42N 088.92W



AIR FORCE TRACK 20

LOCATION IDENTIFIER

COORDINATES

LOCATION IDENTIFIER	COORDINATES
PEASE DEPARTURE	43.08N 070.82W
BOS	42.37N 071.00W
ACK	41.28N 070.03W
DROP 01	41.17N 068.00W
POGGO	41.13N 067.00W
DROP 02	39.58N 066.00W
DROP 03	38.00N 065.00W
DROP 04	39.50N 062.50W
DROP 05	40.75N 060.00W
DROP 06	42.13N 057.00W
DROP 07	43.33N 054.00W
KONCH/DROP 08	44.55N 055.48W
DROP 09	46.00N 058.00W
CANSO	45.33N 060.00W
DROP 10	44.17N 062.00W
CUDAS/DROP 11	42.62N 064.23W
POGGO/DROP 12	41.13N 067.00W
ACK	41.28N 070.03W
BOS	42.37N 071.00W
PEASE DESTINATION	43.08N 070.82W

AIR FORCE TRACK 20

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 (DTG) _____ 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 REQUIREMENT)
- 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
FORM 6
RECCO RECORDING FORM

DATE		ORGANIZATION				MISSION IDENTIFIER				TYPE AIRCRAFT				CALL SIGN
9	8	7	6	5	4	3	2	1	INDICATOR	C	C	C	C	CLOUD TYPE Table 11
RECCO INDICATOR GROUP SPECIFYING TYPE OF OBSERVATION Table 1	TIME OF OBSERVATION (Hours and Minutes) (GMT)	DAY OF WEEK SUN-1	LONGITUDE DEGREES AND TENTHS (Note 4)	PRESSURE ALTITUDE OF AIRCRAFT REPORTED TO THE NEAREST DECI-METER TYPE OF WIND Table 6	WIND DIRECTION AT FLIGHT LEVEL (Tens of deg. true)	TEMPERATURE WHOLE °C (Note 6)	INDICATOR INDEX TO H H H Table 9	INDICATOR NR OF CLOUD LAYERS (Note 9)	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	8	7	6	5	4	3	2	1	INDICATOR NR OF CLOUD LAYERS (Note 9)	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11
9	8	7	6	5	4	3	2	1	INDICATOR NR OF CLOUD LAYERS (Note 9)	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11
9	8	7	6	5	4	3	2	1	INDICATOR NR OF CLOUD LAYERS (Note 9)	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11	CLOUD TYPE Table 11

RECCO RECORDING FORM										REMARKS													
METEOROLOGIST					TYPE AIRCRAFT					REMARKS													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
INDICATOR	NR OF CLOUD LAYERS (Note 9)	ALTITUDE OF BASE Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12
INDICATOR	NR OF CLOUD LAYERS (Note 9)	ALTITUDE OF BASE Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12
INDICATOR	NR OF CLOUD LAYERS (Note 9)	ALTITUDE OF BASE Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12
INDICATOR	NR OF CLOUD LAYERS (Note 9)	ALTITUDE OF BASE Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12	ALTITUDE OF TOP Table 12

CHAPTER 2
APPENDIX E
FORM 6
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. The intermediate observation (Section Three) is reported following Section One (or Section Two if appended to Section One) in the order that it was taken.
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. "FL TEMP" vice "700 MB FL TEMP". The last report plain language remarks are mandatory, i.e., "LAST REPORT. OBS 01 thru 08 to RJTY, OBS 09 and 10 to RPKM".
4. The hundreds digit of longitude is omitted for longitudes from 100° to 180°.
5. Describe conditions along the route of flight actually experienced at flight level by aircraft.
6. TT, T_dT_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 -52°C is given as 02, the distinction between -52°C and 2°C being made from i_d. Missing unknown temperatures are reported as //. When the dew point is colder than -49.4°C, Code T_dT_d as // and report the actual value 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 Figure 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 ///.
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. In those cases where a cloud layer(s) is discernible, but a descriptive cloud picture of the observation circle is not possible, use appropriate remarks such as "clouds blo" or "As blo" to indicate the presence of lclouds. In such cases, coded entries are not made for group 9. 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. Only use code figure 0 as a place holder when you can determine that no additional cloud layers exist. In case of undercast, overcast, etc., use code figure 9 as a placeholder.
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 along the track are reported for Ws.
12. When aircraft encounters icing in level flight, the height at which the icing occurred will be reported for h_ih_i. The H_iH_i will be reported as //.

CHAPTER 2
APPENDIX E
FORM 6
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 In the clear
- 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
- 1 Scattered (trace 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 No additional cloud layers (place holder)
- i 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 (place holder)

TABLE 11 C

- 0 Cirrus (Ci)
- 1 Cirrocumulus (Cc)
- 2 Cirrostratus (Cs)
- 3 Altcumulus (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 (not used for S_s)

TABLE 16 w_d

- 0 No report
- 1 Signs of a tropical cyclone
- 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 I_r

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

TABLE 18 I_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_cL_aL_a L_oL_oL_oBf_c h_ah_ah_ad_td_a
 dffff TTT_dT_dw /iHHH

SECTION TWO (ADDITIONAL)

lk_nN_sN_sN_s Ch_sh_sH_tH_t 4dfff
 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_cL_aL_a L_oL_oL_oBf_c h_ah_ah_ad_td_a
 dffff TTT_dT_dw /iHHH

CHAPTER 2
APPENDIX F

DROPWINDSONDE/DROPSONDE CODE BREAKDOWN
PART A

1	2	3	4	5	6	7
XXAA	YYGGI _d	99L _a L _a L _a	Q _c L _o L _o L _o L _o	MMM _U U _{1a} U _{1o}	99PPP	TTTT _a DD
8	9	10	11	12	13	14
ddfff	PPhhh	TTT _a DD	ddfff	.....	88999	77999

GP	IND	MEANING
1	XX	Dropsonde observation follows.
	AA	Part A follows.
2	YY	Day of the month (GMT), with 01 indicating the first day, 02 the second day, etc. YY is used to indicate the unit of wind speed in addition to indicating the day of the month. When wind speeds are given (Dropwindsonde observation), they will be in knots and 50 is added to YY. That is, day 01 will be 51, day 02 will be 52, etc.
	GG	Actual time of observation, to the nearest whole hour (GMT).
	I _d	Highest level for which wind is available. 7=700mbs, 5=500mbs, 4=400mbs, etc. On a standard Dropsonde observation, I _d will be encoded as a "/" and no winds will be reported in any part of the message.
3	L _a L _a L _a	Latitude, in tenths of a degree.
4	Q _c	Quadrant of the globe. 7=NW, 1=NE, 3=SW, 5=SE.
	L _o L _o L _o L _o	Longitude, in tenths of a degree.
5	MMM	Marsden square.
	U _{1a}	Units digit in the reported latitude.
	U _{1o}	Units digit in the reported longitude.
6	99	Indicator for surface.
	PPP	Pressure, in whole millibars. If PPP is less than 800, add 1000 to PPP.
7	TT	Tens and units digits of the air temperature at the surface.
	T _a	Approximate tenths value and sign (plus or minus) of the air temperature. Even = plus. Odd = minus.
	DD	Depression of the dew point. 00-54 is in degrees and tenths. 60-80 is in whole degrees after subtracting 50. 55-59 is not used.
8	dd	True direction of the wind in tens of degrees (Dropwindsonde only).
	fff	Wind speed measured in the units specified in group 2 (Dropwindsonde only).
9	PP	Pressure level indicator of the mandatory level. 11=1000mbs, 85=850mbs, 70=700mbs, etc.
	hhh	Height of the mandatory pressure level in geopotential meters or decameters above the surface. In meters up to 501mbs; in decameters above 501mbs. If the height of the 1000mb level is negative, 500 is added to hhh.
10	TT	See group 7.
	T _a	See group 7.
	DD	See group 7.
11	dd	See group 8.
	fff	See group 8.
12	.....	Groups 9-11 are repeated for each mandatory level, except only groups 9 and 10 will be added for the standard Dropsonde observation.
13	88999	The tropopause data is missing.
14	77999	The maximum wind data is missing (reported on both Dropsonde and Dropwindsonde observations).

CHAPTER 2
APPENDIX F

PART B

1	2	3	4	5	6	7	8	
XXBB	YYGG/	99L _a L _a L _a	Q _c L _o L _o L _o L _o	MMMU _{l_a} U _{l_o}	OOPPP	T _o T _o T _a DD	ddfff	
9	10	11	12	13	14	15	16	17
NNPPP	TTT _a DD	ddfff	.....	21212	NNPPP	ddfff	51515	101A _{df} A _{df}

GP IND	MEANING
1 XX	See Part A.
BB	Part B follows.
GROUPS 2-5 are repeats of Part A.	
6 OO	Indicator for the surface level.
PPP	See Part A.
7 TTT	See Part A.
T _a	See Part A.
DD	See Part A.
8 dd	See Part A.
fff	See Part A.
9 NN	Significant level indicator. 11-99 and then repeats. 00 is not used as it is reserved for surface.
PPP	See group 6.
10 TT	See Part A.
Ta	See Part A.
DD	See Part A.
11 dd	See Part A.
fff	See Part A.
12	See Part A.
13 21212	Significant wind data follows. Significant wind data will not be sent on standard Dropsonde observation.
14 NN	Same as group 9.
PPP	Same as group 9.
15 dd	See Part A.
fff	See Part A.
16 51515	Additional data follows.
17 101	Indicator.
A _{df} A _{df}	Coded number. 66=hgts doubtful. 90=extrapolated mandatory level. 91=extrapolated SLP.

NOTE: Any missing data will be reported with a diagonal (/).

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 User's Guide and Operational Amendments
National Operations Plan for Drifting Data Buoys (under preparation)

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 Environmental Satellite, Data, and Information Service (NESDIS).

(1) Geostationary Operational Environmental Satellite (GOES). The GOES system consists of one fully operational satellite (GOES-6) located over the equator at 98W from July through early November and at 108W from mid-November through June. 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.

(2) NOAA Polar-Orbiting Satellites. NOAA-8 and NOAA-9 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 used 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 NESDIS 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. NESDIS 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. Special Satellite Precipitation Estimates (SPE) are transmitted via AFOS to all WSFOs and RFCs in the conterminous United States.

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. In addition, the following support products are available to the meteorological community:

a. Satellite Interpretation Messages (SIM). SIM's are available through the NWS AFOS communications system and the FAA's Leased Service A and RAWARC teletype circuits. All WSFO's receive these automatically as transmitted from the SFSS's. The heading and issue times for the SIM's are as follows:

<u>NWS</u>	<u>FAA</u>	<u>ISSUE TIME</u>
WBCSIMWBC	- TBXX6 KWBC	- 0100Z,0700Z,1300Z,1900Z
MKCSIMMKC	- TBXX6 KMKC	- 0030Z,0530Z,1230Z,1830Z
MIASIMMIA	- TBXX7 KMIA	- 0300Z,0900Z,1500Z,2030Z
NEWSIMNEW	- TBXX7 KNEW	- 0130Z,0400Z,0700Z,1200Z 1600Z,1900Z,2200Z

(Times subject to change)

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

b. Satellite cloudtop and tropopause (SCAT) messages are prepared by WBC 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 are WBCSIMSCT(NWS-AFOS) and TBXX10 KWBC (FAA). Issue times are 1030Z and 2200Z.

(b) NWS-SFSS Station Contact:

Miami SFSS	(305)350-4460 FTS: 350-4460	24-h/day
Kansas City SFSS	(816)374-7395 and 7396 FTS: 758-7395 and 7396	24h/day
Washington SFSS	(301)763-8119 and 8425 FTS: 763-8119 and 8425	24h/day
New Orleans SFSS	(504)649-0429 FTS: 682-2807 and 2808	24h/day

(c) NESDIS Station Contact

Satellite Analysis Branch	(301)763-8444 FTS: 763-8444	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 (CARCAH).

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 moored buoys.) Coastal Marine Automated Network (C-MAN) stations provide additional marine observations. (See Figure 3-2 for location of C-MAN sites). The status and capability of data buoys can be obtained from the Data Systems Division, National Data Buoy Center (NDBC), NSTL Station, MS 39529, telephone (601)688-2836 or FTS 494-2836.

b. Moored Data Buoys and Coastal Marine Automated Network.

(1) Procedures. The stations routinely acquire, store, and transmit data every hour. Data obtained operationally can include sea-level pressure, wind direction and speed, air temperature, sea-surface temperature, wave height, and spectral data. Data obtained from C-MAN locations typically include sea level pressure, wind speed and direction, and air temperature. Some C-MAN stations located on piers and platforms measure sea surface temperature, wave height, and wave spectral data. A description of the data from a typical moored buoy payload is provided in Table 3-2.

(2) Communications. Data are transmitted by UHF communications via the GOES satellite to NESDIS and then are relayed on to NMC, Suitland, Maryland, for processing and dissemination. Data from buoys are formatted into WMO FM13-VII synoptic code and C-MAN sites in FM12-VII.

c. Drifting Data Buoys.

1. Procedures. These free floating buoys are deployed by ship or aircraft in data sparse areas. Their movements are largely dependent upon ocean currents. The buoys routinely acquire, store, and transmit data via NOAA polar orbiting satellites. Data obtained can include position, sea-level, pressure, wind speed, wind direction, air temperature and sea surface temperature.

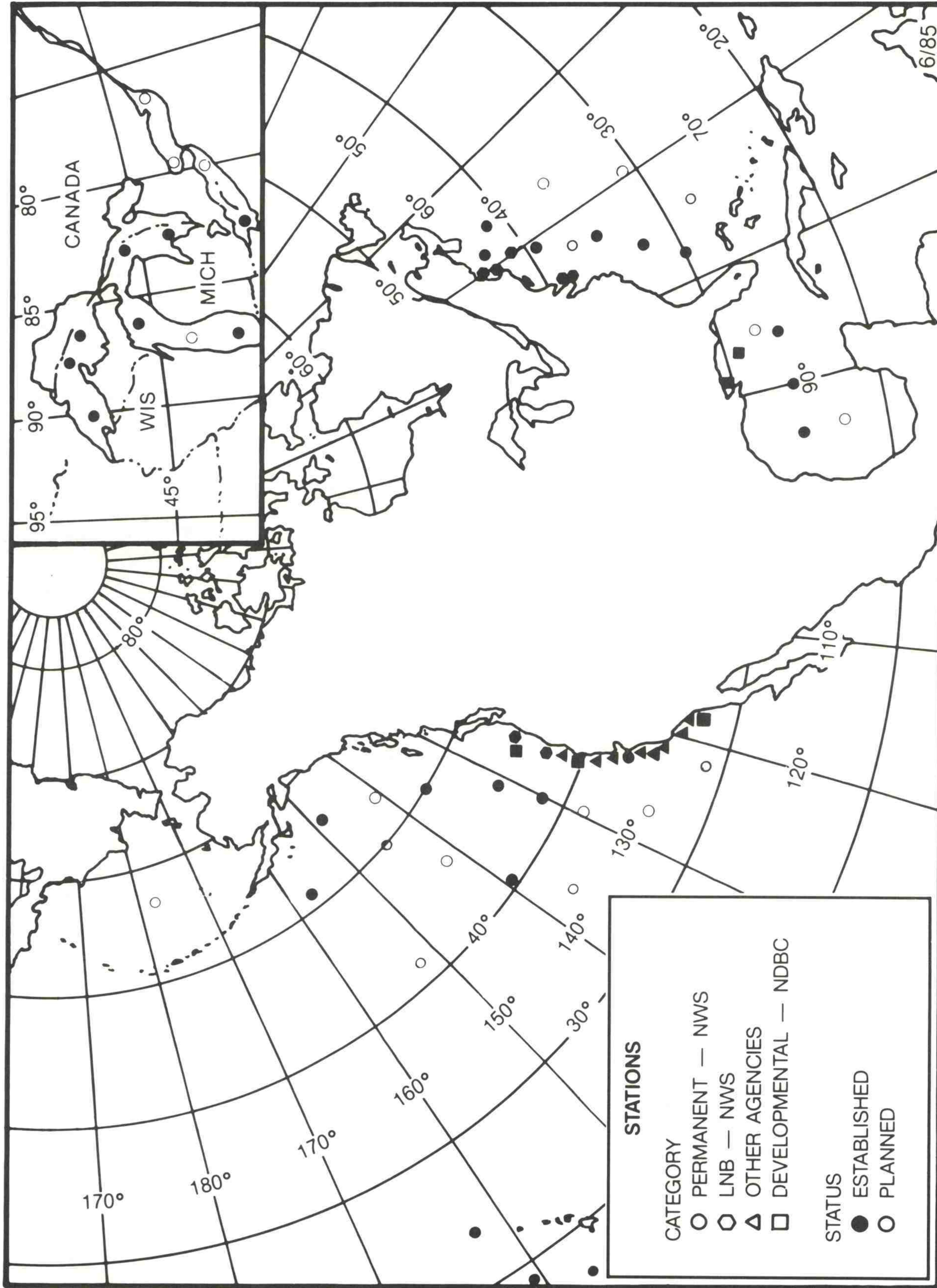
2. Communications. Data are transmitted by UHF communications via the NOAA polar orbiting satellites to NESDIS ground receiving stations and then relayed to Service Argos in Toulouse, France for processing and dissemination. Data from drifting buoys are formatted into WMO FM-14-VII DRIBU code.

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-6 (98.0 N) (108.0 W)	VISSR/VAS	Every 30 minutes (24 hr/day)	1. 1, 2, and 4 km resolution visible standard sectors covering Western United States, Midwest, and Eastern United States and Eastern Pacific Ocean (daylight).
	4 Spacecraft (standby) limited operational capability	(Limited scan for short-interval viewing available)	2. 9 km resolution equivalent IR standard sectors for the entire United States (night). 3. Equivalent IR-enhanced imagery. 4. Floating sectors at 1, 2 and 4 km resolution 5. Full disc IR (day and night). 6. Movie loops 7. Wind analysis 8. Cloud top heights 9. Rainfall/snowfall estimates 10. Satellite information messages
NOAA-8	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	0740 / 1940*	1. Mapped digitized data (cloud cover) 2. Unmapped imagery (all data types) at DMSP sites. 3. Sea-surface temperature analysis 4. Moisture analysis 5. Soundings
NOAA-9		1430 / 0230	
DMSP	LF	0700/1900	1. Unmapped imagery (LF only) 2. Mapped imagery (none)
GAC - Global Area Coverage (recorded reduced resolution data for Central Processing)			LF - Light Fine (Visual Scanning Radiometer 0.3 nmi)
LAC - Local Area Coverage (recorded high resolution data, limited amount)			AVHRR - Advanced Very High Resolution Radiometer VAS - VISSR Atmospheric Sounder
TOVS - TIROS Operational Vertical Sounder			VISSR - Visible-Infrared Spin Scan Radiometer
HRPT - High Resolution Picture Transmission (1.1 km)			
APT - Automatic Picture Transmission (4 km)			* - Local/time--Equator crossing

FIGURE 3-1
NDBC BUOY LOCATIONS



GDH-2 (2) REV. D
 6/85

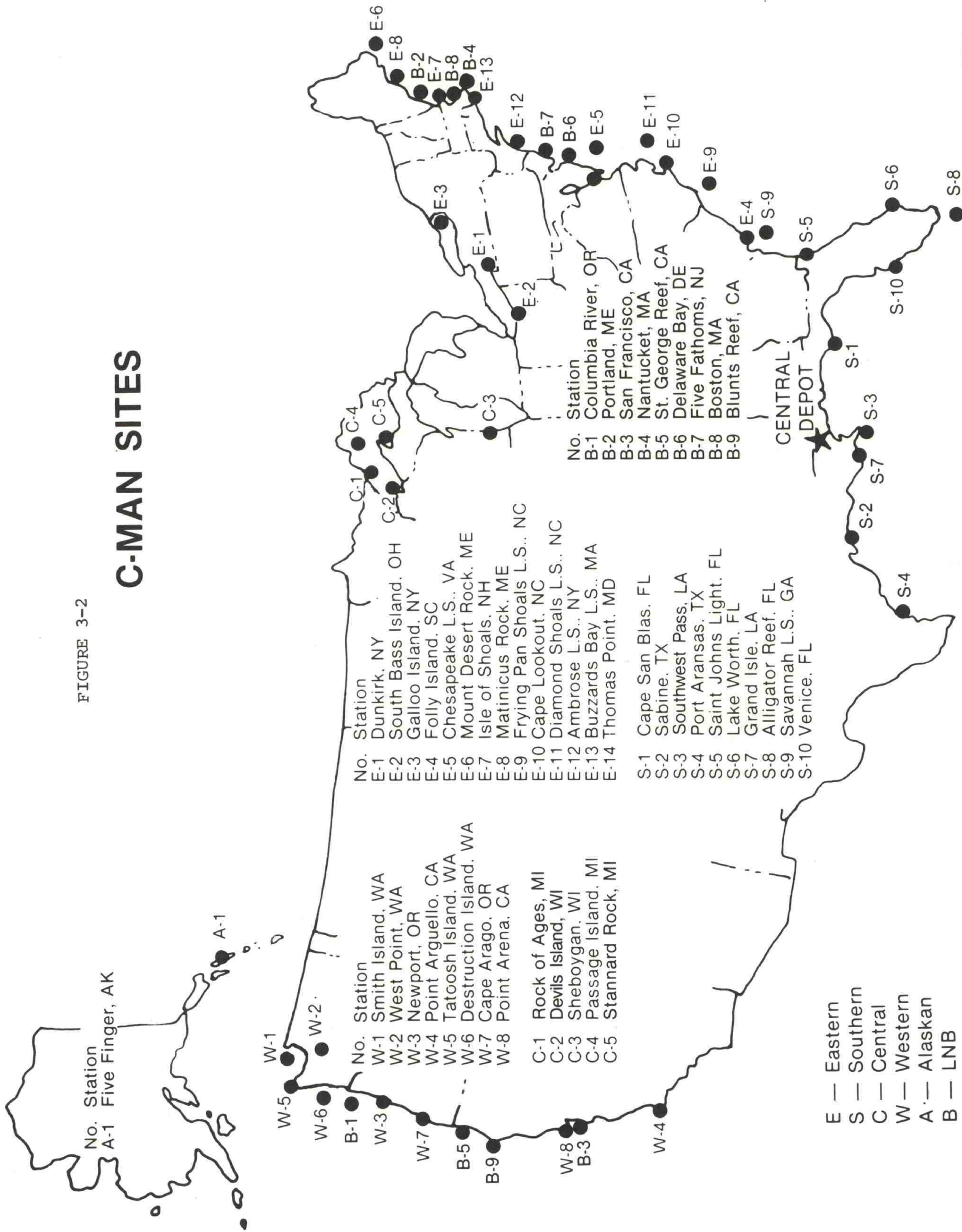
TABLE 3-2
TYPICAL STATION PAYLOAD DATA

<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	\pm 1 m/s or 10%
Wind Direction	0 to 360°	10°	1 s	8.5 min	\pm 10°
Wind Gust	0 to 80 m/s	1 m/s	1 s	8.5 min*	\pm 1 m/s or 10%
Air Temperature	-15° to 50°C	0.5°C	90 s	90 s	\pm 1°C
Barometric Pressure	900 to 1100 mb	0.1 mb	4 s	8.5 min	\pm 1 mb
Significant Wave Height	0 to 20 m	0.5 m	0.67 s	20 min	\pm 0.5 m
Wave Period	2 to 30 s	1 s	0.67 s	20 min	\pm 1 s
Wave Spectra	0.01 to 0.5 Hz	0.005 Hz	0.67 s	20 min	-----
Surface Water Temperature	-15° to 50°C	0.5°C	1 s	1 s	\pm 1°C

*Highest 8-second window average retained.

FIGURE 3-2

C-MAN SITES



E — Eastern
 S — Southern
 C — Central
 W — Western
 A — Alaskan
 B — LNB

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. Office of Aircraft Operations (OAO). The OAO will use the communications facilities of the Air Force described in Appendix 4-A.

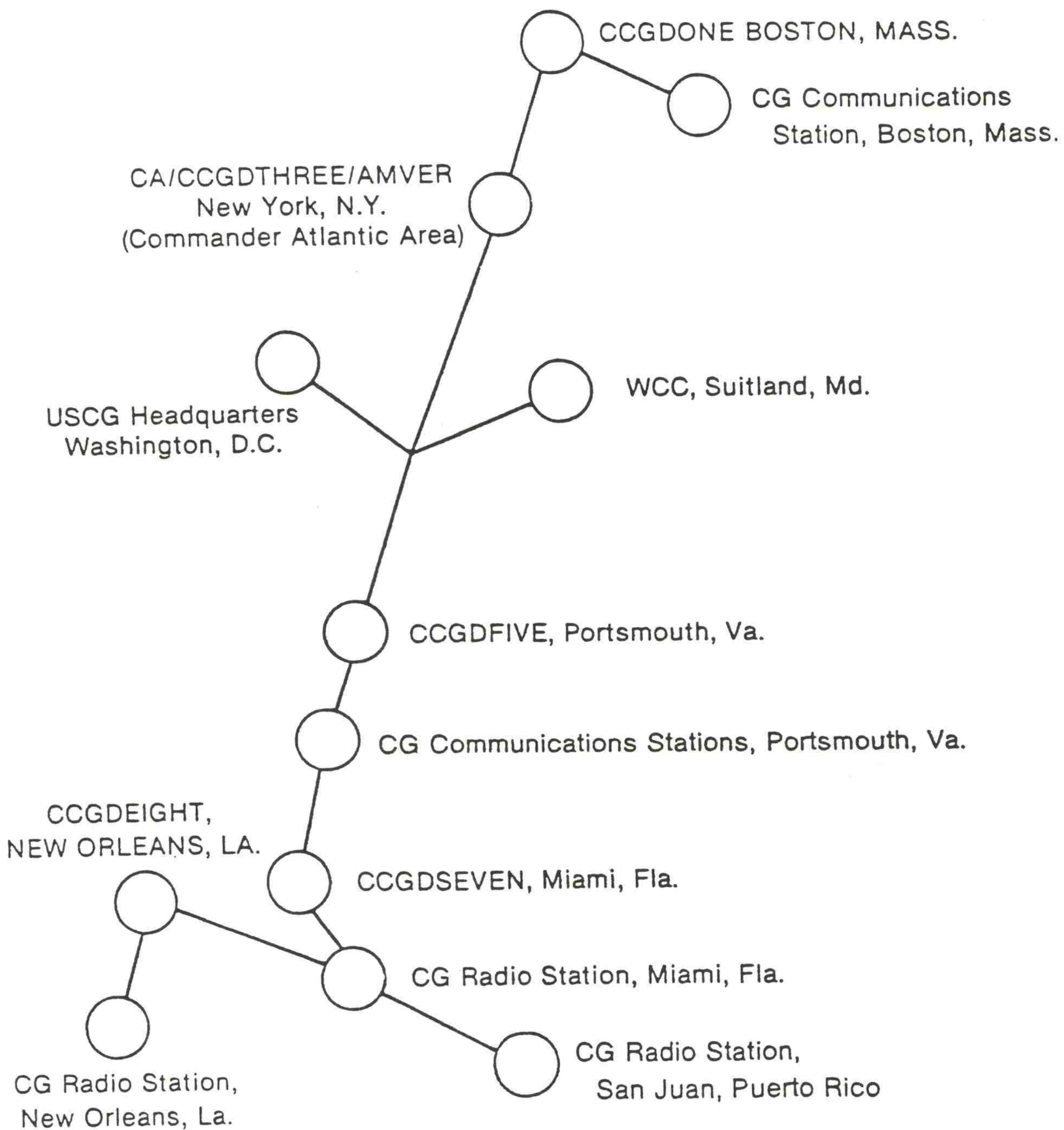
2. Department of Defense.

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 Procedures are 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 (AFCC) Global Command and Control System (GCCS) to the appropriate weather reconnaissance data monitor. Weather monitors will evaluate these reports and disseminate them.

2. Air/Ground Communications. The USAF (AFCC) GCCS 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 GCCS station.

SECONDARY

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

CHAPTER 4
APPENDIX B

RECONNAISSANCE ORGANIZATION COMMUNICATION CAPABILITIES

<u>STATION</u>	<u>ADDRESS</u>	<u>TELETYPE</u>	<u>TELEPHONE</u>
Federal Coordinator for Meteorology (OFCM)	Suite 300, 11426 Rockville Pike Rockville, MD 20852	-	AV 851-1460 CO 301-770-3464 FTS 443-8704
CARCAH/MIAMI Monitor	OL-G, AWS Coral Gables, FL	A B	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	A	AV 828-4377
Hickam Weather Monitor	Det 4, 1 WW Hickam AFB, HI	A	AV 315-449-1279
National Hurricane Center	Nat'l. Hurricane Center Coral Gables, FL	A B	CO 305-667-3108 FTS 350-5547
Alternate National Hurricane Center	WSFO Washington, DC	B	CO 301-899-0627 FTS-763-8300
	WSFO New Orleans, LA	B	CO 504-522-7330 FTS 682-6891
Eastern Pacific Hurricane Center	WSFO Redwood City, CA	B	CO 415-876-9381 FTS 463-7767
Central Pacific Hurricane Center	WSFO Honolulu, HI	B	CO 808-839-7692
Naval Eastern Oceano- graphy Center, Norfolk	NAVEASTOCEANCEN Norfolk, VA	A	AV 564-7750 CO 804-444-7750
Naval Western Oceano- graphy Center, Pearl Harbor	NAVWESTOCEANCEN Pearl Harbor, HI	A	CO 808-471-0004
OAO	OAO Miami, FL		AV 894-1600 CO 305-526-2936
Det 1, 7WW	Det 1, 7WW Keesler AFB, MS		AV 868-2544
AF Global Weather Central	AFGWC Offutt AFB, NE	A	AV 271-2586 FTS 866-2586
CINCLANTFLT OAC	CINCLANTFLT OAC Ronkonkoma, NY	B	AV 938-1694
ARTCC Miami	ARTCC Miami, FL	B	AV 894-1910
53 WRS	53 WRS Keesler AFB, MS		AV 868-4540 CO 601-377-4540
815 WRS	815 WRS Keesler AFB, MS		AV 868-4318 CO 601-377-4318

A - COMEDS
B - 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:

OJCS/J-3/ESD
Washington, DC 20301-5000

Department of the Army
ATTN: DAMI ISP
Washington, DC 20310

Department of the Air Force (SAF/PA)
Washington, D.C. 20330

Commander, Naval Oceanography Command
NSTL Station, 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

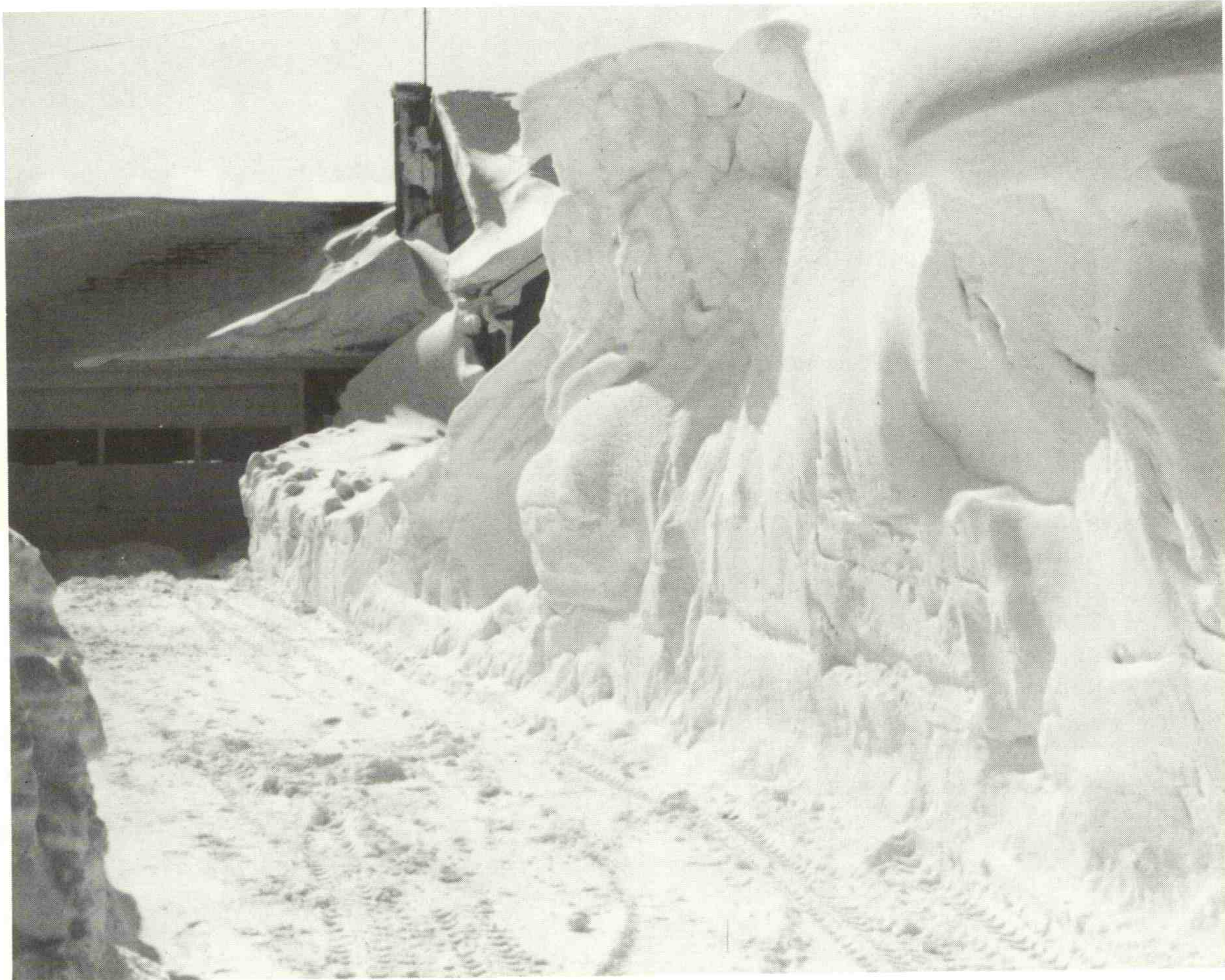
Commandant (G-BPA)
Headquarters, U.S. Coast Guard
Washington, DC 20593

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

23d Air Force (23AF/DO)
Scott AFB, IL 62225

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

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 (sustained or gust 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 in most areas of the country, but some variation in the snowfall criterion is allowable on a regional basis).
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 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.
8. 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.

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 for the National Winter Storms Operation Plan 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 25° N to 48° N, west of longitude 55° 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.

ANNEX A

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCC	Air Force Communications Command
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
CBS	Committee for Basic Services
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
GCCS	Global Command and Control 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	National Data Buoy Office
NESDIS	National Environmental Satellite, Data, and Information 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

OA0	Office of Aircraft Operations
OSV	Ocean Station Vessel
OWS	Ocean Weather Station
Pa	Pascal
PIREP	Pilot Report
RAREP	Radar Report
RECCO	Reconnaissance Code
SAR	Search and Rescue
SARLANT	Search and Rescue Atlantic Circuit
SFSS	Satellite Field Services Station
SIGMET	Significant Meteorological Information Bulletin
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
WRS	Weather Reconnaissance Squadron
WSFO	Weather Service Forecast Office
WSO	Weather Service Office
WSP0D	Winter Storm Plan of the Day

ANNEX B

DISTRIBUTION LIST

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Office of Aircraft Operations	5
National Weather Service	
Gramax Building	25
World Weather Building	11
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National Hurricane Center	5
Eastern Region Headquarters	20
Central Region Headquarters	2
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Dr. Richard A. Dirks GALE Project Office NCAR P.O. Box 3000 Boulder, CO 80307-3000	10	Mr. John Bunting Regional Office of Audits, OIG Department of Commerce, Room 2241 1020 - 15th Street Denver, CO 80202	1
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