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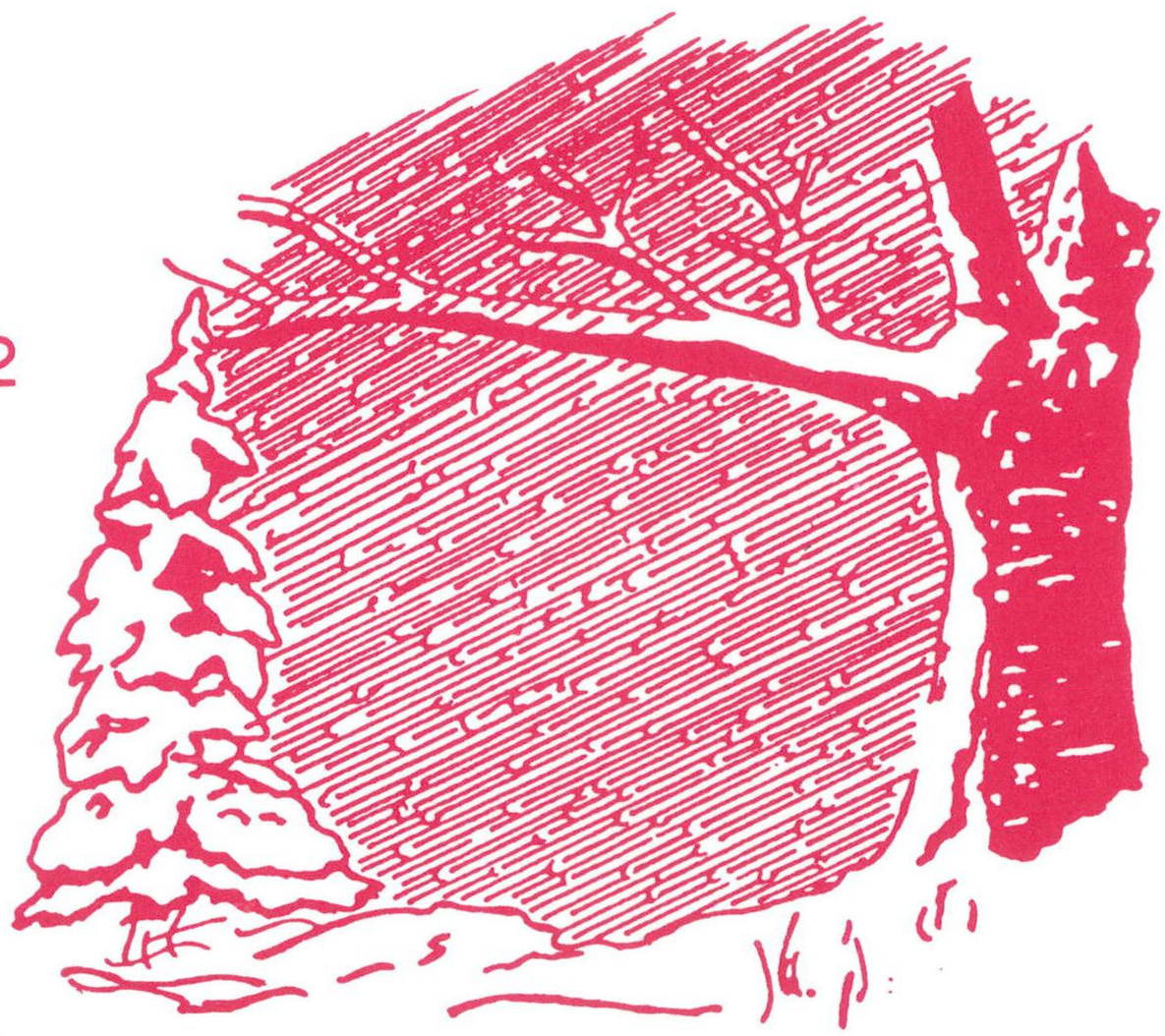
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DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA

OFFICE OF THE FEDERAL COORDINATOR FOR METEOROLOGY

National Winter Storms Operations Plan



FCM-P13-1992

Washington, DC
October 1992

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NATIONAL WINTER STORMS

OPERATIONS PLAN

FCM-P13-1992

Washington, D.C.
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CHANGE AND REVIEW LOG

Use this page to record changes and notices of reviews.

Change Number	Page Numbers	Date Posted	Initial
1			
2			
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Changes are indicated by a vertical line in the margin next to the change.

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FOREWORD

Within the interagency structure of the Office of the Federal Coordinator for Meteorology, the Working Group for Hurricane and Winter Storms Operations, operating under the Committee for Basic Services, is responsible for maintaining the National Winter Storms Operations Plan. This plan was developed to coordinate the efforts of the Nation's weather services to furnish weather observations used in providing adequate and timely warnings of severe winter storms along the coasts of the United States.

The Plan covers the period from November 1 to April 15 -- that time of year normally having the highest incidence of winter storms. This version is the nineteenth edition of the Plan and represents a general update of information published in previous editions. This edition also incorporates west coast storm tracks. These tracks were coordinated and flown on a test basis in February/March 1992 in support of the national "STORMFEST" project.

James A. Almazan

James A. Almazan
Acting Federal Coordinator for
Meteorology

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CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

1.1 General

1.1.1 National Weather Service (NWS). The National Weather Service is responsible for issuing winter weather forecasts, watches, and warnings to the public and various special user groups. Its responsibilities are documented in National Weather Service Operations Manual, Chapter A-02, "Weather Service Mission," and in Chapter C-42, "Winter Weather Warnings."

1.1.2 U.S. Navy (USN). The U.S. Navy, through the Naval Oceanography Command (NAVOCEANCOM) is responsible for issuing gale, storm, and high seas warnings for fleet operations and Navy shore installations and Marine Corps operations and installations, as elaborated in the NAVOCEANCOM Instruction 3140.1 series.

1.1.3 U.S. Air Force (USAF). The U.S. Air Force, through the local and centralized weather units, is responsible for issuing 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 Force Regulation 105-2, "Operational Weather Support".

1.2 Responsibilities.

1.2.1 The Department of Commerce (DOC). The DOC will

- provide basic surface, upper air, and radar observations from its network of stations making such observations;

- provide additional observations, when required, making available all reports to any requesting agency;

- provide basic analyses and forecasts through the National Meteorological Center (NMC), Camp Springs, Maryland;

- provide products under a multi-tier concept consisting of Weather Service Forecast Offices (WSFO) and local Weather Service Offices (WSO) along contiguous U.S. coastal areas, who will provide outlooks, statements, watches, and warnings when appropriate;

- provide advice on aircraft reconnaissance requirements forwarded through the National Hurricane Center (NHC) to the Chief, Aerial Reconnaissance Coordination, All Hurricanes (CARCAH), from NMC (the NMC is the central coordinating office for this program for all reconnaissance requirements);

- operate satellite systems capable of providing coverage of the coastal areas of the contiguous United States during the winter storms season;

- coordinate with the National Aeronautics and Space Administration (NASA) to obtain pertinent meteorological data from NASA research and development experimental satellites;

- coordinate with the Department of Defense (DOD) to obtain pertinent Meteorological data from the Defense Meteorological Satellite Program;

- provide data in the form of satellite pictures for selected situations to authorized research facilities;

- furnish aircraft from the Aircraft Operations Center (AOC) to support the operational reconnaissance objectives of the National Winter Storms Program with

  - the primary objective 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 and

  - the secondary objective to provide data that will permit analyses and a better understanding of the structure and dynamics of these winter storm systems;

- provide oceanographic and meteorological surface data obtained from offshore buoy deployment, if possible, within existing facilities; and

- provide dissemination of weather observation data to appropriate agencies.

1.2.2 The Department of Defense (DOD). The DOD will

- make available to the National Oceanic and Atmospheric Administration (NOAA) agencies, through the Automated Digital Weather Switch (ADWS), basic surface, upper air, and radar observations from those DOD stations making such observations, pilot reports (PIREPs), and aircraft reports (AIREPS) that become available;

- furnish to the NWS, aircraft reconnaissance observations that are within its capabilities and in accordance with established reconnaissance priorities and special observations detailed in Chapter 3 of this plan;

- designate CARCAH as the point of contact for coordination with NMC for aircraft reconnaissance required in support of this plan;

- provide weather reconnaissance data monitor services to evaluate and disseminate reconnaissance reports;

- provide USAF aeronautical station communications to relay reconnaissance reports from the aircraft to the Miami Weather Monitor; and

- provide warnings to all DOD facilities and military units of weather that threatens to inhibit their operations or to damage their installations.

1.2.3 Department of Transportation (DOT).

1.2.3.1 The Federal Aviation Administration (FAA). The FAA will provide for

- Air Traffic Control (ATC) services as appropriate to support this plan;

- dissemination of PIREPs and AIREPS and

- hourly and special weather observations at selected terminal and flight service station locations.

1.2.3.2 The U.S. Coast Guard (USCG). The USCG will

- provide surface observations to NWS from its coastal facilities and vessels;

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

- provide personnel, vessel, and communication support to the NOAA Data Buoy Office for development, deployment, and operation of environmental data buoy systems.

CHAPTER 2

AIRCRAFT RECONNAISSANCE

2.1 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 Air Force Reserve (AFRES)/National Oceanic and Atmospheric Administration (NOAA) Memorandum of Understanding, DOC has identified a requirement for, and the Department of Defense (DOD) maintains aircraft to support on a noninterference with primary mission basis, up to one operational weather 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.

2.2 Responsibilities.

2.2.1 DOD. The DOD is responsible for providing operational aircraft for winter storm synoptic tracks in response to DOC needs on a noninterference with primary mission basis.

2.2.2 DOC. The DOC is responsible for aircraft operations that will be used (when available, on request) as backup for USAF aircraft reconnaissance, for a storm or storm threat. Additionally, DOC aircraft missions may be flown on storms of research interest as desired by the Environmental Research Laboratories. All such flights will be listed by the Chief, Aerial Reconnaissance Coordinator, All Hurricanes (CARCAH) in the Winter Storm Plan of the Day (WSPOD).

2.3 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.

2.4 Reconnaissance Planning and Flight Notification.

2.4.1 Requirements. The National Meteorological Center (NMC) will forward sortie and alert needs to CARCAH through the National Hurricane Center's Tropical Satellite Analysis and Forecasting (TSAF) Unit for tasking in the WSPOD within the responsibilities stated above. The CARCAH will advise NMC of mission availability or nonavailability and expected responsiveness of DOD and DOC assets. The NMC will be responsible for requesting all reconnaissance flights and will provide information as specified in paragraph 2.4.5. The NMC will forward NWS mission requirements for the next 24-hour period (1100 UTC to 1100 UTC) 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. CARCAH will pass all tasking, amendments and cancellations to the flying units.

2.4.2 Change to Requirements. Changes to mission requirements will be accepted by CARCAH based on the following guidelines:

- Early departures will not be requested.
- When notification is received more than 2.5 hours prior to scheduled aircraft departure:
  - Changes to tracks normally will be limited to substitution of one track for another.
  - 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.
- 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.

2.4.3 Cancellation of Requirements. Missions should be canceled 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.

2.4.4 Satisfaction of Requirements.

2.4.4.1 Satisfied. 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 min prior to 30 min after scheduled time.

2.4.4.2 Late Satisfied. 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 min after the scheduled time but prior to the requirement expiration time.

2.4.4.3 No Credit. Normally, no credit will be given for early missions.

2.4.4.4 Written Assessment. The requesting agency, NMC and/or a WFSO, will provide CARCAH a written evaluation (Figure 2-1.) of the weather reconnaissance mission any

DATE _____

TO: 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

_____
(Forecasters Signature)

Figure 2-1. Sample mission evaluation form.

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 CARCAH at:

CARCAH
National Hurricane Center
Gables One Tower, Room 631
1320 S. Dixie Highway
Coral Gables, Fl. 33146

2.4.4.5 Reconnaissance Summaries. The CARCAH will maintain monthly and seasonal reconnaissance summaries detailing missions actually flown to satisfy levied requirements.

2.4.5 Reconnaissance Winter Storm Plan of the Day.

2.4.5.1 Coordination. The NMC will coordinate with the appropriate National Weather Service (NWS) field offices as needed and provide WSPOD information (Figure 2-2.) to CARCAH through the TSAF unit by 1430 UTC. Direct discussion in weather situations is also encouraged between the Navy and NMC with respect to storms or storm threats. The East Coast Navy point of contact is the Naval Eastern Oceanography Center (NAVEASTOCEANCEN) through the Norfolk Command Duty Officer. The optimum time of contact is 1:30 p.m. local time. The following data will be provided to CARCAH when applicable:

- Track and flight 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.

- Selected trackpoint (control point) and time the aircraft is required at the point.

- Special observations or dropsonde release points.

- Expiration time of requirement (time the mission is regarded as dropped).

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

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 CANCELED

_____3. SUCCEEDING DAY OUTLOOK

A. ANTICIPATED TRACK NUMBER _____

B. CONTROL POINT AND CONTROL POINT TIME _____

_____

II. TSAF/CARCAH COORDINATION _____

1. TSAF/INITIALS _____

2. NMC FORECASTER INITIALS _____

3. CARCAH DUTY OFFICER INITIALS _____

4. DATE AND TIME _____

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

Figure 2-2. National Winter Storms Operations Plan coordination request.

2.4.5.2 Preparation. Using 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 the WSPOD is shown in Figure 2-3.

2.4.5.3 Dissemination. The WSPOD will be made available in message form to all appropriate agencies that provide support or control reconnaissance aircraft. The CARCAH will be responsible for disseminating the WSPOD as soon as possible after the DOC requirements, including changes, are received. Negative WSPODs <u>will not</u> be disseminated except to cancel a previously published requirement or outlook.

2.4.5.4 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."

2.5 <u>Reconnaissance Flights</u>.

2.5.1 General Storm Tracks.

2.5.1.1 East Coast and Gulf Coast. Air Force tracks 01 through 24 (Figures F-1-1. through F-1-24.) normally will be flown during a storm or storm threat.

2.5.1.2 West Coast. Air Force tracks to be flown off the west coast of the U.S. are shown in Appendix G (Figures G-1. through G-8.).

2.5.1.3 Airborne Diversions. Within operational limitations and with prior Air Route Traffic Control Center (ARTCC) approval, airborne diversions deemed advisable by the airborne meteorologist may be made from these tracks.

2.5.1.3 Permanent Changes to Tracks. Permanent changes to winter storm reconnaissance tracks must be coordinated with DOD and DOC and approved by the appropriate Federal Aviation Administration (FAA) ARTCCs at least 30 days in advance of the implementation date.

O/R _____ (DTG)

FM CARCAH CORAL GABLES FL/CARCAH

TO (AFRES/NOAA APPROVED ADDRESSEES)

BT

UNCLAS

SUBJECT: RECONNAISSANCE WSPOD FM (DTG) _____ TO (DTG)_____

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

Figure 2-3. Winter Storm Plan of the Day (WSPOD) format.

2.5.2 Flight Plans. Flight plans for reconnaissance flights will be filed with the FAA as soon as practicable before departure time.

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

2.5.4 Dropsonde Releases. Dropsonde instrument releases will be coordinated with the appropriate ARTCC at least 10 min before drop time except for those outside of controlled airspace that do not require coordination.

2.5.5 Air Traffic Control (ATC).

2.5.5.1 ATC Separation. 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 an ATC clearance is mandatory for safety purposes.

2.5.5.2 Assigned Altitudes. When storm aircraft cannot maintain assigned altitudes due to turbulence, ATC should be advised. Normal vertical separation of 1000 ft. at flight level (FL) 290 and below and 2000 ft 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.

2.5.5.3 Military Clearance. For the east coast storms, the U.S. Navy through Commander in Chief, Atlantic Fleet Oceanic Aircraft Coordinator (CINCLANTFLT OAC) will review the WSPOD for each proposed flight to determine if clearance into a particular area will be required. For the west coast storm trails, each mission will need to be coordinated with the regional controlling agencies for each warning area. The reconnaissance unit flying the mission will contact the appropriate clearance agencies prior to entry into any restricted airspace.

2.5.5.4 Coordination of Non-Standard Procedures. Any procedure desired by storm-mission commanders that is outside the above parameters must be coordinated with the appropriate ATC center.

2.5.6 Data Requirements. Data requirements are defined in Table 2-1. Data will be coded and transmitted in standard reconnaissance code (RECCO) for flight level observations (Appendix D) or World Meteorological Organization temporary dropsonde (WMO TEMP DROP) format for dropsonde soundings (Appendix E).

Table 2-1. Requirement for aircraft reconnaissance data.

Data required	Altitudes where data are required	Areal portion of cyclone or environment where 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 300 nmi (550 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)	+- 5 kt (2.5 m/s) (wind speed) +- 10° (wind direction) +- 1°C +- 20m +- 2 mb (200 Pa) Position within 20 nmi (37 km)
Location and strength of radar echoes.	Any level.	All sectors	When available.	
*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. (3m) (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.
**Includes dropwindsondes. If a sonde fails or vertical data are otherwise unobtainable at a specified position, make another release as soon as possible.

2.5.6.1 First Observation Remarks. A plain language remark stating the departure station (International Civil Aviation Organization (ICAO) four letter identifier), time of departure, and estimated time of arrival (ETA) at the control point will be appended to the first observation.

EXAMPLE: AF987 TRACK 01 OB01
97779... 93/// DPTD KBIX 10/0845Z ETA 37.3N 72.3W
10/1210Z

2.5.6.2 Last Observation Remarks. A plain language remark stating ETA and intended arrival station (ICAO four letter identifier), number of observations, and monitor that copied observations will be appended to the last observation.

EXAMPLE: NOAA2 TRACK 05 0&06
97779... 91///
95559...Last Report ETA KMIA 17/2300Z OBS 01 THRU 06 TO KMIA

CHAPTER 3

OTHER OBSERVATIONS

3.1 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 Federal Meteorological 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
- Federal Meteorological Handbook No. 11, Doppler Radar (Part A, B, C, and D)
- Operations of the National Weather Service
- Federal Plan for Environmental Data Buoys
- The GOES User's Guide and operational amendments
- The NOAA Polar Orbiter Data Users Guide
- National Operations Plan for Drifting Data Buoys
- The Coastal Marine Automated (C-MAN) NWS Users Guide

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 National Weather Service Operations Manual, Chapter B-90, "Special Warning Program Observations." The chapter covers observational programs of several agencies involved. The only two observational programs that will be covered in any detail here are the two data sources that provide unique capabilities to support winter storm analysis and forecasting.

3.2 Satellite Observations.

3.2.1 Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), the National Environmental Satellite, Data, and Information Service (NESDIS).

3.2.1.1. Geostationary Operational Environmental Satellite (GOES). The GOES system consists of one operational satellite, GOES-7 located over the equator at 112 degrees west, its new designated station. Future movements of GOES-7 are being evaluated by NESDIS and NWS personnel. 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, 1, 2, 4 km resolution visible fixed standard sectors are produced, where as at night, equivalent infrared sectors of the same resolution are furnished. Additionally, certain IR pictures are enhanced at specific times to emphasize various features. Also, 14km resolution sectors of Water Vapor are available half-hourly.

3.2.1.2 NOAA Polar-Orbiting Satellites. NOAA-12 and NOAA-11 provide data for direct readout (Automatic Picture Transmission (APT)) and High Resolution Picture Transmission (HRPT). These two NOAA satellites also provide data that are received, processed and disseminated via the NWS facsimile circuits. In some instances, the GOES distribution system will be used to disseminate data via the Satellite Field Distribution Facilities (SFDF) to the Weather Service Forecast Offices (WSFOs).

3.2.1.3 The European Geostationary Meteorological Satellites (METEOSAT). METEOSATs have now been configured to provide coverage of the Atlantic Ocean area and South America, as well as Europe and Africa. This arrangement is referred to as Atlantic Data Coverage, or ADC.

A. METEOSAT-3 (M-3) was stationed at 50 degrees West in the Fall of 1991. Once the installation of an upgraded communications relay system to directly acquire METEOSAT-3 data is in place at the Wallops, Maryland, Command and Data Acquisition station (scheduled completion date of December 1992), METEOSAT-3 will begin moving to its new station at 75°W. METEOSAT-3 will arrive on-station by late February 1993.

B. For meteorological application, METEOSAT-3 data are transmitted to the National Hurricane Center in Coral Gables, Florida, and to NESDIS' Synoptic Analysis Branch (SAB) and the National Meteorological Center at the NOAA Science Center in Camp Springs, Maryland. For further distribution, METEOSAT-3 WEFAX data are available on GOES-Tap.

C. METEOSAT-3 is a viable source of data for products disseminated to the user. Once moved to 75°W it will emulate a GOES-East operation, supplementing coverage from GOES-7 stationed at 112°W. Under the current processing and communication scheme, data are not distributed in real-time. However, NESDIS is currently working on a mechanism to convert the real-time digital data to a analog facsimile for immediate dissemination on GOES-Tap.

Table 3-1. Satellites and satellite data availability for the National Winter Storms Operations Plan

Geosynchronous Orbit

SATELLITE	TYPE OF DATA	LOCAL TIME*	REMARKS
GOES-7	VISSR/VAS	Every 30 min (24 hours/day) Limited scan for short interval viewing available)	1. 1, 2, and 4 km resolution visible standard sectors covering Western, Midwest and E. Pacific Ocean 2. 7 km resolution equivalent IR standard sectors for entire U.S. (night) 3. Equivalent IR-enhanced imagery 4. Full disc IR (day/night) 5. Animated imagery 6. Wind analysis 7. Cloud top heights 8. Rainfall/snowfall estimates 9. Satellite information messages 10. VAS soundings 11. 14 km resolution water vapor imagery 12. Manual/Interactive Moisture Analysis
METEOSAT-3	IR	Every 30 min (24 hours/day)	1. 5.0 km visible resolution. 2. 5 km resolution equivalent IR. 3. No equivalent IR-enhanced imagery.
	VI	Available every 30 min from 1100-2330 UTC.	4. Cloud top heights. 5. Rainfall/snowfall estimates. 6. Satellite information messages. 7. 5 km resolution water vapor imagery.
	WV	Every hour when visible data is available (1100-2330 UTC)	8. Cloud Motion Winds. 9. Interactive Moisture Analysis. 10. No Sounder. 11. No RISOP.

* Local time/equatorial crossing time
DD = Daylight descending
DA = Daylight ascending

Table 3-1. Satellites and satellite data availability for the National Winter Storms Operations Plan (continued)

Polar Orbit

SATELLITE	TYPE OF DATA	LOCAL TIME*	REMARKS
NOAA-12	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	0734D/1934A	1. Mapped digitized data (cloud cover) 2. Unmapped imagery (all data types) at Direct Readout sites 3. Sea-surface temperature analysis 4. Moisture analysis 5. Soundings 6. Remap GAC Sectors
NOAA-11		0314D/1514A	
DSMP F-11	OLS(SGDB), SSM/T-2, SSM/I, SSM/T	0500D/1700A	1. Unmapped imagery (DMSP sites only) 2. Mapped imagery (SGDB) 3. Snow and ice coverage 4. Precipitable water 5. Wind speeds 6. Precipitation rates 7. Moisture analysis
F-10	OLS(SGDB), SSM/T, SSM/I	0855D/2055A	
F-8	SSM/I, Non-functional Imaging System	0625A/1825D	

* Local time/equatorial crossing time
DD = Daylight descending
DA = Daylight ascending

3.2.1.4 SFDFs and the Synoptic Analysis Branch (SAB). Under the NESDIS support concept, satellite imagery in support of the National Winter Storms Operations Plan is distributed by the Environmental Satellite Distribution/Interactive Processing Center at Camp Springs, Maryland, to the SFDFs, the SAB, and the WSFOs.

A. The NESDIS SAB operates 24 hours/day 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 are transmitted via the Automation of Field Operations and Services (AFOS) system to all WSFOs and River Forecast Centers in the conterminous United States.

B. Satellite support to the NWS field offices is provided by the Miami SFDF, Kansas City SFDF, and the San Francisco SFDF. In addition, Satellite Interpretation Messages (SIM) are available through the NWS AFOS communications system and the Federal Aviation Administration's (FAA) leased Service A and Radar Report and Warning Coordination (RAWARC) teletype circuits. All WSFOs receive these automatically as transmitted from the SFDFs. The heading and issue times for the SIMs are listed below. Times are subject to change and SIMs may be updated as required by changing weather.

NWS	FAA	ISSUE TIME (UTC)
NFDSIMPSM	TBXX6 KWBC	0000, 0600, 1300, 1800
NFDSIMASM	TBXX6 KMBC	0100, NONE, 1100, NONE
MKCSIMMKC	TBSS6 KMKC	0030, 0530, NONE, 1830
MIASIMMIA	TBXX7 KMIA	0300, 0900, 1500, 2000

3.2.1.5 Points of contact 24 hours/day.

- Miami SFDF 305-350-4460
- Kansas City SFDF 816-374-7395/7396
- NMC Washington, DC 301-763-8364
- SAB 301-763-8444

3.2.2 Department of Defense (DOD) 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-early evening orbit with

approximately 0500/1700 local equator crossing time. The second is in a mid-morning/mid-evening orbit with approximately 0900/2100 local equator crossing time. The DMSP data capabilities in the area of concern are provided in Table 3-1. Special requests for DMSP support will be addressed to CARCAH.

3.3 Automated Environmental Observations

3.3.1 General. Moored buoys in the Atlantic and Pacific Oceans, Gulf of Mexico, and Great Lakes obtain data on meteorological and oceanographic parameters for operational and research purposes. See Figure 3-1 for the location of moored buoys. Coastal Marine Automated Network (C-MAN) stations provide additional marine observations. See Figure 3-2. for locations of C-MAN sites. The status and capability of data buoys can be obtained from the Data Systems Division, National Data Buoy Center (NDBC), Stennis Space Center, MS 39529; telephone 601-688-2836.

3.3.2 Moored Data Buoys and Coastal Marine Automated Network.

3.3.2.1 Procedures. Moored buoy and C-MAN stations routinely acquire and transmit data every hour. Buoy observations include sea-level pressure, wind speed and direction, air temperature, sea-surface temperature, significant wave height and period, and wave spectral data. Reports from C-MAN locations typically include sea-level pressure, wind speed and direction, and air temperature. Some C-MAN stations measure sea-surface temperature, tide level, significant wave height and period, and wave spectral data. A description of the data from a typical moored buoy payload is provided in Table 3-2. Data from a typical C-MAN station are shown in Table 3-3.

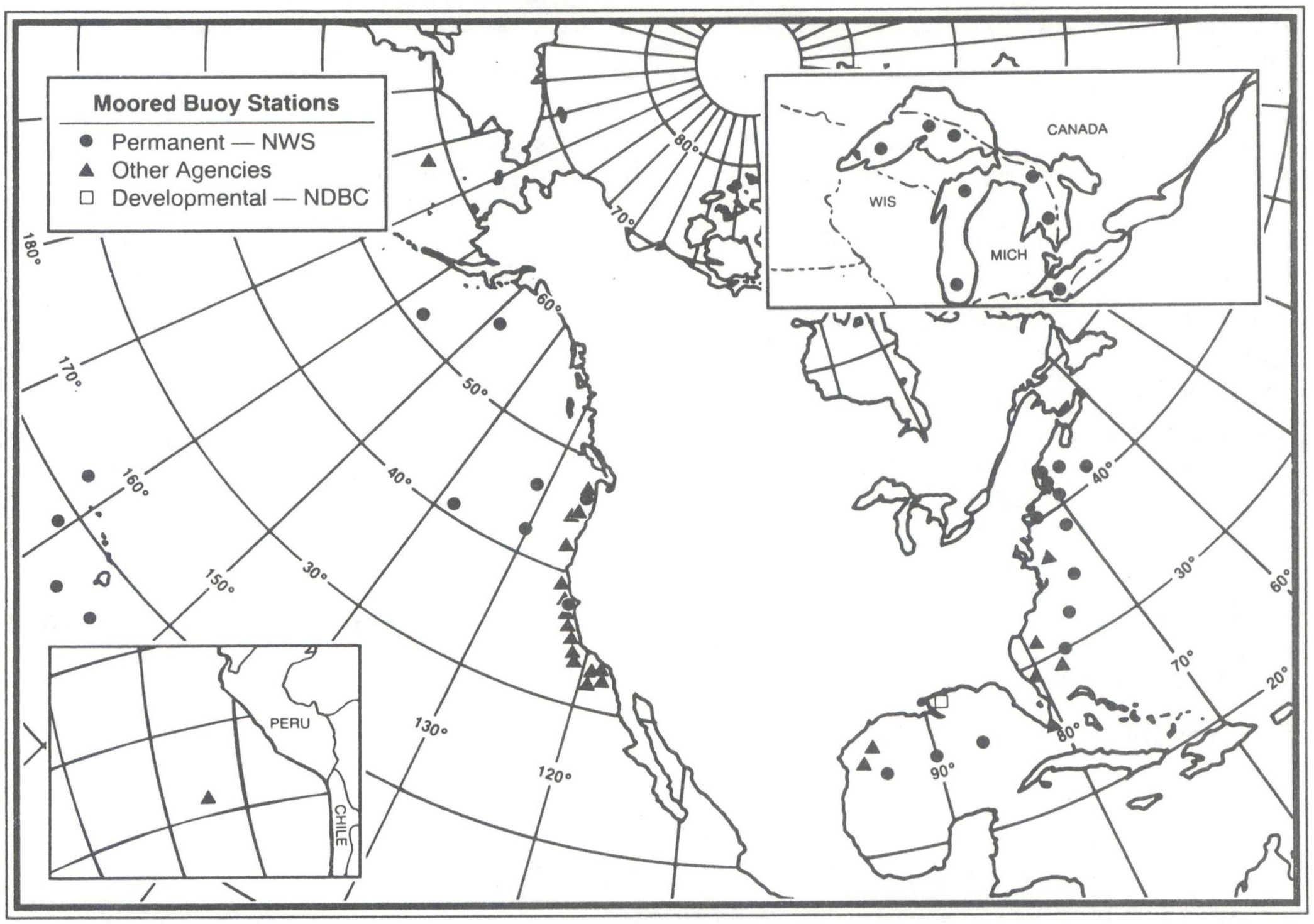
3.3.2.2 Communications. Data are transmitted by ultra high frequency (UHF) communications via the GOES satellite to NESDIS and then are relayed to National Weather Service Telecommunications Gateway (NWSTG) for processing and dissemination. Data from buoys are formatted into World Meteorological Organization (WMO) FM13-IX ship code and from CMAN sites in FM12-IX synoptic code.

3.3.3 Drifting Data Buoys.

3.3.3.1 Procedures. These buoys are deployed by ship or aircraft in data-sparse areas. Their movements are largely dependent upon ocean currents. Data obtained can include position, sea-level pressure, wind speed and direction, air temperature, and sea-surface and subsurface temperature.

3.3.3.2 Communications. Data are transmitted by UHF communications via the NOAA polar-orbiting satellites to NESDIS ground receiving stations and then relayed to the U.S. Argos Global Processing Center in Landover, Maryland for processing and dissemination to the NWSTG. Data from drifting buoys are formatted into WMO FM14-IX DRIBU code.

NDBC BUOY LOCATIONS



MKB 8/92

Figure 3-1. Map showing the location of NDBC moored buoys and USCG Navigational Buoys. Most stations denoted by ▲ are temporery buoys supported by other agencies for specific projects and time periods.

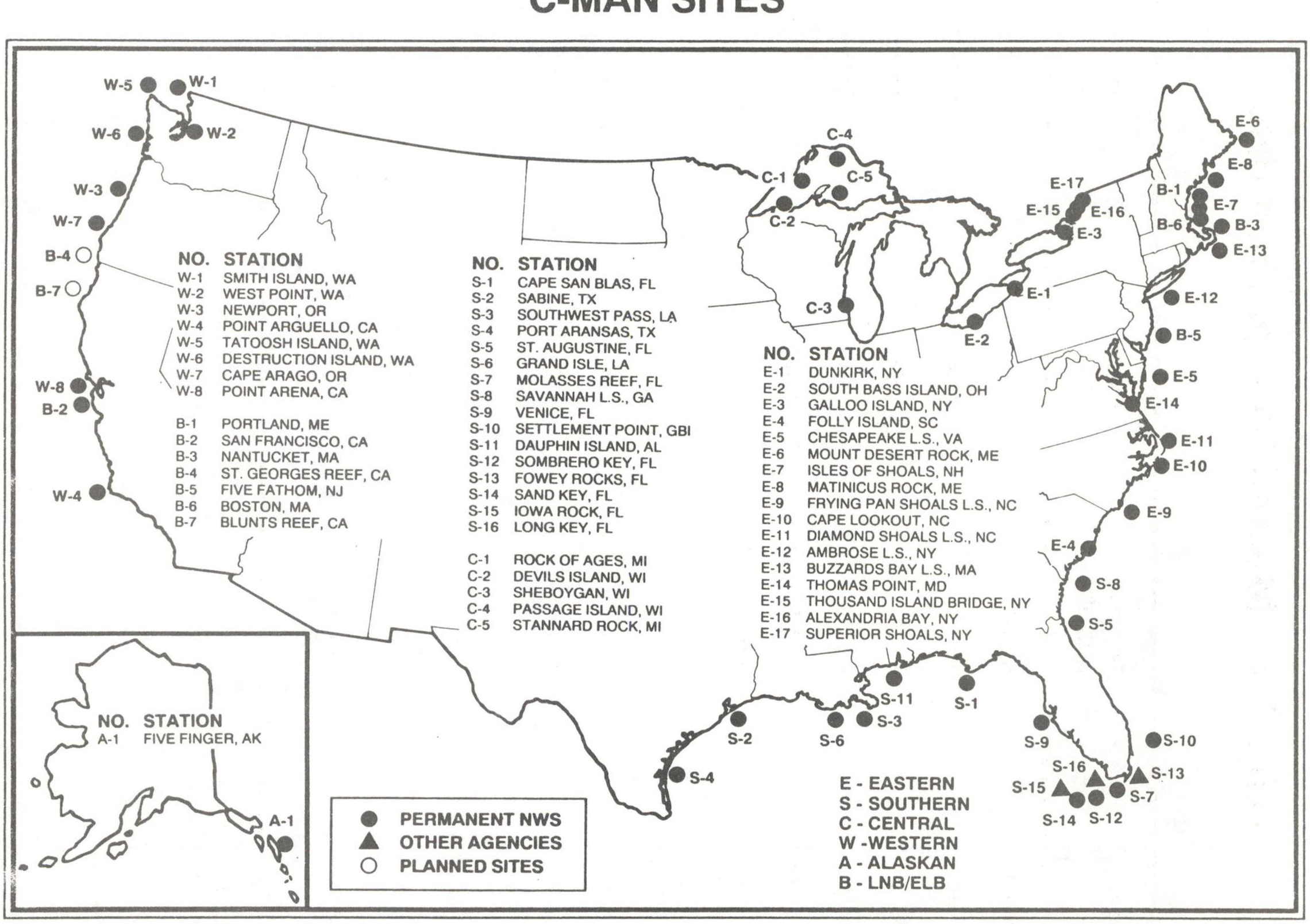


Figure 3-2. Map showing the location of NDBC fixed C-MAN stations in North America, including USCG Navigational Buoys.

Table 3-2. Moored buoy payload data.

Parameter	Reporting Range	Reporting Resolution	Sample Interval	Sample Period	Total System Accuracy
Wind Speed	0 to 62 m/s	0.1 m/s	1 sec	8-10 min**	± 1m/s or 10%
Wind Direction	0 to 360°	1°	1 sec	8-10 min**	± 10°
Peak Wind	0 to 82 m/s	1 m/s	1 sec	8-10 min**	± 1m/s or 10%
Air Temperature	-40° to 50°C	0.1°C	90 sec	8-10 min	± 1°C
Barometric pressure	900 to 1100hPa	0.1 hPa	4 sec	8-10 min	± 1 Hpa
Surface Water Temperature	-7° to 41°C	0.1°C	1 sec	8-10 min	± 1°C
Solar Radiation*	0 to 2150 Watts/M^2	0.5 Watt/M^2	1 sec	8-10 min	± 5%
Relative Humidity*	0 to 100%	0.1%	1 sec	8-10 min	± 6%
Significant Wave Height	0 to 35 m	0.1 m	0.39 sec	20 min	± 0.2 m or 5%
Wave Period	3 to 30 sec	0.1 sec	0.39 sec	20 min	± 1 sec
Nondirectional wave spectra	0.03 to 0.40 Hz	0.01 Hz	0.39 sec	20 min	---
Directional Waves*	0.03 to 0.35 Hz	0.01 Hz	0.5 sec	20 min	± 5°

* Parameter reported on selected buoys
** Continuous winds measured on selected buoys

Table 3-3. Data from a typical fixed C-MAN station.

Parameter	Reporting Range	Reporting Resolution	Averaging* Period	Total System Accuracy
Air Temperature	-40 to 50°C	0.1°C	2 min	± 1.0°C
Wind Direction	0° to 360°	1.0°	2 min	± 10°
Wind Speed	0 to 120 kt	1.0 kt	2 min	± 2.0 kt or 5%
Peak Wind (Highest 5 s running average)	0 to 160 kt	1.0 kt	2 min	± 2.0 kt or 5%
Barometric Pressure	900 to 1100 hPa	0.1 hPa	2 min	± 1.0 hPa
Sea Surface Temperature**	-5° to +40°C	0.1°C	1 min	± 1.0°C
Water Level**	0 to 99.99 ft	0.01 ft	3 min	± 0.1 ft
Significant Wave Height**	0 to 35 m	0.1 m	20 min	0.5 m or ± 5%
Wave Period**	2.5 to 35 sec	1 sec	20 min	± 1 sec
Non-directional Wave Spectra**	0.01 to 0.40 Hz	.01 Hz	20 min	0.2 m or ± 5%

* All sampling rates ≥ 1 Hz
** Not measured at all C-MAN stations

CHAPTER 4

COMMUNICATIONS

4.1. Department of Commerce.

4.1.1 National Weather Service (NWS). All communication systems of the NWS are used in support of the data collection and warning program given in the plan (see Table 4.1). These communication systems are described in the publication, Operations of the National Weather Service.

4.1.2 Aircraft Operations Center (AOC). The AOC may use the communications facilities of the Air Force described in Paragraphs 4.2.1 and 4.2.2.

4.2 Department of Defense (DOD).

4.2.1 Air Force. The Air Force's Automated Weather Distribution System (AWDS) will be used for collection and dissemination of winter storms information received from the Weather Service Forecast Office, Washington. The Air Force's Automated Digital Weather System (ADWS) will be used for the exchange of data between the National Oceanic and Atmospheric Administration and the Air Force.

4.2.2 Weather Reconnaissance. Weather reconnaissance observations will be transmitted via satellite down link, checked for accuracy and then entered into the Air Force Automated Weather Switch. When the aircraft-to-satellite data link is inoperative, observations will be transmitted using high frequency single sideband radio to the Miami Weather Monitor. A summary of reconnaissance communication capabilities by organization is listed in Table 4.1.

4.2.3 U.S. Navy. The Navy Oceanographic Data Distribution System (NODDS), the Automated Digital Network (AUTODIN), and the Naval Environmental Data Network (NEDN) will be used to disseminate gale, storm and high seas warnings. The Fleet Numerical Oceanography Center/National Meteorological Center Data Link (FNDL) will be used for exchange of data between NWS and the Navy.

4.3 U.S. Coast Guard. The Coast Guard operates numerous activities that routinely report or collect meteorological data. Those units that will provide data inputs for this program are Coast Guard communications facilities at Boston, Massachusetts; Portsmouth, Virginia; Miami, Florida; New Orleans, Louisiana; and San Juan, Puerto Rico. These facilities collect Automated Mutual Assistance Vessel Rescue (AMVER) and METEO messages from merchant vessels on a routine basis. The METEO data are then passed directly to the NMC over various teletypewriter circuits such as GT7990. Figure 4-1 shows the applicable east coast commands that have terminations on this circuit.

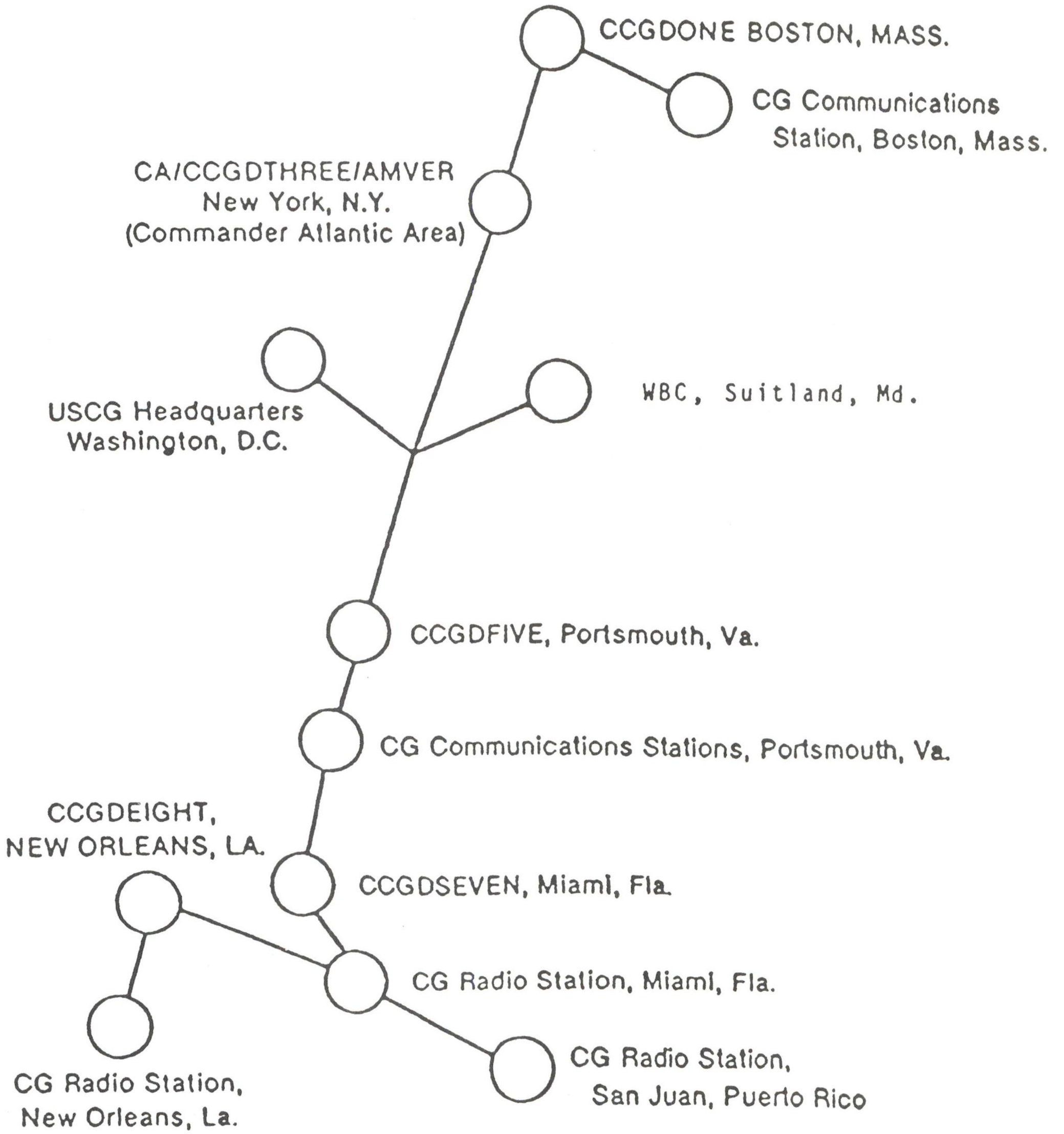


Figure 4-1. Search and rescue circuit.
(Operational Digital Network ADT 64941)
All stations except WBC have send and receive capability.

Table 4-1 Reconnaissance organization communications capabilities.

STATION	ADDRESS	TELETYPE	TELEPHONE
Federal Coordinator for Meteorology (OFCM)	Suite 900, 6010 Executive Blvd. Rockville, MD 20852		DSN 851-1460 301-770-3464
CARCAH/Miami Monitor	National Hurricane Center Gables One Tower, Rm. 631 1320 S. Dixie Highway Coral Gables, FL	A B C	305-661-5076 DSN 434-3420
National Hurricane Center	Gables One Tower 1320 Dixie Highway Coral Gables, FL	A B C	305-667-3108
Alternate National Hurricane Center	NMC/Meteorological Operations Division Washington, DC	A B C	301-763-8201
Central Pacific Hurricane Center	P.O. Box 29879 Honolulu, HI	C	808-836-1831
Naval Eastern Oceanography Center	NAVEASTOCEANCEN Norfolk, VA	A	DSN 564-7750/3770 804-444-7750/3770
Naval Western Oceanography Center	NAVWESTOCEANCEN Pearl Harbor, HI	A	DSN 315-471-0145 808-471-0145
Aircraft Operations Center	AOC Miami, FL		DSN 894-1600 305-526-2936
AF Global Weather Central	AFGWC Offutt AFB, NE		DSN 271-2586 402-291-2586
FACSFAC VACAPES OAC	FACSFAC VACAPES, Oceana, VA		DSN 433-2851 (804) 433-2851 x-233
815 AS	815 AS Keesler AFB, MS	A	AV 597-2409/4318 601-377-2409/4318

A - COMEDS/AWDS
B - AFTN
C - AFOS

CHAPTER 5

PUBLICITY

5.1 News Media Releases. News media releases, other than warnings and advisories, for the purpose of informing the public of the operational and research activities of the Departments of Commerce, Defense, and Transportation should reflect the joint effort of these agencies by giving due credit to the participation of other agencies.

5.2 Distribution. Copies of these releases, along with any pertinent pictures, (see Figure 5-1) should be forwarded to the following agencies:

- NOAA Office of Public Affairs
  Herbert C. Hoover Building
  14th and Constitution Avenue, N.W.
  Washington, DC 20230

- Commander, Naval Oceanography Command
  Stennis Space Center, MS 39529-5000

- Hq Air Force Reserve (AFRES/PA)
  Robins AFB, GA 31093

- Chief, Environmental Services Division (J-3)
  The Joint Chiefs of Staff
  Washington, DC 20318-3000

- Federal Aviation Administration (APA-310)
  800 Independence Avenue, S.W.
  Washington, DC 20591

- Federal Coordinator for Meteorology
  Suite 900, 6010 Executive Boulevard
  Rockville, MD 20852



Figure 5-1. Results of a strong winter storm--Albany, New York.

APPENDIX A

ABBREVIATIONS

-A-

ADWS	Automated Digital Weather Switch/System
AF	Air Force (U.S. Air Force)
AFB	Air Force Base
AFCC	Air Force Communications Command
AFGWC	Air Force Global Weather Central
AFOS	Automation of Field Operations and Services
AFRES	Air Force Reserve
AFTN	Aeronautical Fixed Telecommunications
A/G	Air to Ground
AIRMET	Airmen's Meteorological Information Bulletin
AIREP	Aircraft Report
AMVER	Automated Mutual Assistance Vessel
AOC	Aircraft Operations Center
APT	Automatic Picture Transmission
ARINC	Aeronautical Radio, Incorporated
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
AUTODIN	Automated Digital Network (DOD)
AUTOVON	Automated Voice Network (DOD)
AV	AUTOVON (Also Defense Switched Network (DSN))
AVHRR	Advanced Very High Resolution Radiometer
AWN	Automated Weather Network

-C-

C	Celsius
CA	Commander, Atlantic Area (USCG)
CARCAH	Chief, Aerial Reconnaissance Coordination, All Hurricanes
CBS	Committee for Basic Services (OFCM)
CCGD	Commander, Coast Guard District
CG	Coast Guard
CINCLANTFLT	Commander-in-Chief, Atlantic Fleet
C-MAN	Coastal - Marine Automated Network
COMEDS	CONUS Meteorological Data System (USAF)
CONUS	Continental United States

-D-

DA	Daylight Ascending
Det	Detachment
DMSP	Defense Meteorological Satellite Program
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation
DRSR	Direct Readout Scanning Radiometer
DTG	Date Time Group

-E-

ESSA	Environmental Science Services
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure

-F-

FAA	Federal Aviation Administration
FCMSSR	Federal Committee for Meteorological Services & Supporting Research
FL	Flight Level
FNDL	Fleet Numerical Oceanography Center/National Meteorological Center Data Link
FT	Foot, Feet
FSS	Flight Service Station
FTS	Federal Telecommunications System

-G-

GA	Global Area Coverage
GCCS	Global Command and Control System (USAF)
GOES	Geostationary Operational Environmental Satellite

-H-

HF	High Frequency
Hr	Hour
HRPT	High Resolution Picture Transmission

-I-

ICAO	International Civil Aviation Organization

ICMSSR	Interdepartmental Committee for Meteorological Services and Supporting Research

-K-

Km	Kilometer(s)
kPa	Kilopascal
kt	Knot(s)

-L-

LAC	Local Area Coverage
LF	Light Fine

-M-

m	meter(s)
M-3	METEOSAT-3
MAC	Military Airlift Command
mb	millibar(s)--see kPa
METEO	Cable Address for Ships
METEOSAT	European Geostationary Meteorological Satellites
mi	(statute) mile(s)
min	minute(s)
mph	mile(s) per hour
MSB	Meteorological Services Division
m/s	meter(s) per second

-N-

NASA	National Space and Aeronautics Administration
NAVEASTOCEANCEN	Naval Eastern Oceanography Center
NAVOCEANOCOM	Naval Oceanography Command
NAVOCEANCOMDET	Naval Oceanography Command Detachment
NAVOCEANCOMFAC	Naval Oceanography Command Facility
NAVWESTOCEANCEN	Naval Western Oceanography Center
NAWAS	National Warning System
NDBC	National Data Buoy Center
NESDIS	National Environmental Satellite, Data, and Information Service
NEDN	Naval Environmental Data Network
NHC	National Hurricane Center
NMC	National Meteorological Center
nmi	nautical miles(s)

NOAA	National Oceanic and Atmospheric Administration
NODDS	Naval Oceanographic Data Distribution System
NSSFC	National Severe Storms Forecast Center
NSSL	National Severe Storms Laboratory (NOAA)
NWSTG	National Weather Service Telecommunications Gateway

-O-

OAC	Oceanic Aircraft Coordinator (USN)
OFCM	Office of the Federal Coordinator for Meteorology
ONR	Office of Naval Research
OSV	Ocean Station Vessel

-P-

Pa	Pascal
PIREP	Pilot Report

-R-

RAREP	Radar Report
RECCO	Reconnaissance Code

-S-

SAB	Synoptic Analysis Branch
SAR	Search and Rescue
SARLANT	Search and Rescue Atlantic Circuit
SCAT	Satellite Cloudtop and Tropopause
SFSS	Satellite Field Service Station
SIGMET	Significant Meteorological Information
SSB	Single Sideband
SSC	Stennis Space Center
SSM/I	Special Sensor Microwave/Imagery

-T-

TOVS	TIROS-N Operational Vertical Sounder

-U-

UHF	Ultra High Frequency
USA	United States Army
USAF	United States Air Force

USCG	United States Coast Guard
USN	United States Navy
UTC	Universal Coordinated Time (Z)

-V-

VAS	VISSR Atmospheric Sounder
VISSR	Visible and Infrared Spin Scan Radiometer

-W-

WBC	Identifier for NMC
WG	Working Group
WG/HWSO	Working Group Hurricane and Winter Storms Operations (OFCM)
WMO	World Meteorological Organization
WRS	Weather Reconnaissance Squadron
WS	Weather Squadron (USAF)
WSFO	Weather Service Forecast Office
WSO	Weather Service Office
WSPOD	Winter Storm Plan of the Day
WW	Weather Wing (USAF)

-Z-

Z	Zulu Time (UTC)

APPENDIX B

DISTRIBUTION

DEPARTMENT OF COMMERCE

Mr John Bunting, Regional Office of Audits	1

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Asst Administrator for Ocean Services and Coastal Zone Management (N)	1
Director, Office of Public Affairs, NOAA (PA)	2
Director, Office of Meteorology W(OM)	1
Chief, Warning and Forecast Branch	20
Director, National Climate Program (CSCP)	1
Director, Office of Climate and Atmospheric Research (R)	1
Director, Office of NOAA Corps (NC)	1
Director, Program Development and Coordination Staff (R/PDC)	1
NOAA Library	4
Director, National Meteorological Center	5
Chief, Development Division, NMC	1
Chief, Satellite Services Division, NESDIS (E SP2)	1
Director, National Data Buoy Center	3
Director, National Hurricane Center	5
Director, NWS Eastern Region	20
Director, NWS Central Region	2
Director, NWS Southern Region	5
Director, NWS Western Region	2
WSFO, Boston, MA	1
WSFO, San Juan, PR	1
WSFO, San Francisco, CA	1
WSFO, New Orleans, LA	5
Director, Office of Aircraft Operations	5
Director, Environmental Research Laboratories (R/E)	1
Director, Environmental Research Laboratories (Boulder)	3
Director, Environmental Research Laboratories (Miami)	3
Director, National Climatic Data Center	2
Deputy Asst Administrator for Information Services (E)	10
Asst Admin for Environmental Satellite, Data, and Information Services (FB4)	1
NOAA Budget Officer, Office of Management and Budget	1

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE AIR FORCE

HQ USAF/XOWX	4
AQ AMC/XOW	2
HQ AWS/DO	6
HQ USAF/XOOOW	1
AWS Technical Library	1
HQ PACAF/DOW	1
374 OSS/WE	1
15 WS/CC	1
HQ USAFE/DOW	1
HQ USSTRATCOM/J-315	1
HQ ATC/DOTW	1
HQ AFSPACECOM/DOW	1
HQ AFMC/DOW	1
45 WS/CC	1
HQ ACC/DOW	1
AFGWC/DO	5
Det 7, AFGWC	1
HQ AFRES/DOTM	3
HQ 4AF/DO	3
403 AW/DO	2
815 AS/DO	2
815 WF	35
3350 TCHTG/TTGU-W	1
Phillips Lab/GP	1
CARCAH (OLA, 815 AS)	10

DEPARTMENT OF THE ARMY

Hq Department of the Army/DAMI-POI	2

DEPARTMENT OF THE NAVY

NRL SSC	1
Commandant of the Marine Corps (DC/S Aviation)	5
Oceanographer of the Navy	2
Commanding Officer, Naval Oceanographic Officer	50
CINCLANTFLT FACSFAC VACAPES, OAL	1
Commander, Naval Air Systems Command	1
Commander, Tactical Wing Atlantic	1
Commanding Officer, NAVEASTOCEANCEN	1

CINCLANT (J37)	1
CINCCANTFLT (N37, N526)	2
NRL Monterey	1
Mr William F. Cross, ONR	1

OFFICE OF THE JOINT CHIEF OF STAFF

The Joint Staff/Director (J33 & J36)	2

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

FT Worth ARTCC	3
Boston ARTCC	3
Seattle ARTCC	3
Atlanta ARTCC	3
Los Angeles ARTCC	3
FAA Air Traffic Manager, Nashua, NH	1
FAA Regional Air Traffic Division, ANE-500, Burlington MA	1
FAA Regional Air Traffic Division Manager, AEA-500, NY	1
FAA Air Traffic Manger, LI, NY	3
FAA ATM 200, Washington DC	5
FAA Air Traffic Service, ATR-130	12
FAA Air Traffic Manager, Leesburg, VA	3
FAA Air Traffic Division, ASO-500, Atlanta, GA	1
FAA Air Traffic Manager, Hillard, FL	3
FAA Air Traffic Manager, Miami ARTCC	3
FAA Regional Traffic Division, ASW-500	1
FAA Air Traffic Manager, Houston, TX	3
FAA Regional Air Traffic Division, AWP-500, LA, CA	1
FAA Air Traffic Manager (TMO, NWS, MLS) Albuquerque, NM	3
FAA Air Traffic Manager, Fremont, CA	3
FAA Regional Air Traffic Division, ANW-500, Renton, WA	1

U.S. COAST GUARD

Commandant, USCG Headquarters (NIO)	1
Commandant, USCG Headquarters (G-OIO)	1
Commandant, USCG (G-TGC-l)	1
Commander, Atlantic Area, USCG	1
Commander, First Coast Guard District	1
Commander, Fifth Coast Guard District	2
Commander, Seventh Coast Guard District	2

Commander, Eighth Coast Guard District	1
Commanding Officer, USCG Reserve Training Center	1
Commanding Officer, USCG Aviation Training Center	1
Commanding Officer, USCG Air Station, Otis AFB, MA	1
Commanding Officer, USCG Air Station, Opa Locka , FL	1
Commanding Officer, USCG Air Station, Floyd Bennett Field, Brooklyn, NY	1
Commanding Officer, USCG Air Station, New Orleans, LA	1
Commanding Officer, USCG Air Station, Elizabeth City, NJ	1
Commander, Pacific Area, U.S.C.G. (PO), Alemeda, CA	1

DEPARTMENT OF AGRICULTURE

Dr Thomas J. Jackson, USDA/ARS	1

DEPARTMENT OF STATE

Mr. Jeffrey Maclure	1

DEPARTMENT OF THE INTERIOR

Chief, Science and Technology Staff	1
Mr Lewis T. Moore, Bureau of Reclamation	1

FEDERAL EMERGENCY MANAGEMENT AGENCY

National Preparedness Programs	1

NATIONAL SCIENCE FOUNDATION

Head, Atmospheric Research Section	1
Dr Ronald C. Taylor, Director, Meteorology Program	1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr John W. Kaufman, Atmospheric Sciences Division, MSFC	1

OTHER U.S.

GSA Fed Intro CTR	1
Dr Richard A. Dirks, GALE Project Office, NCAR	1
Dr Carl W. Kreitzberg, ERICA Project Office, Drexell	2
Roddenbery Memorial Library, Cairo, GA	1
Dr Robert E. Morrison, Congressional Research Service, Library of Congress	1
University of Chicago Library, The Joseph Regenstein Library	1
Natural Hazards Research & Applications Information Center, University of Colorado	1

GOVERNMENT OF CANADA

Officer in Charge, METOC Centre, Maritime Command Headquarters, Halifax, NS	1
Director, Canadian Meteorological Centre, Downsview, ON	1
Base Meteorological Officer, CFB Greenwood, NS	1
Base Meteorological Officer, CFB Summerside, PE	1

UNITED KINGDOM

Dr S.J. Caughey, Assistant Director, Head of Defence Services, Meteorological Office	1

APPENDIX C

DEFINITIONS

Area of Concern. The geographic area of concern for the National Winter Storms Operations Plan covers the Gulf of Mexico -----extending about 150 mi inland along the U.S. Gulf Coast. 0 In the Atlantic, the area of concern ranges from latitudes 25 N to 48 N, west of longitude 55 W, extending about 150 mi inland along the eastern coast of the United States. Areas for Storm reconnaissance off the west coast are being coordinated by AFRES and NOAA for testing during the winter of 1991-92.

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 visibility, frequently less than one-fourth mile).

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.

Heavy Snow Warning. A heavy snow warning, carried in NWS forecast and special weather statements, 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).

Ice Storm Warning. This product may be issued when significant ice accumulations are expected and no other winter storm element is expected to occur.

Mission Identifier. The nomenclature assigned to winter storm aircraft reconnaissance missions for weather data identification. It comprises an agency-aircraft indicator followed by a CARCAH-assigned mission-system indicator.

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

Sleet. One form of ice pellet. Generally, solid grains of ice that 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.

Storm Fix. For winter storms the process of determining overall synoptic features for a cyclone by flying a track as coordinated with the tasking agency.

Winter Storm Outlook. This product may be issued when there is a good chance of a major winter storm beyond the point normally covered by a watch. The intent of an outlook is to provide information to those who need considerable lead time to prepare for the event (i.e. 36 to 72 hours).

Winter Storm Plan of the Day. A coordinated mission plan that tasks operational weather reconnaissance requirements during the next 050OZ to 050OZ day; describes reconnaissance flights committed to satisfy operational requirements and identifies possible reconnaissance requirements for the succeeding 24-hour period.

Winter Storm Warning. A Winter Storm Warning is a headline carried in NWS forecasts and special statements. It is issued when hazardous weather or a hydrologic event is occurring, is imminent, or has a very high probability of occurrence. A warning is used for conditions posing a threat to life or property. 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 three special situations: one is the heavy snowfall that often occurs along the lee of the Great Lakes, two is locally heavy orographic snowfall in mountainous terrain, and the third when freezing precipitation is the only element expected. When any of these conditions cannot be directly connected to a synoptic-scale winter storm, the headlines **Heavy Snow Warning** and **Ice Storm Warning** may be used in forecasts.

Winter Storm Watch. A Winter Storm Watch is a headline carried in NWS forecasts and special statements. It is used when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough lead time so those who need to set their plans in motion can do so. The watch will cover the possible occurrence of the following elements, either separately or in combination: blizzard conditions, heavy snow (or light snow in areas where snow is relatively rare), accumulations of freezing rain or freezing drizzle, and/or heavy sleet.

Winter Weather Advisories. Event-specific advisories are used to describe conditions that 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. These types of advisories include snow (less than 4 in), blowing snow, wind chill, freezing rain, dense fog, etc.

APPENDIX D

RECCO FORM, CODE TABLES AND REGULATIONS

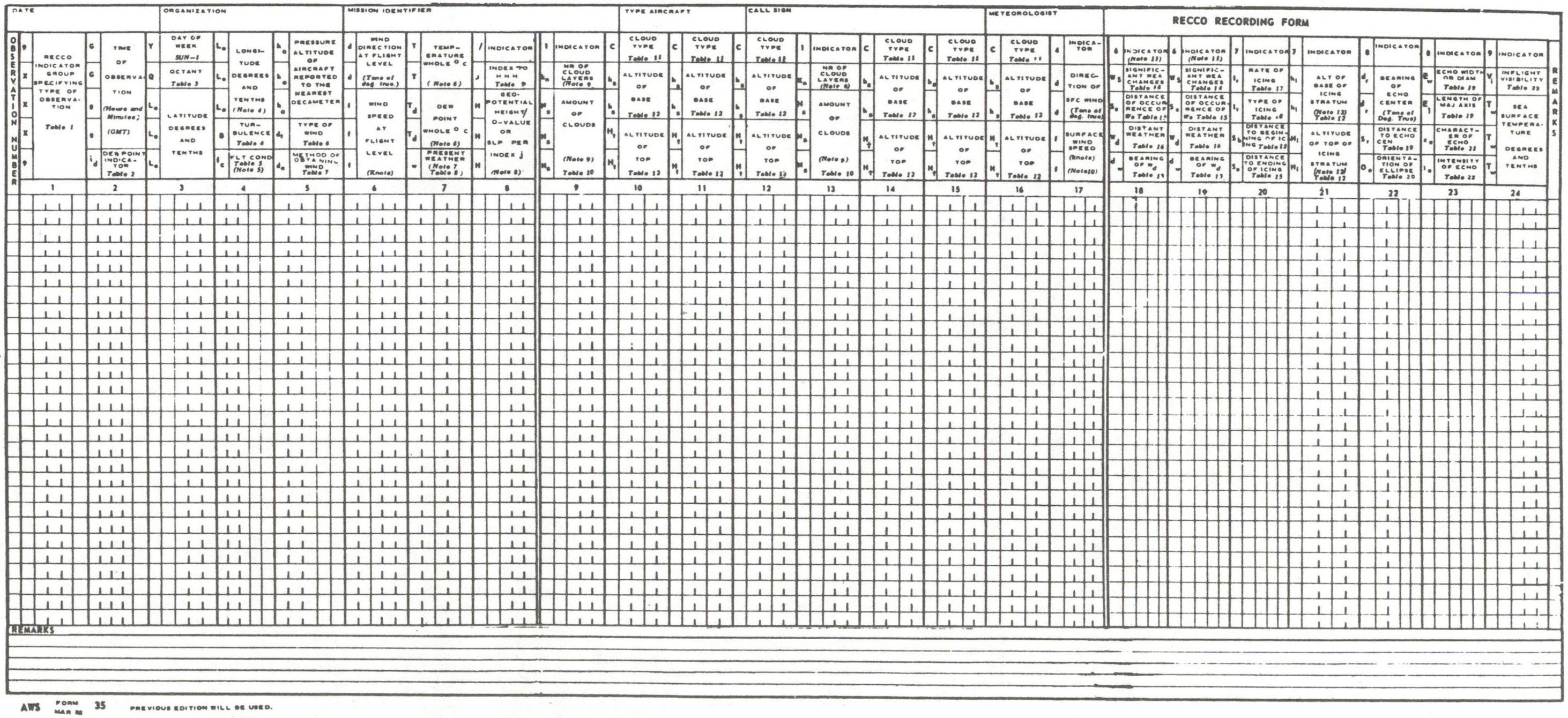


Figure D-1. Reconnaissance code recording form (AWS Form 32)

Table D-l. Reconnaissance 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 capabilities

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 tem -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° -90° W	Northern
1	90° W - 180°	Northern
2	180° - 90° E	Northern
3	90° - 0° E	Northern
4	Not Used	
5	0° - 90° W	Southern
6	90° - 180° W	Southern
7	180° - 90° E	Southern
8	90° - 0° 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 of Wind
l 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 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 (continous or intermittent precip - from strata 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)
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 of 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 Altocumulus (Ac)
4 Altostratus (As)
5 Nimbostratus (Ns)
6 Statocumulus (Sc)
7 Stratus (St)
8 Cumulus (Cu)
9 Cumulonimbus (Cb)
/ Cloud type unknown due to darkess 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 l00 ft
02 200 ft
03 300 ft
etc, etc
49 4,900 ft
50 5,000 ft
51-55 Not used
56 5,600 ft
57 7,000 ft
etc, etc
79 29,000 ft
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 D-1. Reconnaissance code tables (continued)

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 neutical miles long*)
9 Persistent contrails

TABLE 19 S_r, E_w, E_l

0 0NM	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$_a$L$_a$L$_a$ L$_o$L$_o$L$_o$Bf$_c$ h$_a$h$_a$h$_a$d$_t$d$_a$

ddfff TTT$_d$T$_d$w /jHHH

SECTION TWO (ADDITIONAL)

1k$_n$N$_s$N$_s$N$_s$ Ch$_s$h$_s$H$_t$H$_t$ 4ddff

6W$_s$S$_s$W$_d$d$_w$ 7I$_r$I$_t$S$_b$S$_e$ 7h$_i$h$_i$H$_i$H$_i$ 8d$_r$d$_r$S$_r$O$_e$

8E$_w$E$_l$c$_e$i$_e$ 9V$_i$T$_w$T$_w$T$_w$

SECTION THREE (INTERMEDIATE)

9XXX9 GGggi$_d$ YQL$_a$L$_a$L$_a$ L$_o$L$_o$L$_o$Bf$_c$ h$_a$h$_a$h$_a$d$_t$d$_a$

ddfff TTT$_d$T$_d$w /jHHH

Table D-2. Reconnaissance code regulations

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 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 RPMK."

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 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 ///.

9. If the number of cloud layers reported exceeds 3, k_n in the first 1-group reports the total number of cloud layers. The second 1-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 clouds. 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 W_s.

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 //.

APPENDIX E

TEMP DROP CODE BREAKDOWN

CODE FORM:

PART A

SECTION 1	$M_iM_iM_jM_j$	YYGGI_d	99$L_aL_aL_a$	$Q_c$$L_oL_oL_oL_o$	MMM$U_{La}$$U_{Lo}$
SECTION 2	99$P_oP_oP_o$	$T_oT_oT_{ao}D_oD_o$	$d_od_of_of_of_o$		
	$P_1P_1h_1h_1h_1$	$T_1T_1T_{a1}D_1D_1$	$d_1d_1f_1f_1f_1$		
	.....	.....	.....		
	$P_nP_nh_nh_nh_n$	$T_nT_nT_{an}D_nD_n$	$d_nd_nf_nf_nf_n$		
SECTION 3	88$P_tP_tP_t$ or 88999	$T_tT_tT_{at}D_tD_t$	$d_td_tf_tf_tf_t$		
SECTION 4	77$P_mP_mP_m$ or 66$P_mP_mP_m$ or 77999	$d_md_mf_mf_mf_m$	($4V_bv_bv_av_a$)		

PART A

SECTION 1 - IDENTIFICATION AND POSITION

M_iM_i Identification letters of the report = XX

M_jM_j Identification letters of the part of the report = AA

YY Day of the month (GMT) = 01,02 etc. When wind data are included (Dropwindsonde observation), 50 is added to YY.

GG Actual time of the observation, to the nearest whole hour (GMT).

1_d Highest level for which wind is available. 7 = 700mbs, 5 = 5000mbs, etc. If flight level is above a standard surface, for example 495, report a 5 for 500 MBs in the 1_d group. When no winds are reported in any part of the message encode as "/"

99 Indicator for aircraft position

$L_aL_aL_a$ Latitude, in tenths of a degree.

Q_c Quadrant of the globe. The earth is divided by the Greenwich Meridian and the Equator into quadrants. The code figure reported depends on the latitude and longitude of the observation position. i.e., 7 = NW, 1 = NE, 3 = SW, 5 = SE.

$L_oL_oL_oL_o$ Longitude, in tenths of a degree.

MMM Marsden square. The number of the Marsden Square for aircraft position at the time of the observation is reported for MMM. Always report three digits for MMM, with zeros reported for the hundreds and tens digits when required. When an observation is within a depicted 10 degree square, report the number of that square. When on an even 10 degree latitude or longitude circle, the Marsden Square for MMM is obtained by moving in the direction of larger latitude and/or longitude.

EXAMPLE: assuming a position of 18.1N, 131.4W, MMM is 050; assuming a position of 30.0N, 140.0E, MMM is 130. At the equator or on the prime meridian, report the Marsden square compatible with the Q_c reported.

U_{La} Units digit in the reported latitude

U_{Lo} Units digit in the reported longitude

SECTION 2- SURFACE AND STANDARD ISOBARIC SURFACES

99-	Indicator for surface
$P_oP_oP_o$	Pressure in whole millibars, thousands digits omitted. ($P_oP_oP_o$ is always surface level)
P_1P_1 ... P_nP_n	Pressure of mandatory standard isobaric surfaces in units of tens of millibars. (1000mbs=00, 850mbs=85, 700mbs=70, etc.)
$h_1h_1h_1$ ... $h_nh_nh_n$	Height of the mandatory pressure level in geopotential meters or decameters above the surface. Encoded in meters up to 501mbs; Encoded in decameters above 501mbs. Add 500 to hhh for negative 1000mb heights. Report 1000mb groups as 00/// ///// when surface pressure is less than 950mbs.
T_oT_o T_1T_1 ... T_nT_n	Tens and units digit of air temperature (not rounded off) in degress. Celsius, at specified levels beginning with surface.
T_{ao} T_{a1} ... T_{an}	Approximate tenths value and sign (plus or minus) of the air temperature. Even = plus 0dd = minus
D_oD_o D_1D_1 ... D_nD_n	Dewpoint depression (with respect to water) at standard isobaric surfaces beginning with surface level. When the depression is 4.9C or less encode the units and tenths digits of the depression. Encode depression of 5.0 through 5.4 as 50; Encode depressions of 5.5 through 5.9 as 56. Dewpoint depressions of 6.0 and above are encoded in tens and units with 50 added. Dewpoint depressions for relative humidities less than 20% are encoded as 80. When air temperature is below -40°C report D_nD_n as two solidi.
d_Od_O d_1d_1 ... d_nd_n	True direction (rounded off to nearest 5 degrees) in tens of degrees. from which the wind is blowing. (Dropwindsonde)
$f_Of_Of_O$ $f_1f_1f_1$ ... $f_nf_nf_n$	Wind speed in knots (Dropwindsonde)

[NOTE: When flight level is just above a mandatory surface (Dropwindonde) and, in the operator's best meterological judgement, the winds are representative of the winds at the mandatory surface, then the operator may encode the mandatory surface winds using the data from flight level. If the winds are not representative, then encode /////.]

SECTION 3 - DATA FOR TROPOPAUSE LEVELS

88	Indicator for tropopause data.
$P_tP_tP_t$	Pressure at the tropopause level reported in whole millibars
T_tT_t	Air temperature in whole degrees Celsius, at the tropopause level.
T_{at}	Approximate tenths value and sign (plus or minus) of the air temperature at the tropopause level.
D_tD_t	Dewpoint depression at the tropopause level.
d_td_d	True direction (rounded off to the nearest 5 degrees), in tens of degrees, from which the wind is blowing at the tropopause level.

$f_tf_tf_t$ Wind speed, in knots, at the tropopause level

88999 Tropopause data not available.

SECTION 4 - MAXIMUM WIND DATA

66 Indicator that data for maximum wind level and for vertical wind shear follow (the top of the wind sounding corresponds to the highest wind speed observed throughout the descent.)

77 Indicator that data for maximum wind level and for vertical wind shear follow (maximum wind level does not coincide with the top of the wind sounding.)

$P_mP_mP_m$ Pressure at maximum wind level in whole millibars

d_md_m True wind direction (rounded off to nearest 5 degrees), in tens of degrees, from which the maximum wind is blowing.

$f_mf_mf_m$ Maximum wind speed in knots

4 Indicator for vertical wind shear data

v_av_a Absolute value of vector difference between max wind and wind blowing 3000 feet ABOVE the level of maximum wind. Reported to the nearest knot. Use "//" if missing and 4 group is reported. A vector difference of 99 knots or more is reported with the code figure 99.

v_bv_b Absolute value of vector difference between max wind and wind blowing 3000 feet BELOW the level of maximum wind. Reported to the nearest knot. Use "//" if missing and 4 group is reported. A vector difference of 99 knots or more is reported with the code figure 99.

CODE FORM:

PART B

SECTION 1	$M_iM_iM_jM_j$	YYGG/	$99L_aL_aL_a$	$Q_cL_oL_oL_oL_o$	$MMMUL_aU_{Lo}$
SECTION 5	$n_0n_0P_0P_0P_0$	$T_0T_0T_{a0}D_0D_0$			
	$n_1n_1P_1P_1P_1$	$T_1T_1T_{a1}D_1D_1$			
	.....	.....			
	$n_nn_nP_nP_nP_n$	$T_nT_nT_{an}D_nD_n$			
SECTION 6	21212	$n_0n_0P_0P_0P_0$	$d_0d_0f_0f_0f_0$		
	$n_1n_1P_1P_1P_1$	$d_1d_1f_1f_1f_1$			
	.....	.....			
	$n_nn_nP_nP_nP_n$	$d_nd_nf_nf_nf_n$			
SECTION 9	51515	10166	10167	10190	10191

PART B

SECTION 1 - IDENTIFICATION AND POSITION

M_jM_j Identification letters of the part of the report = BB

/ Filler figure for YYGG group

All other groups are the same as reported in Part 1 - Section 1

SECTION 5 - DATA FOR SIGNIFICANT TEMPERATURE AND RELATIVE HUMIDITY LEVELS

n_0n_0 Number of level, starting with surface level. Only surface level will be numbered as "00". When a mandatory level is also
n_1n_1 selected as significant, repeat the level in section 5. Encode significant levels n_nn_n to indicate missing data as nn/// /////.
...
n_nn_n

$P_0P_0P_0$ Pressure at specified levels in whole millibars, beginning with surface.
$P_1P_1P_1$
...
$P_nP_nP_n$

Temperature and humidity data groups are reported in the same manner as the temperature and humidity data in PART A - Section 2.

SECTION 6 - DATA FOR SIGNIFICANT WIND LEVELS

21212 Data for significant levels with respect to wind follow. Wind data groups are reported in the same manner as the wind data in PART A - Section 2

SECTION 9 - ADDITIONAL DATA GROUPS

51515 Additional data in regional code follow.

10166 Geopotential data are doubtful between the following levels. $P_nP_nP'_nP'_n$. This code figure is used only when geopotential data are doubtful from a level to termination of the descent.

NOTE: When radar altimeter is inoperative and surface reference is used, or if the ARWO advises that geopotential platform data are doubtful, a 10166 is reported for the entire run.

10167 Temperature Data are doubtful between the following levels: $0P_1P_1P_2P_2$

This code figure shall be reported when only temperature data are doubtful for a portion(s) of the descent. If the 10167 group is reported a 10166 will also be reported.

EXAMPLE: Temperature is missing from 540mbs to 510mbs. SLP is 1020mbs. The code would be 10166 00251 10167 05451.

10190 Extrapolated altitude data follows:

(1) When the sounding begins within 25 mbs below a standard surface, the height of the surface is reported in the format 10190 $P_nP_nh_nh_nh_n$. The temperature group is not reported.

EXAMPLES: Assume the release was made from 310 mbs and the 300 mb height was 966 decameters. The last reported standard level in Part A is the 400 mb level. The data for the 300 mb level is reported in Part B as 10190 30966.

(2) When the sounding does not reach surface, but terminates within 25 mbs of a standard surface, the height of the standard surface is reported in Part A of the code in standard format and in Part B of the code in the format 10190 PnPnhnhnhn (aircraft reference).

EXAMPLE: Assume termination occurred at 980 mbs and the extrapolated height of the 1000 mb level was 115 meters. The 1000 mb level would be reported in Part A of the code as 00115 ///// and in Part B as 10190 00115.

10191 Extrapolated surface pressure precedes. Extrapolated surface pressure is only reported when the termination occurs between 850 mbs and surface pressure is reported in Part A as $99P_0P_0P_0$///// and Part B as $00PP_0P_0P_0$ /////. When surface pressure is extrapolated, the 10191 group is the last additional data group reported in Part B.

APPENDIX F

EAST AND GULF COAST STORM TRACKS

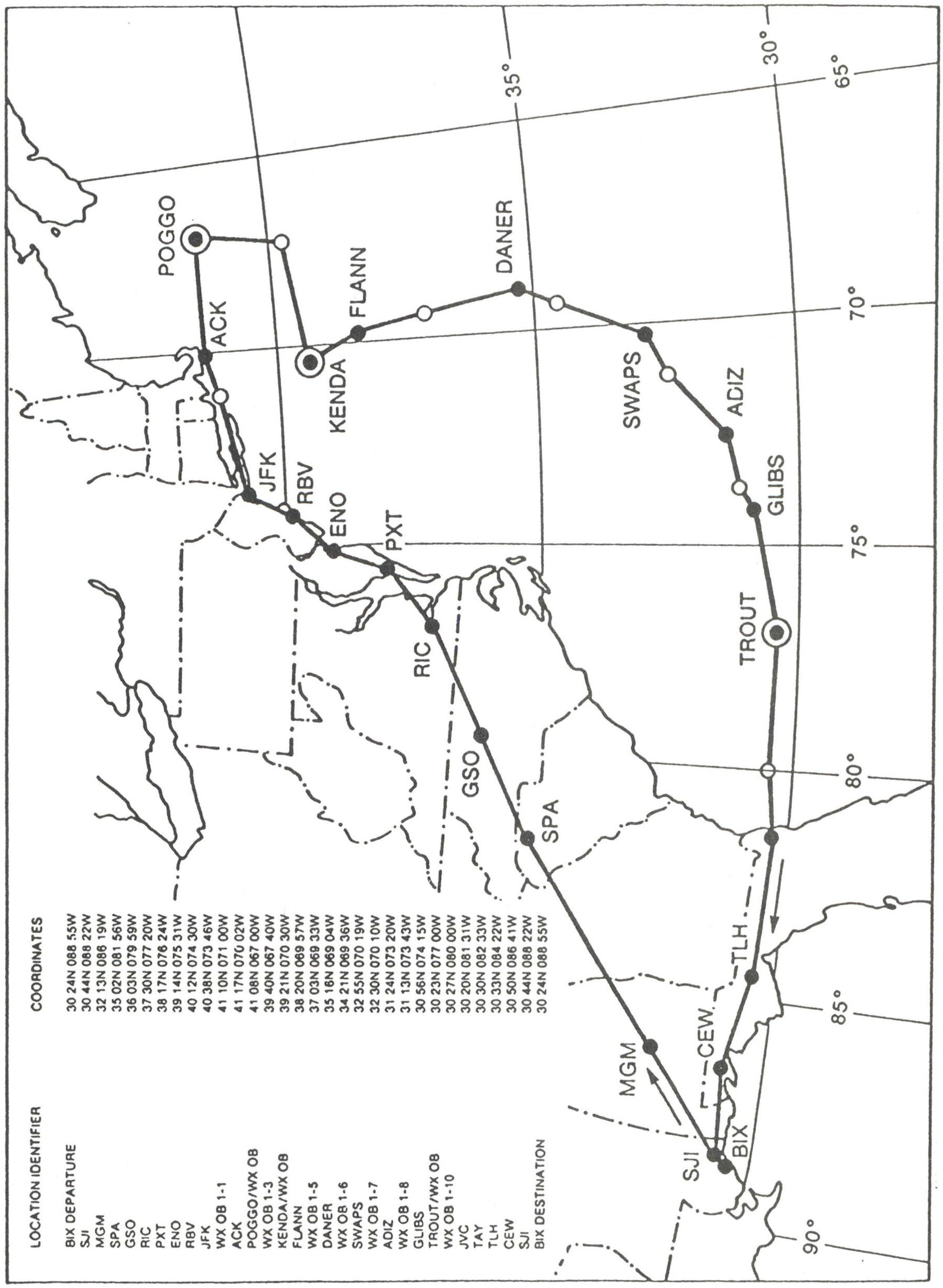


Figure F-1-1. Air Force track 01.

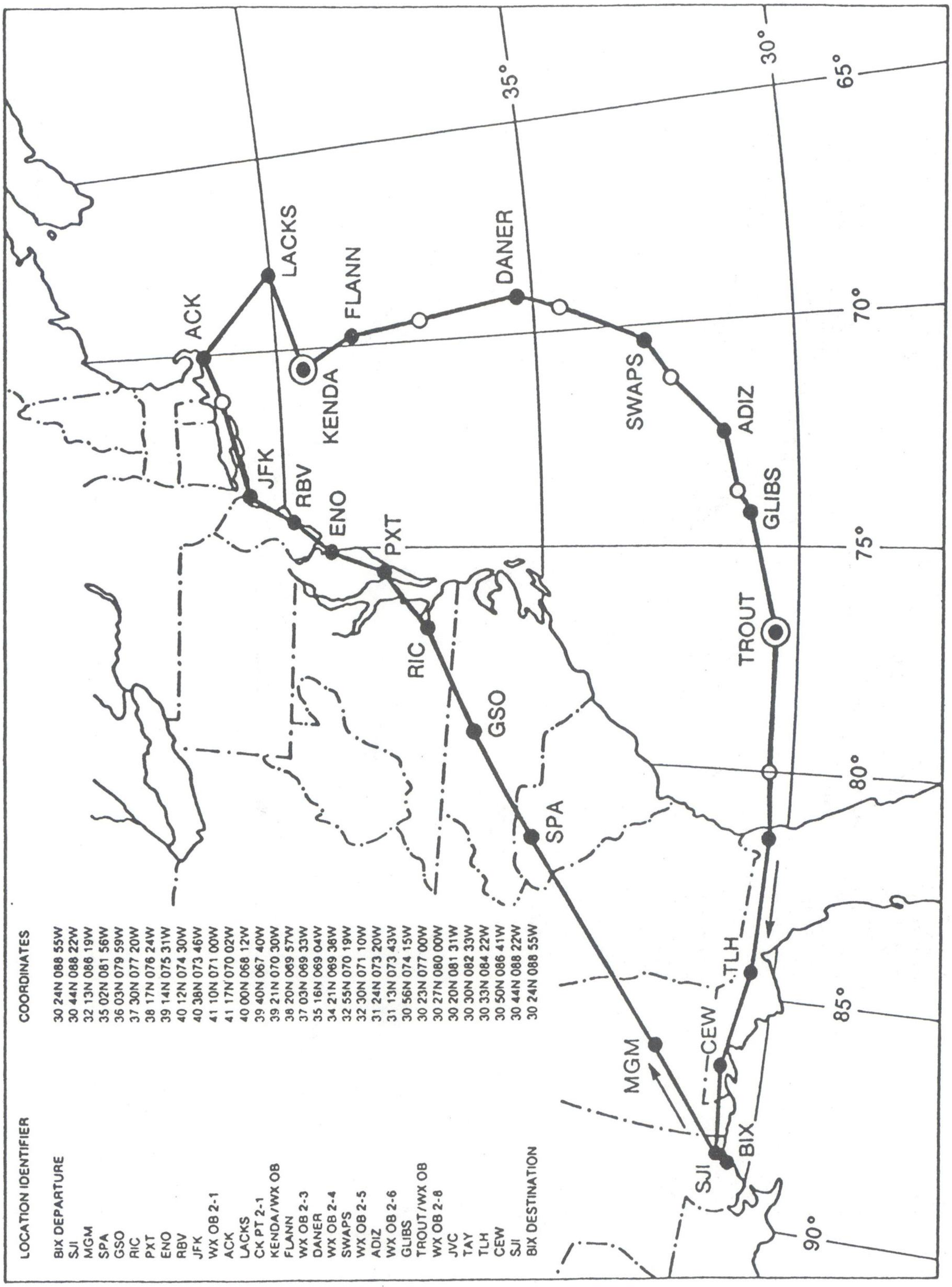


Figure F-1-2. Air Force track 02.

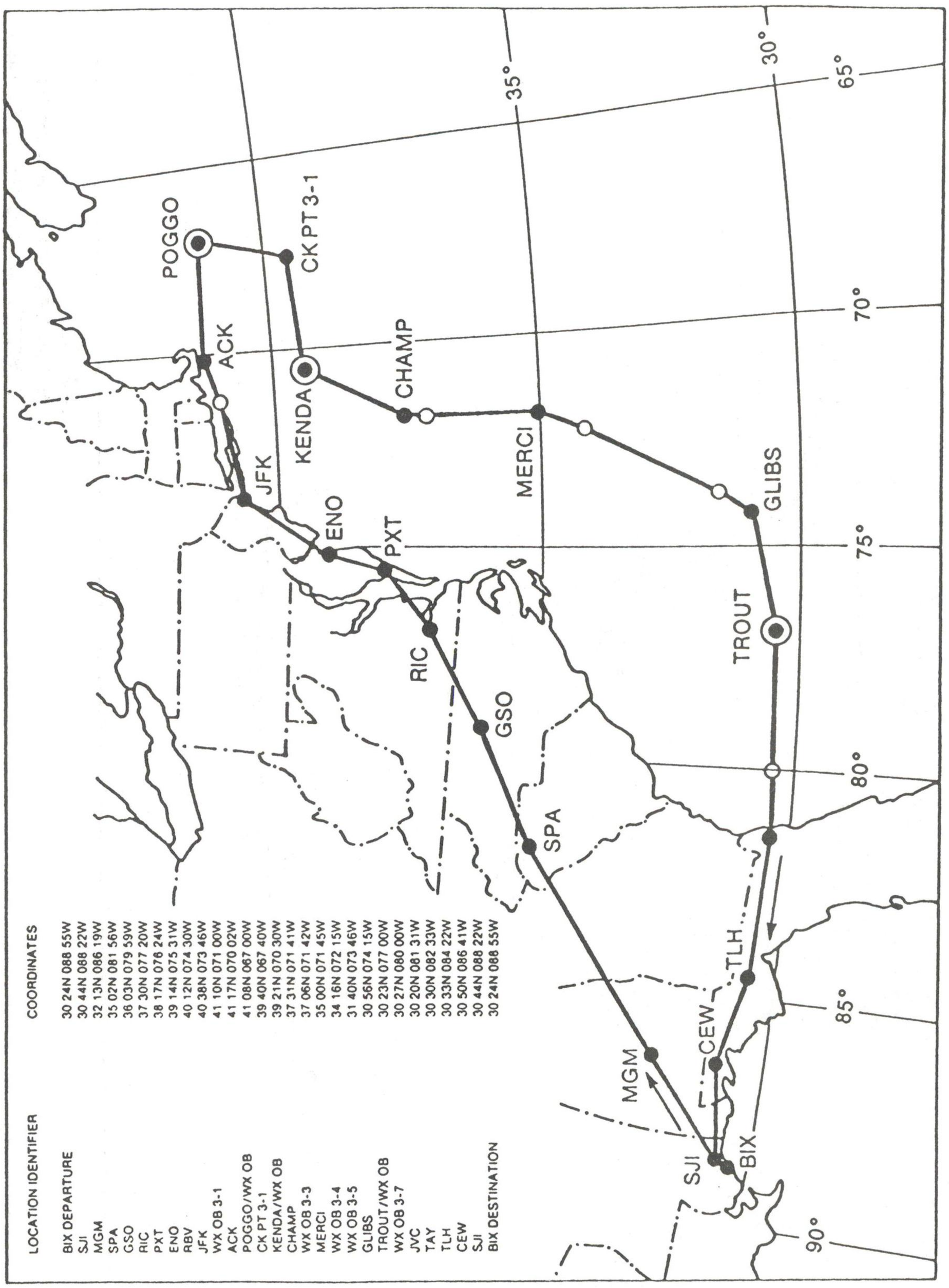


Figure F-1-3. Air Force track 03.

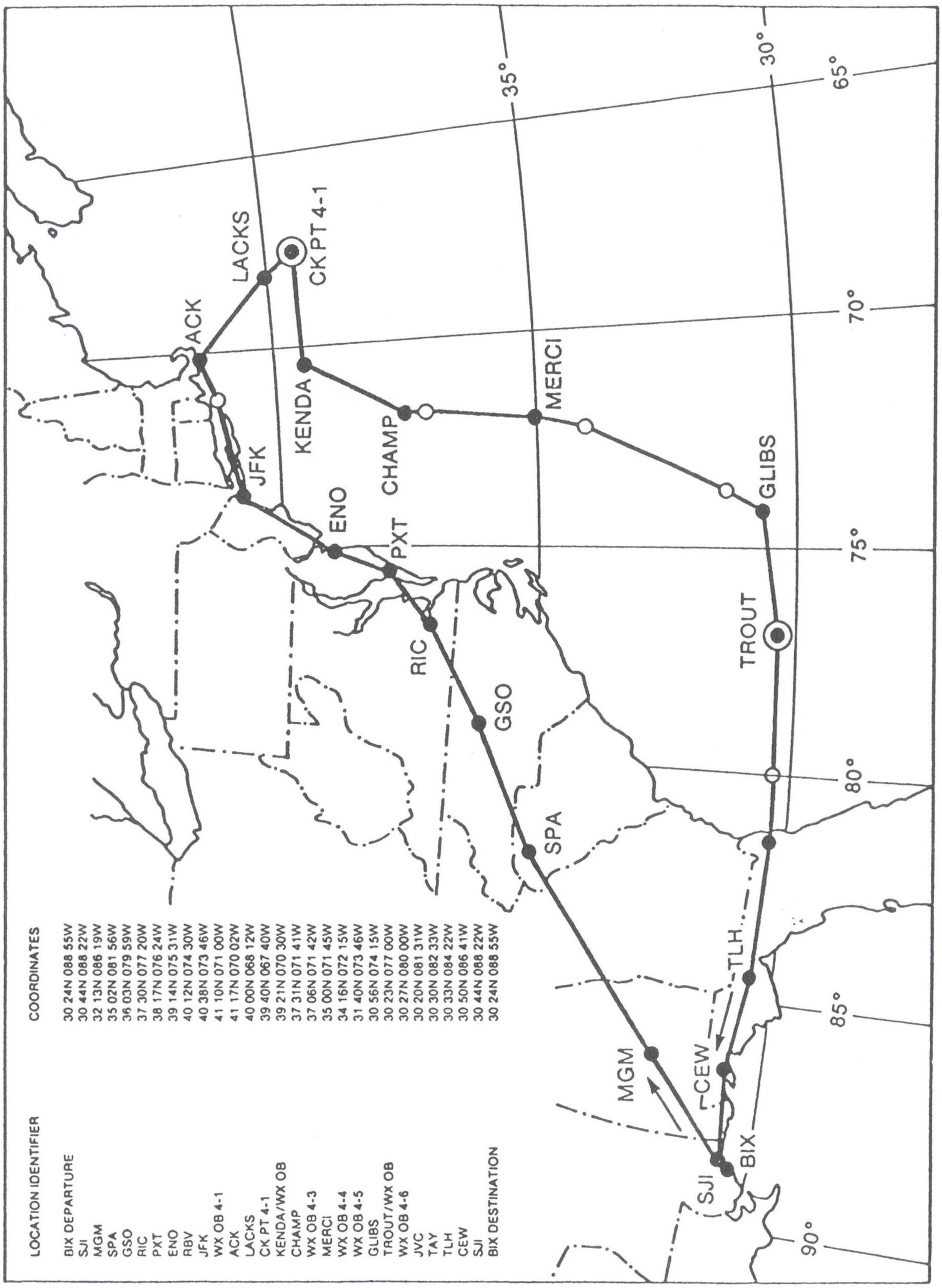


Figure F-1-4. Air Force track 04.

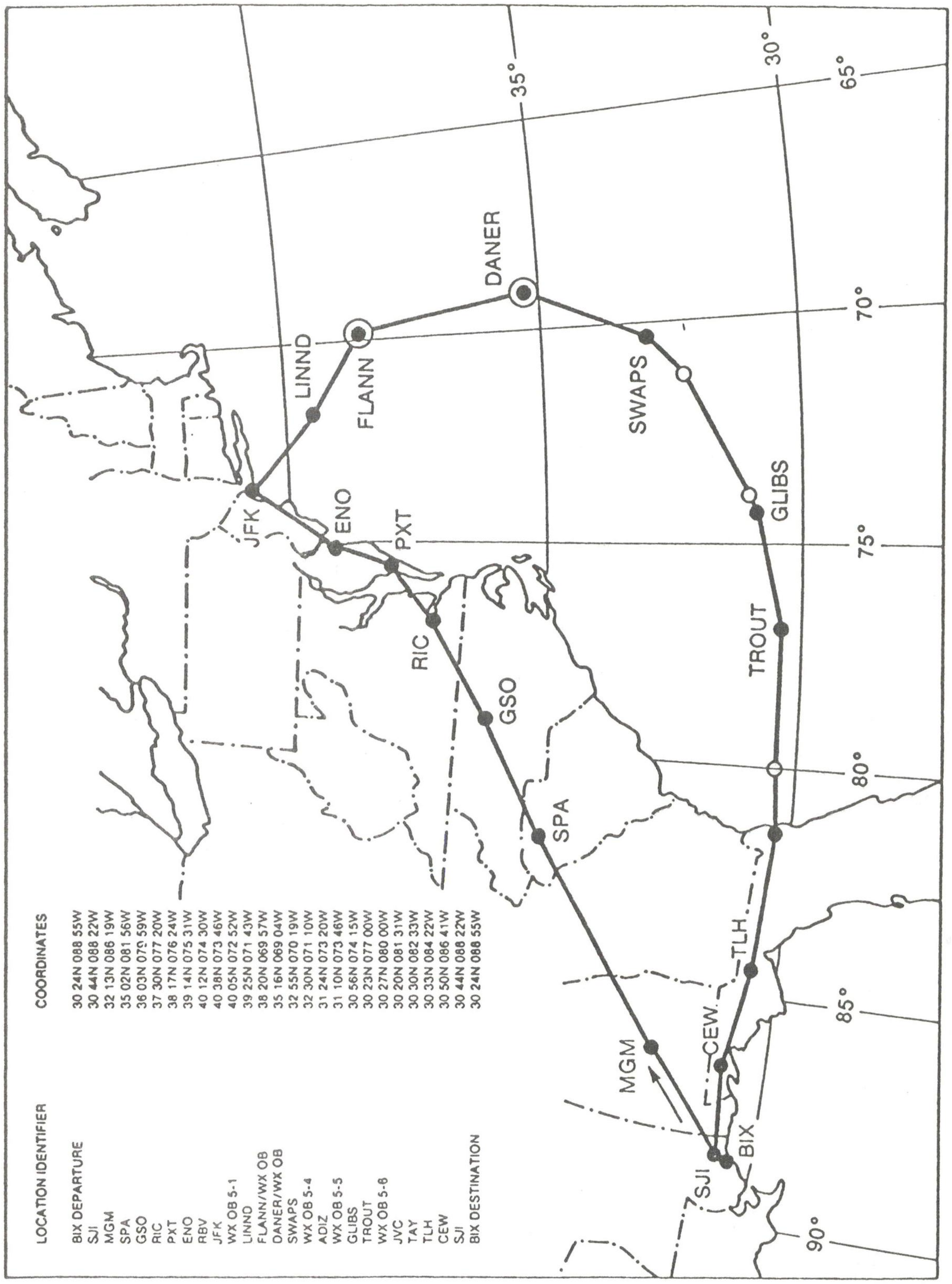


Figure F-1-5. Air Force track 05.

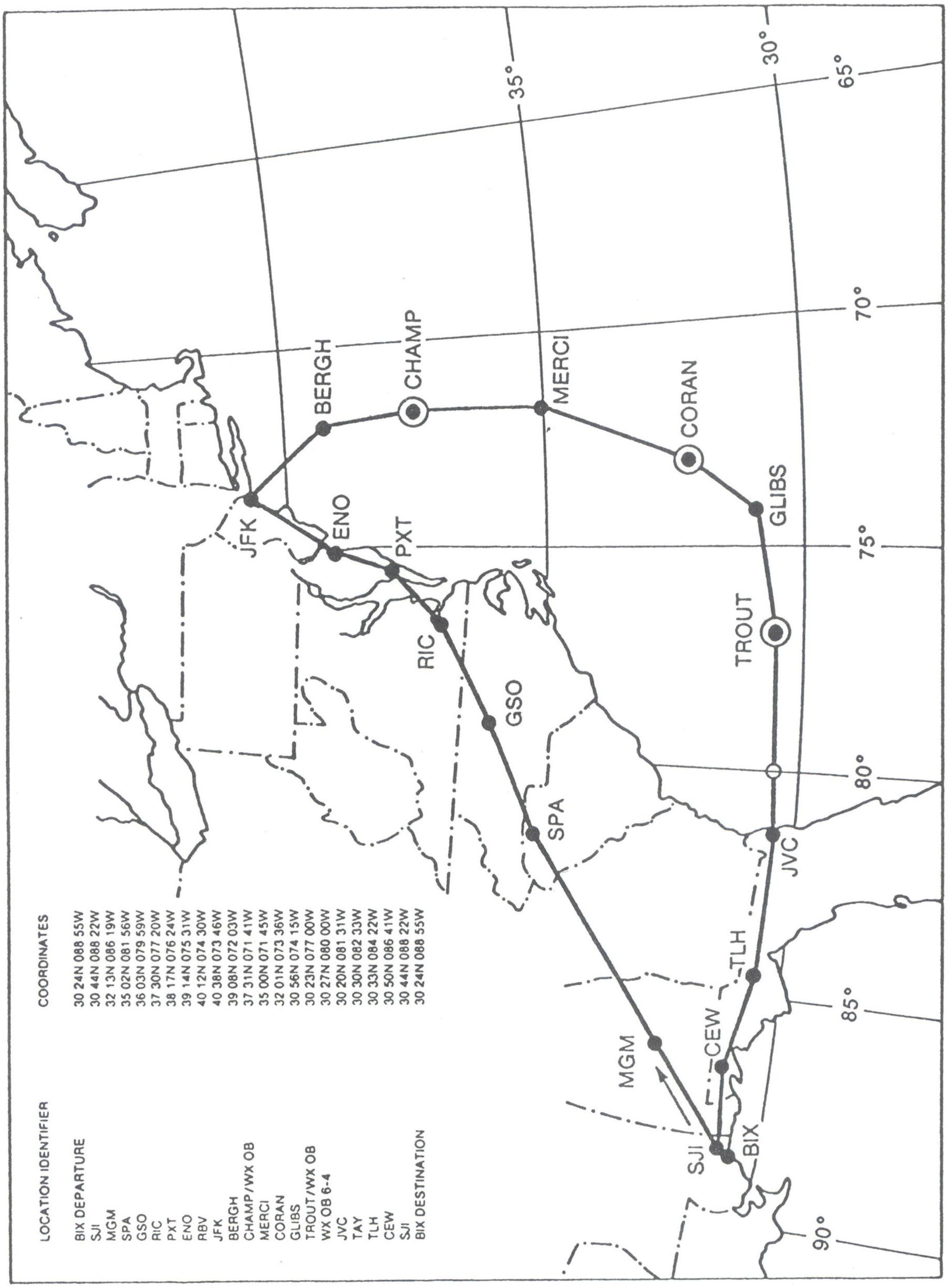


Figure F-1-6. Air Force track 06.

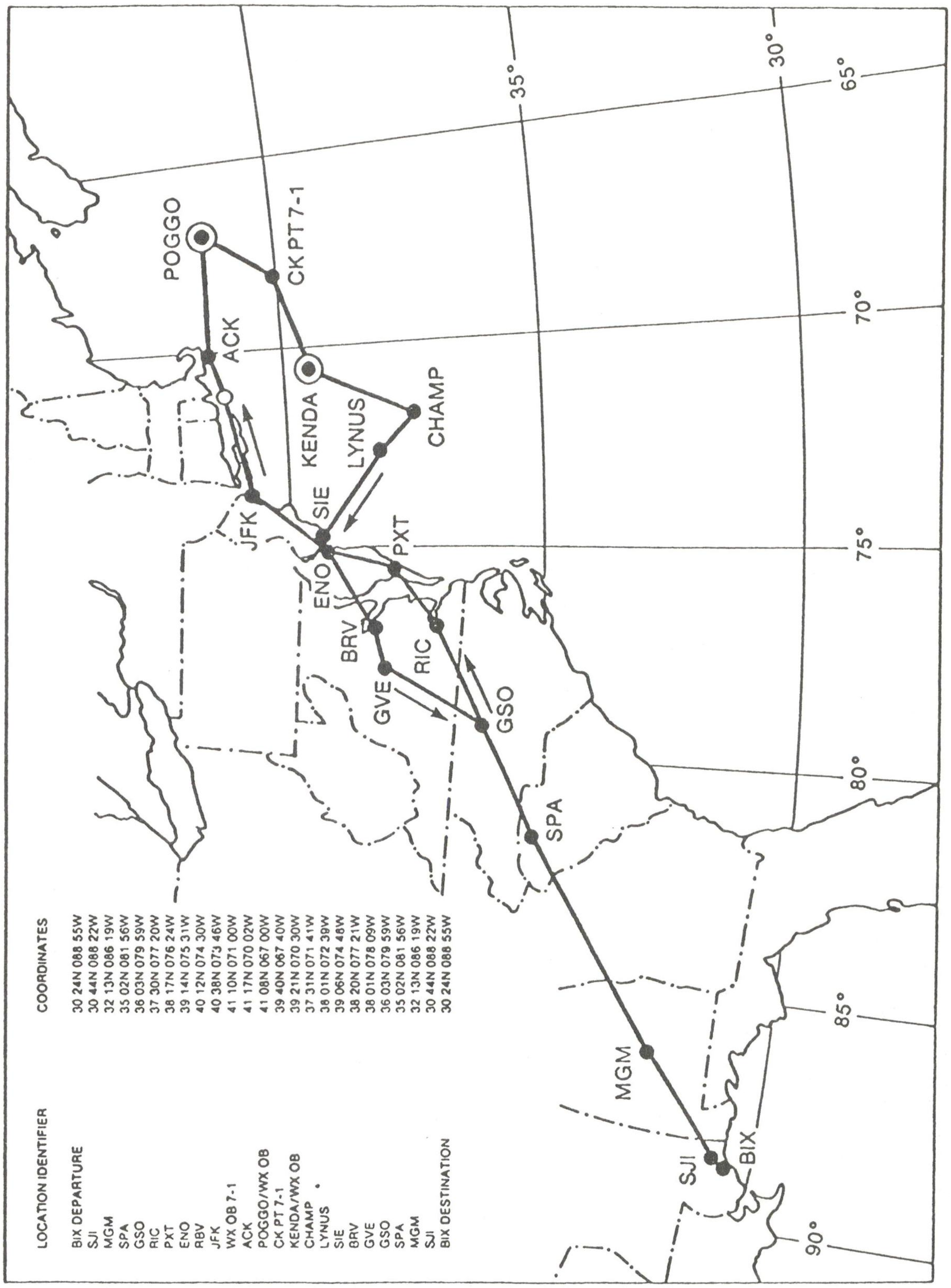


Figure F-1-7. Air Force track 07.

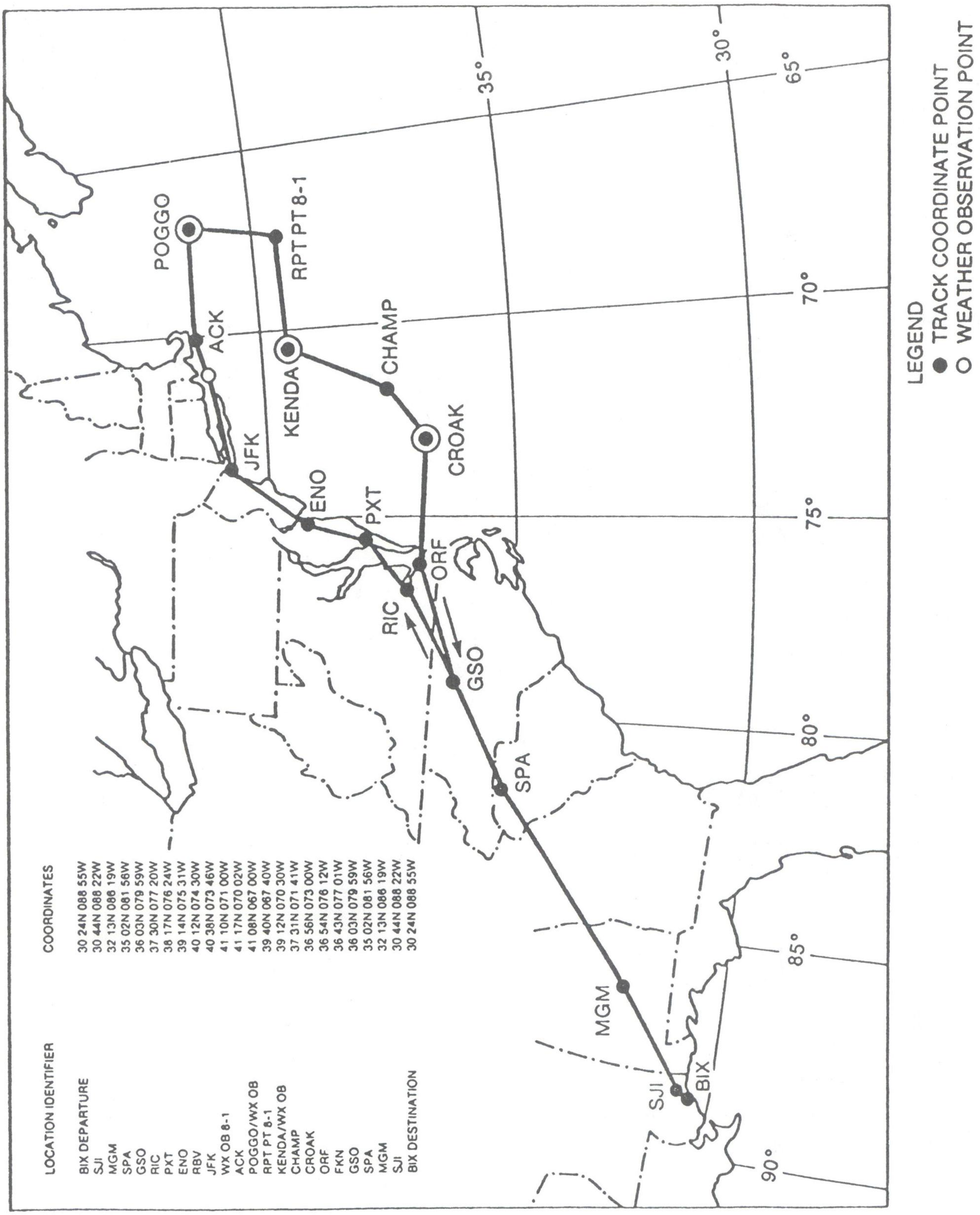
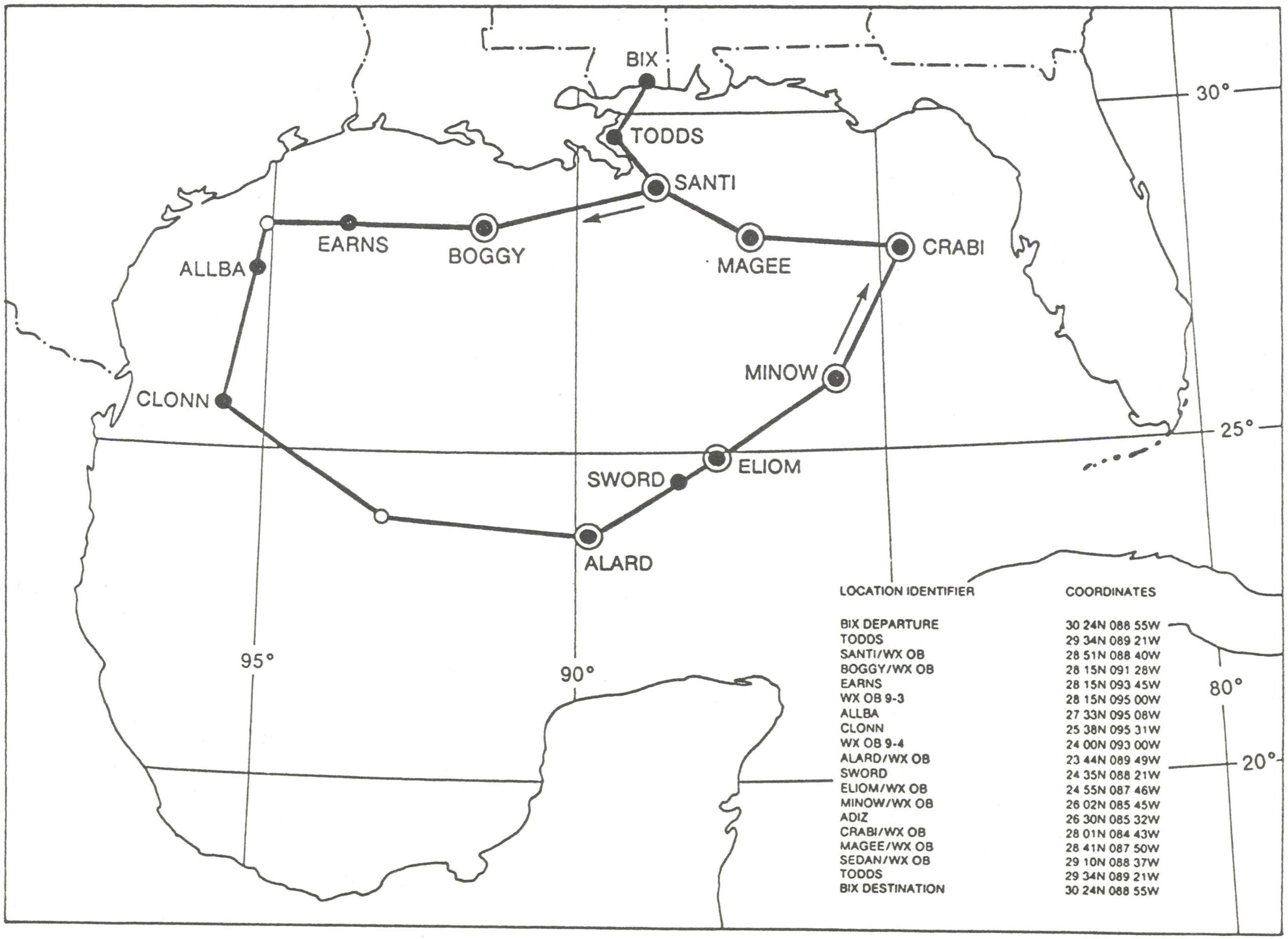


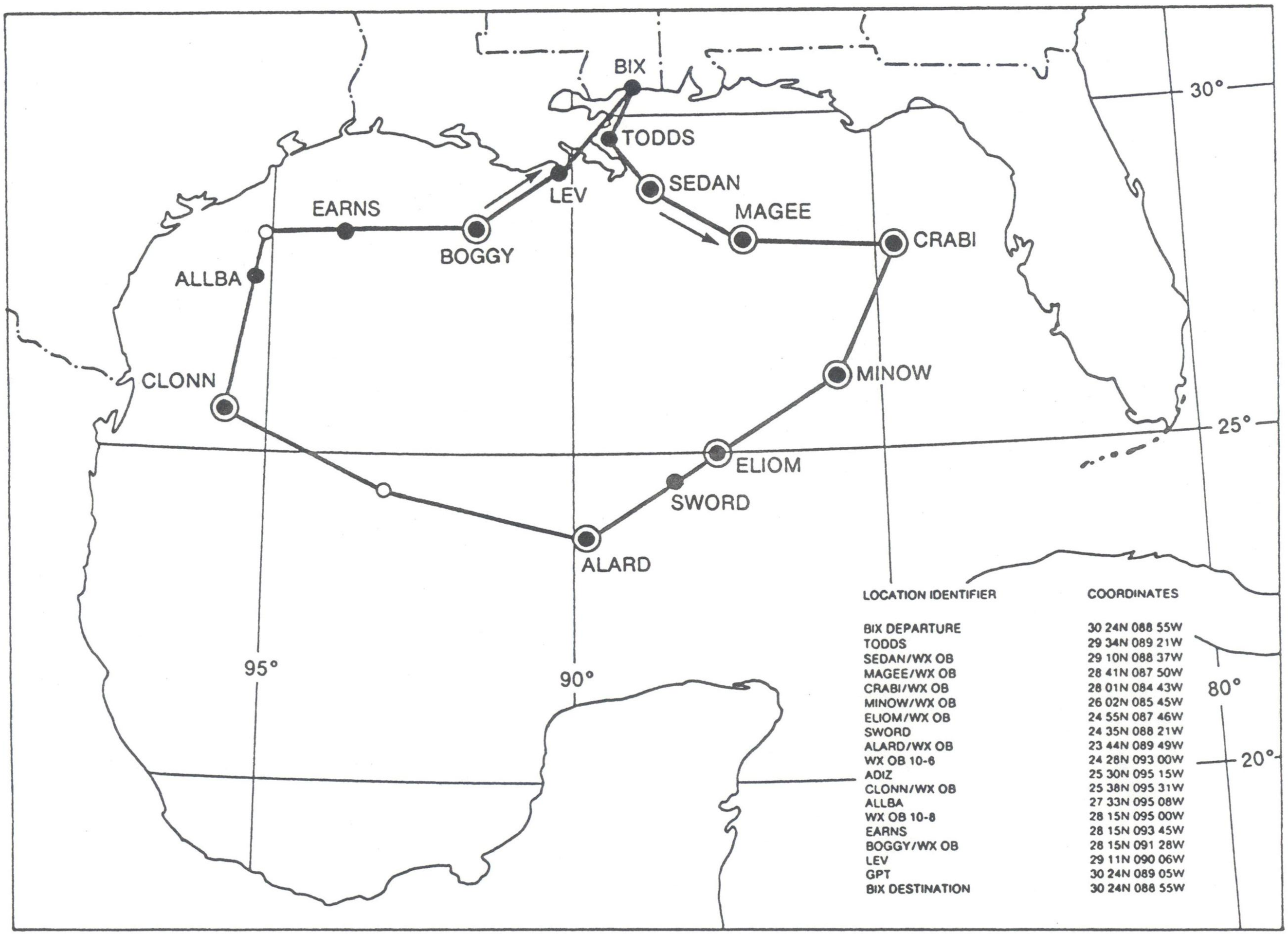
Figure F-1-8. Air Force track 08.

Figure F-1-9. Air Force track 09.



LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	30 24N 088 55W
TODDS	29 34N 089 21W
SANTI/WX OB	28 51N 088 40W
BOGGY/WX OB	28 15N 091 28W
EARNS	28 15N 093 45W
WX OB 9-3	28 15N 095 00W
ALLBA	27 33N 095 08W
CLONN	25 38N 095 31W
WX OB 9-4	24 00N 093 00W
ALARD/WX OB	23 44N 089 49W
SWORD	24 35N 088 21W
ELIOM/WX OB	24 55N 087 46W
MINOW/WX OB	26 02N 085 45W
ADIZ	26 30N 085 32W
CRABI/WX OB	28 01N 084 43W
MAGEE/WX OB	28 41N 087 50W
SEDAN/WX OB	29 10N 088 37W
TODDS	29 34N 089 21W
BIX DESTINATION	30 24N 088 55W

LEGEND
- ● TRACK COORDINATE POINT
- ○ WEATHER OBSERVATION POINT



LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	30 24N 088 55W
TODDS	29 34N 089 21W
SEDAN/WX OB	29 10N 088 37W
MAGEE/WX OB	28 41N 087 50W
CRABI/WX OB	28 01N 084 43W
MINOW/WX OB	26 02N 085 45W
ELIOM/WX OB	24 55N 087 46W
SWORD	24 35N 088 21W
ALARD/WX OB	23 44N 089 49W
WX OB 10-6	24 28N 093 00W
ADIZ	25 30N 095 15W
CLONN/WX OB	25 38N 095 31W
ALLBA	27 33N 095 08W
WX OB 10-8	28 15N 095 00W
EARNS	28 15N 093 45W
BOGGY/WX OB	28 15N 091 28W
LEV	29 11N 090 06W
GPT	30 24N 089 05W
BIX DESTINATION	30 24N 088 55W

LEGEND
- ● TRACK COORDINATE POINT
- O WEATHER OBSERVATION POINT

Figure F-1-10. Air Force track 10.

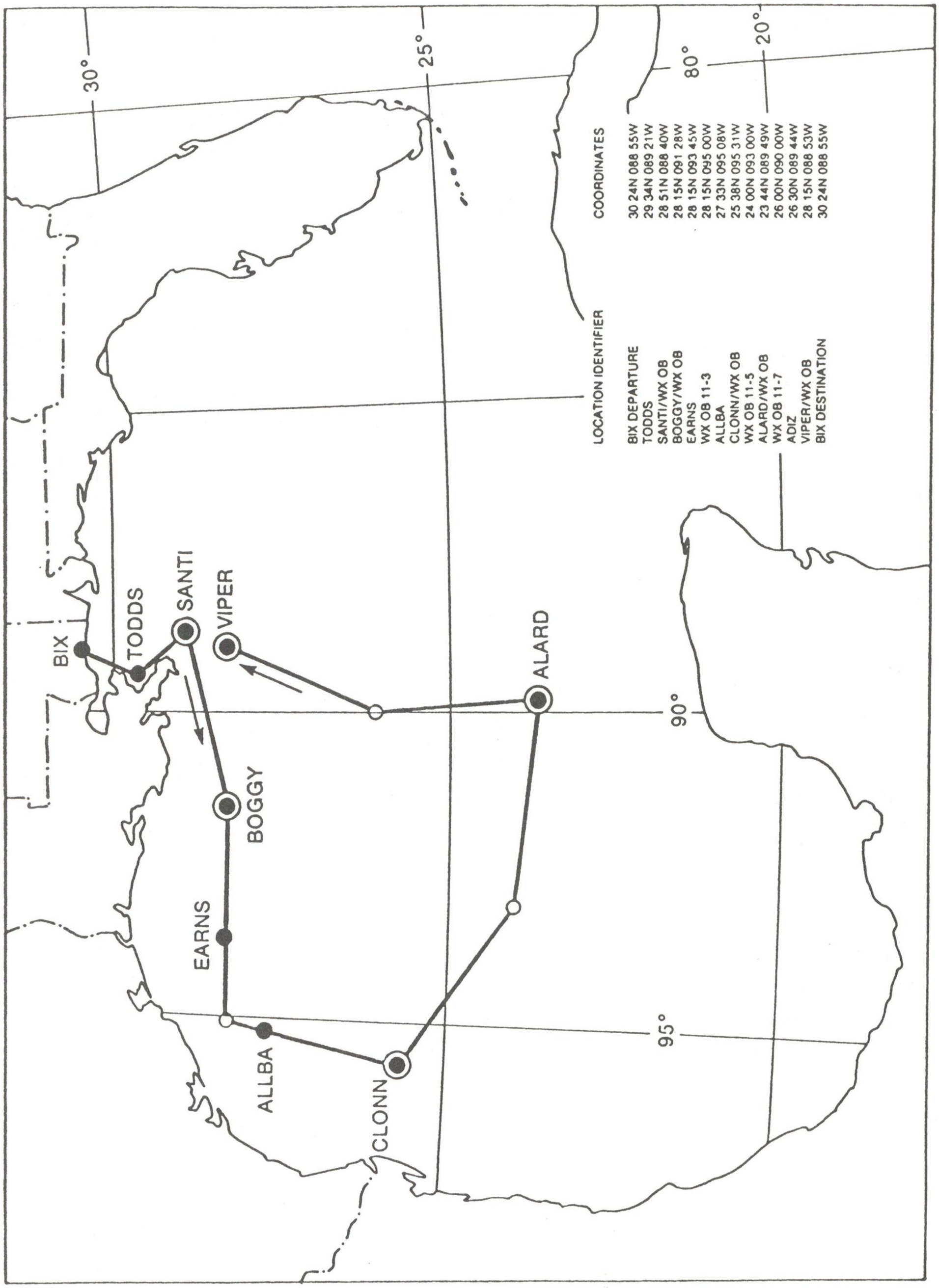


Figure F-1-11. Air Force track 11.

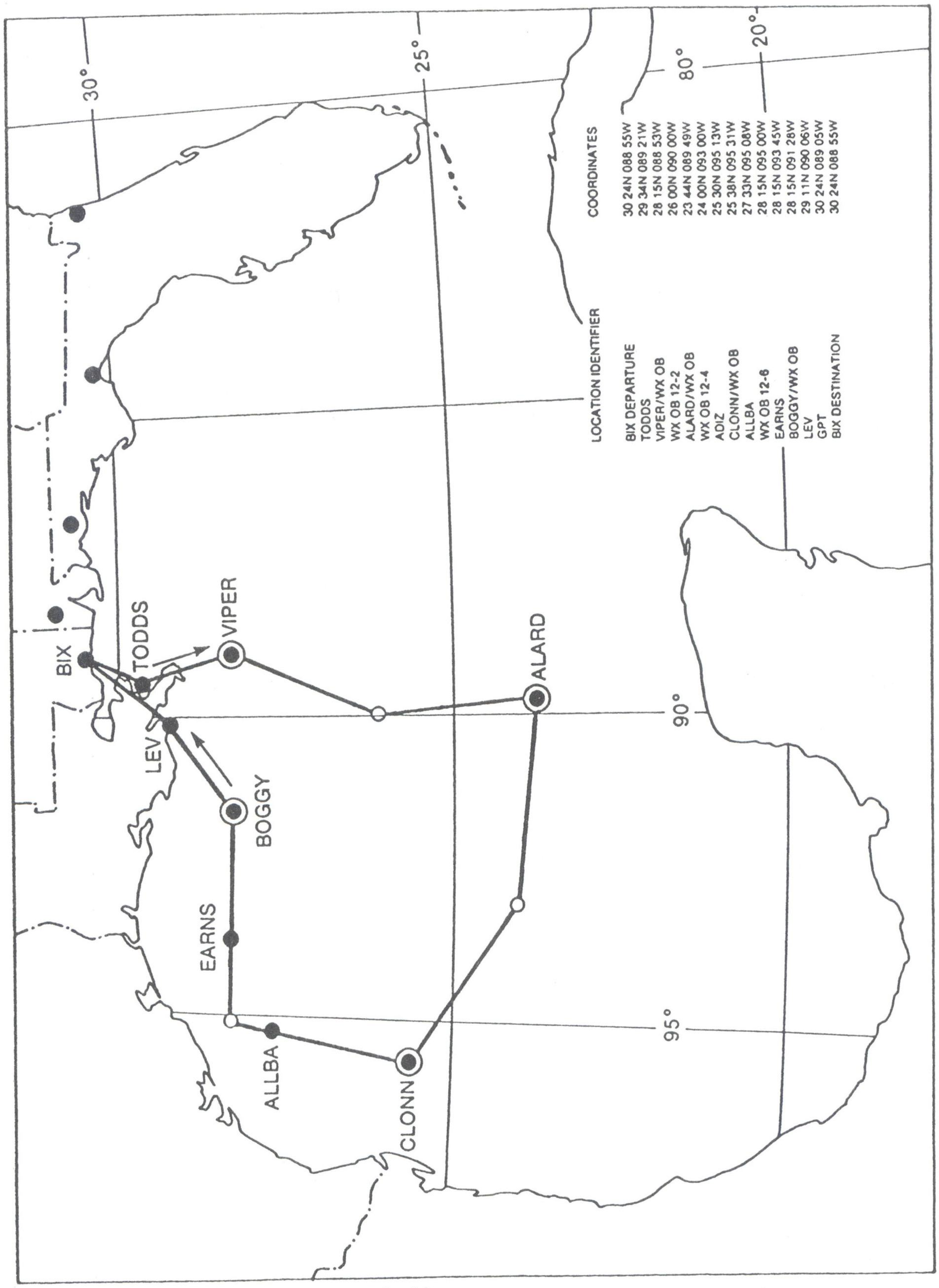


Figure F-1-12. Air Force track 12.

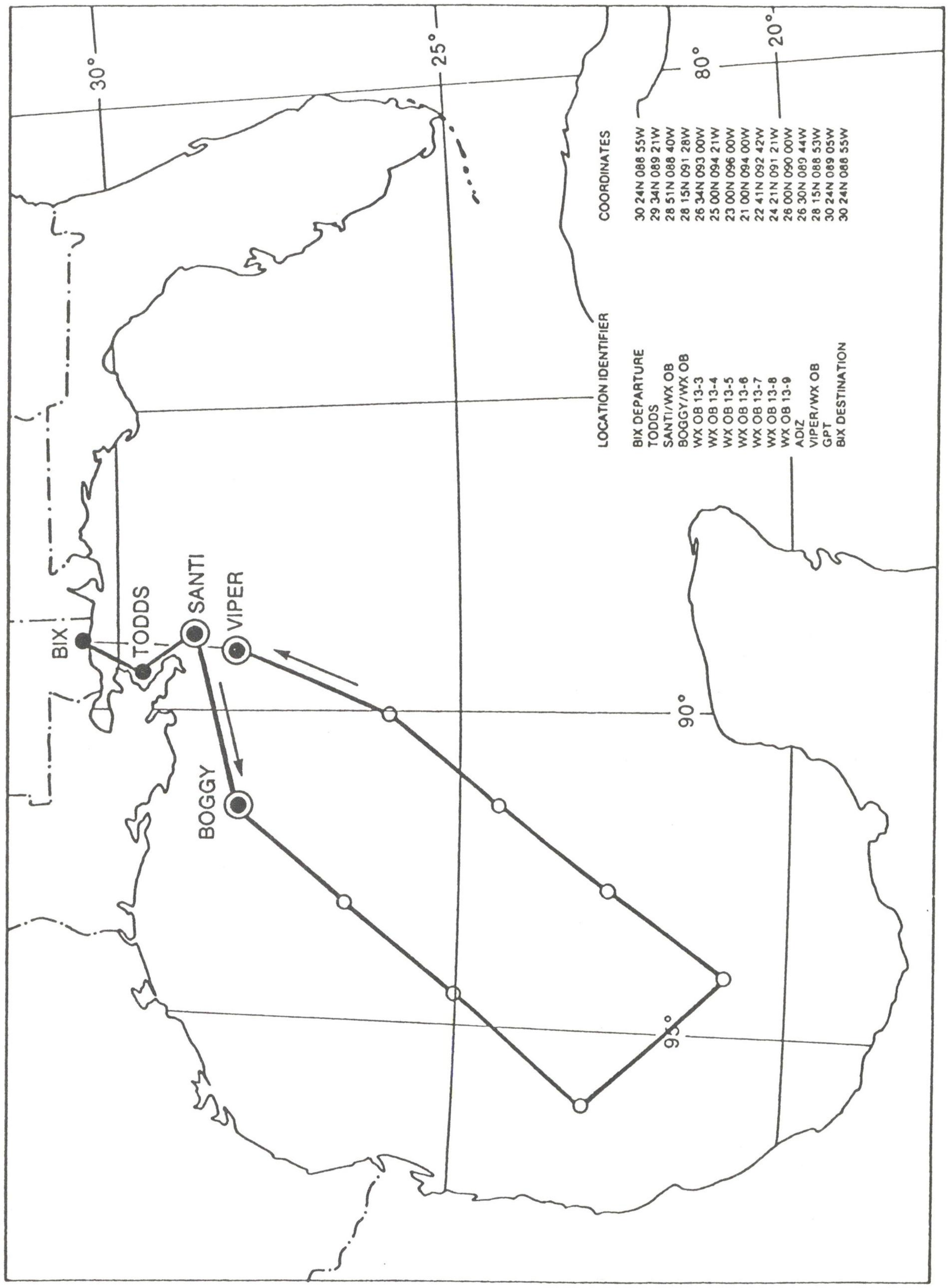


Figure F-1-13. Air Force track 13.

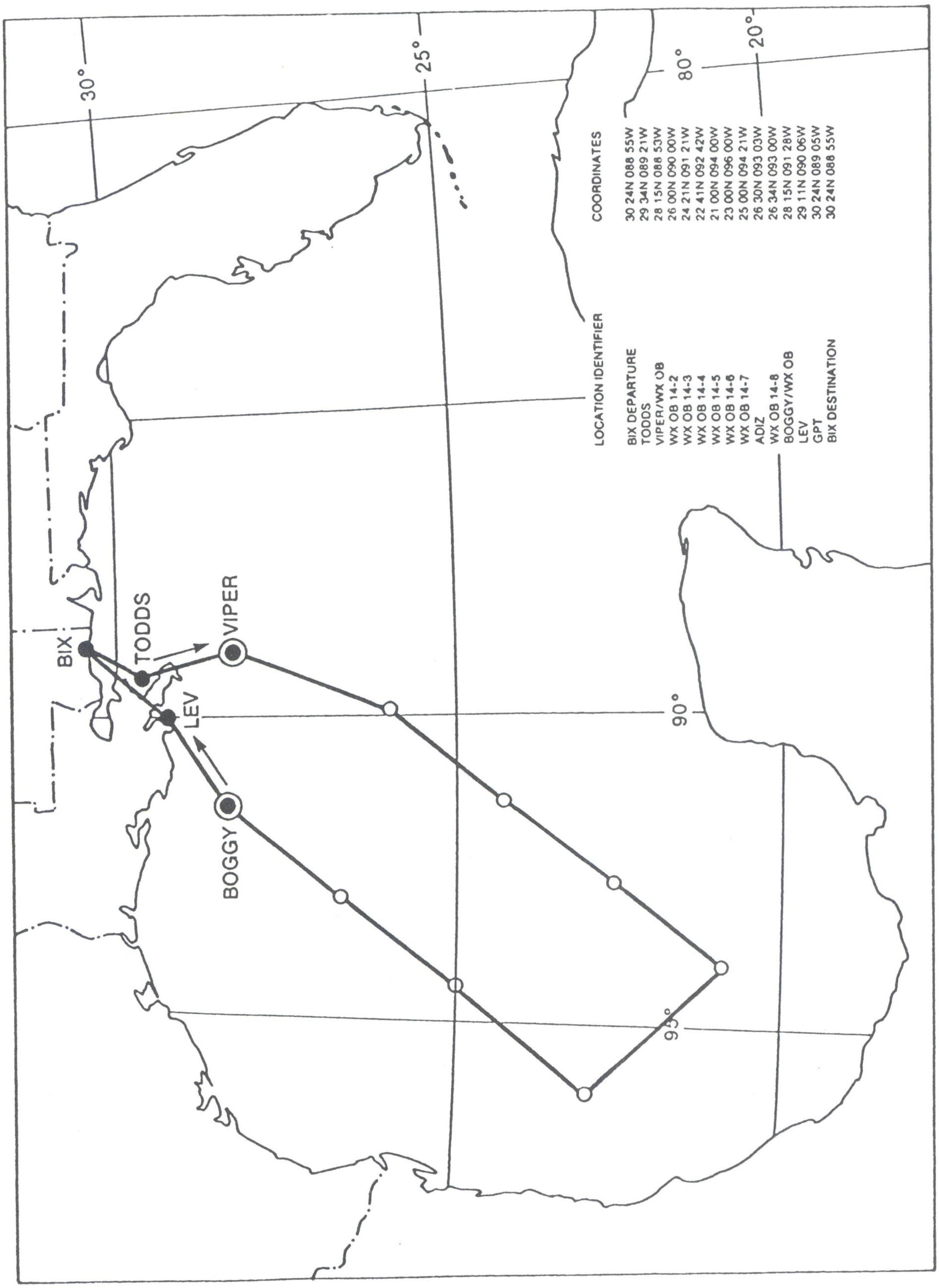


Figure F-1-14. Air Force track 14.

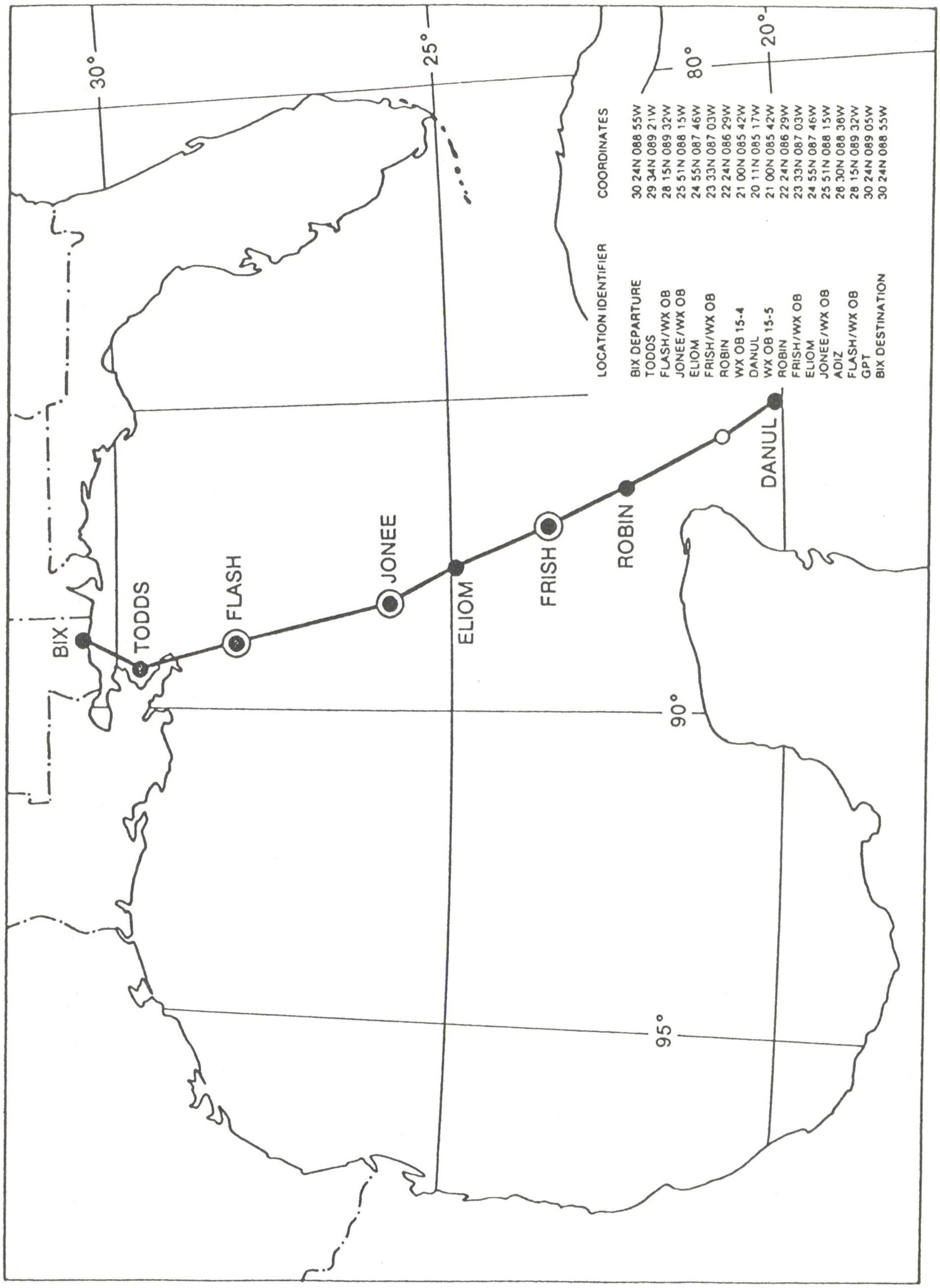


Figure F-1-15. Air Force track 15.

LOCATION IDENTIFIER	COORDINATES
BIX DEPARTURE	30 24N 088 55W
TODDS	29 34N 089 21W
LEV	29 11N 090 06W
DOLPH	28 15N 090 01W
DROP 01	27 00N 090 00W
ELIOM/DROP 02	24 55N 087 46W
DROP 03	24 07N 085 00W
CANOA	24 00N 083 04W
FIS	24 33N 081 47W
DROP 04	24 50N 079 00W
ZQA	25 02N 077 27W
COBBL/DROP 05	24 45N 075 11W
ELKAS/DROP 06	27 28N 073 19W
TALLO/DROP 07	29 30N 071 30W
CATCH/DROP 08	31 59N 070 03W
GAGLY	32 01N 072 01W
DROP 09	31 12N 073 00W
JESSE/DROP 10	29 30N 075 04W
NUCAR	28 08N 077 38W
ADIZ	28 04N 078 00W
ELDER/DROP 11	27 59N 078 38W
VRB	27 41N 080 29W
SRQ	27 24N 082 33W
H	27 36N 082 46W
CRABI/DROP 12	28 01N 084 43W
MAGEE/DROP 13	28 41N 087 50W
SEDAN	29 10N 088 37W
GPT	30 24N 089 05W
BIX DESTINATION	30 24N 088 55W

Figure F-1-16. Air Force track 16.

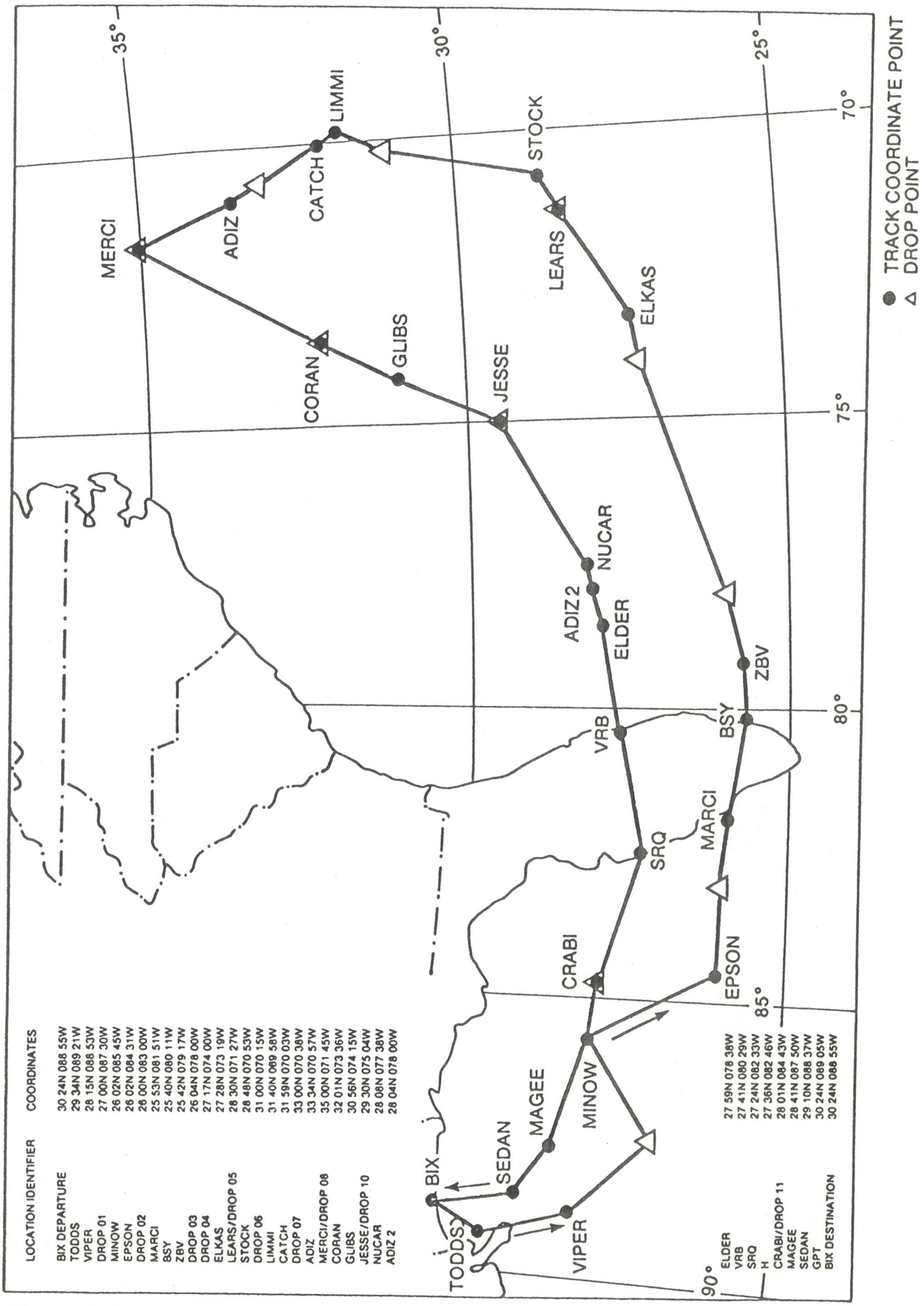


Figure F-1-17. Air Force track 17.

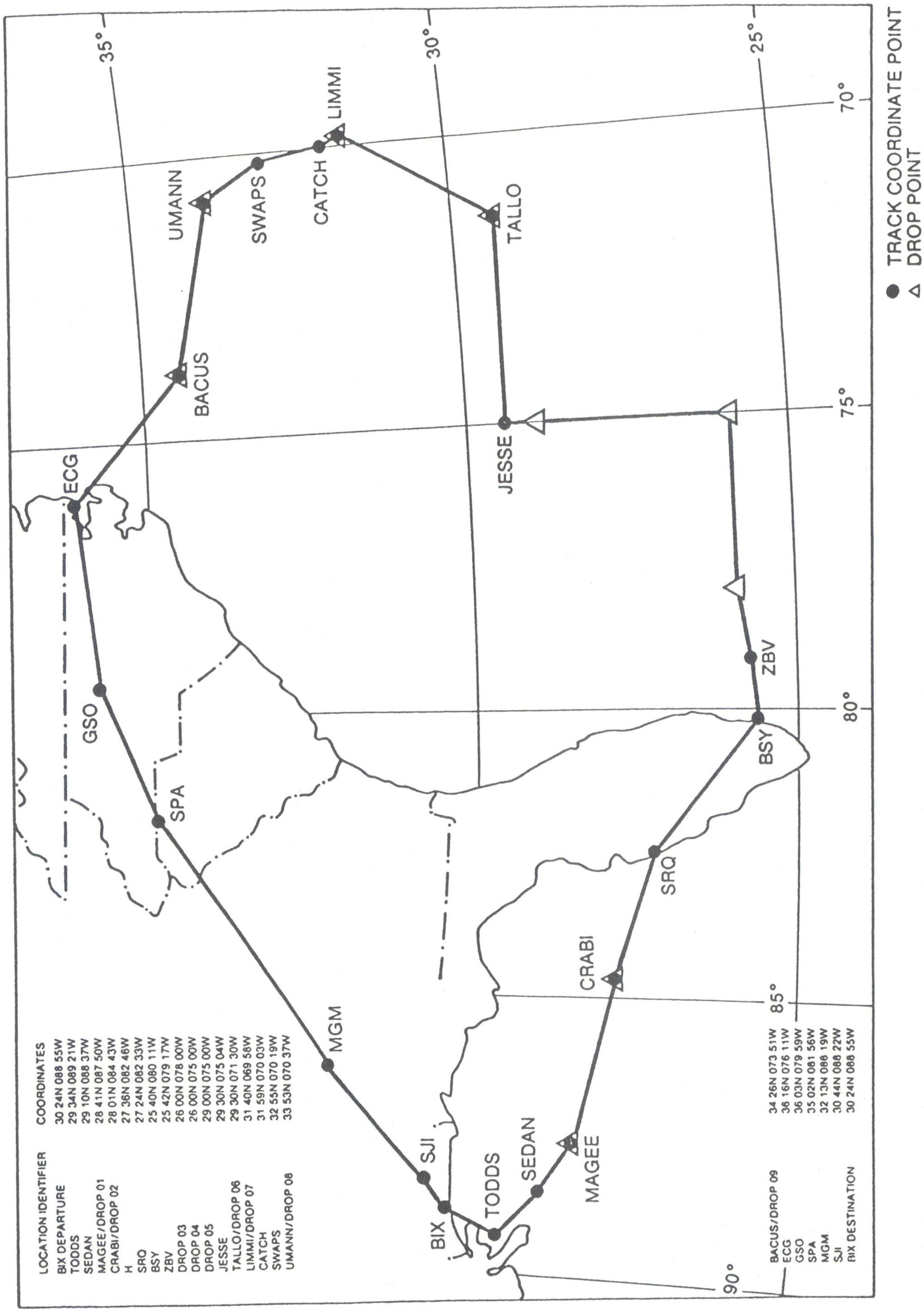


Figure F-1-18. Air Force tract 18.

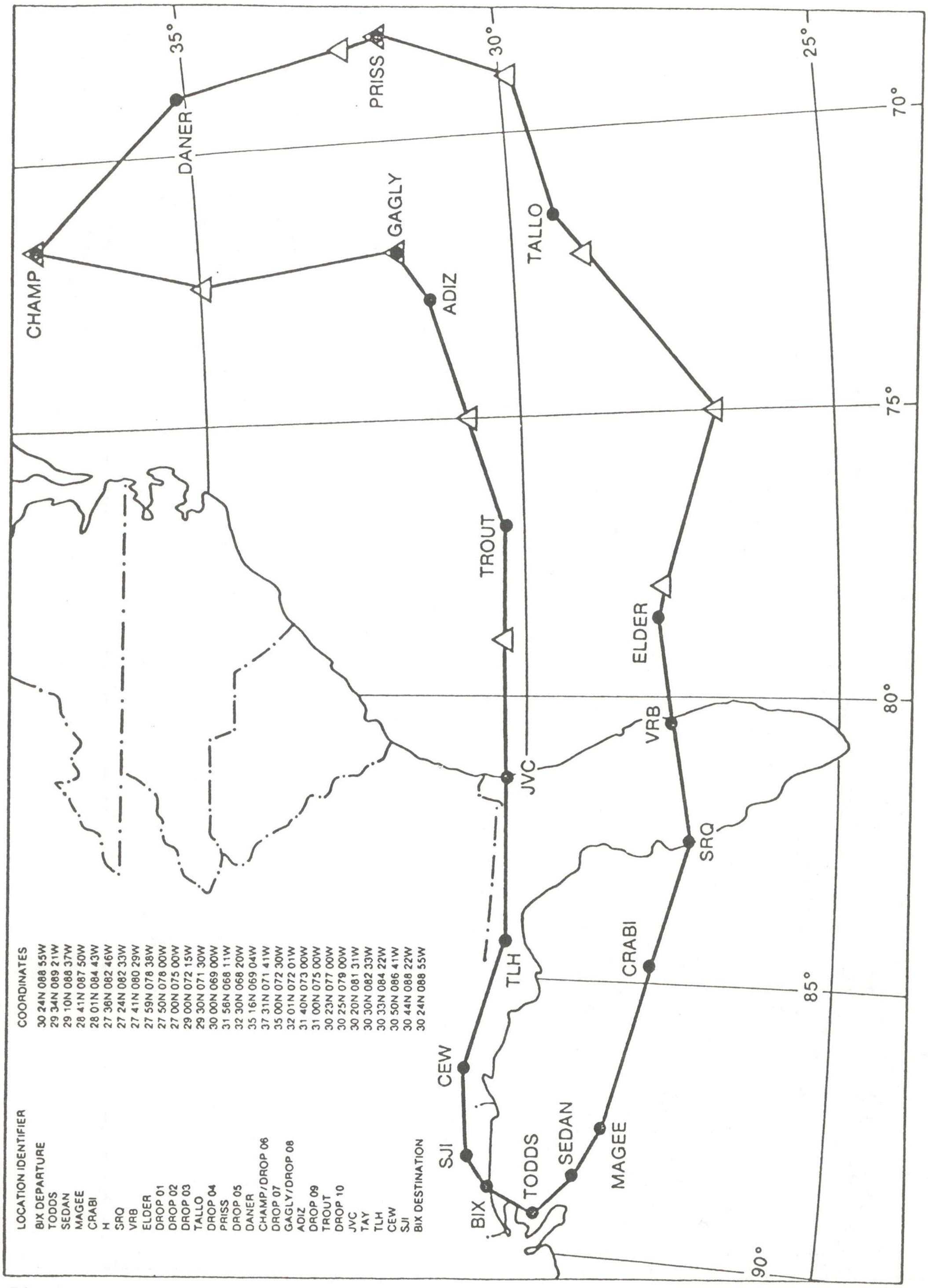


Figure F-1-19. Air Force track 19.

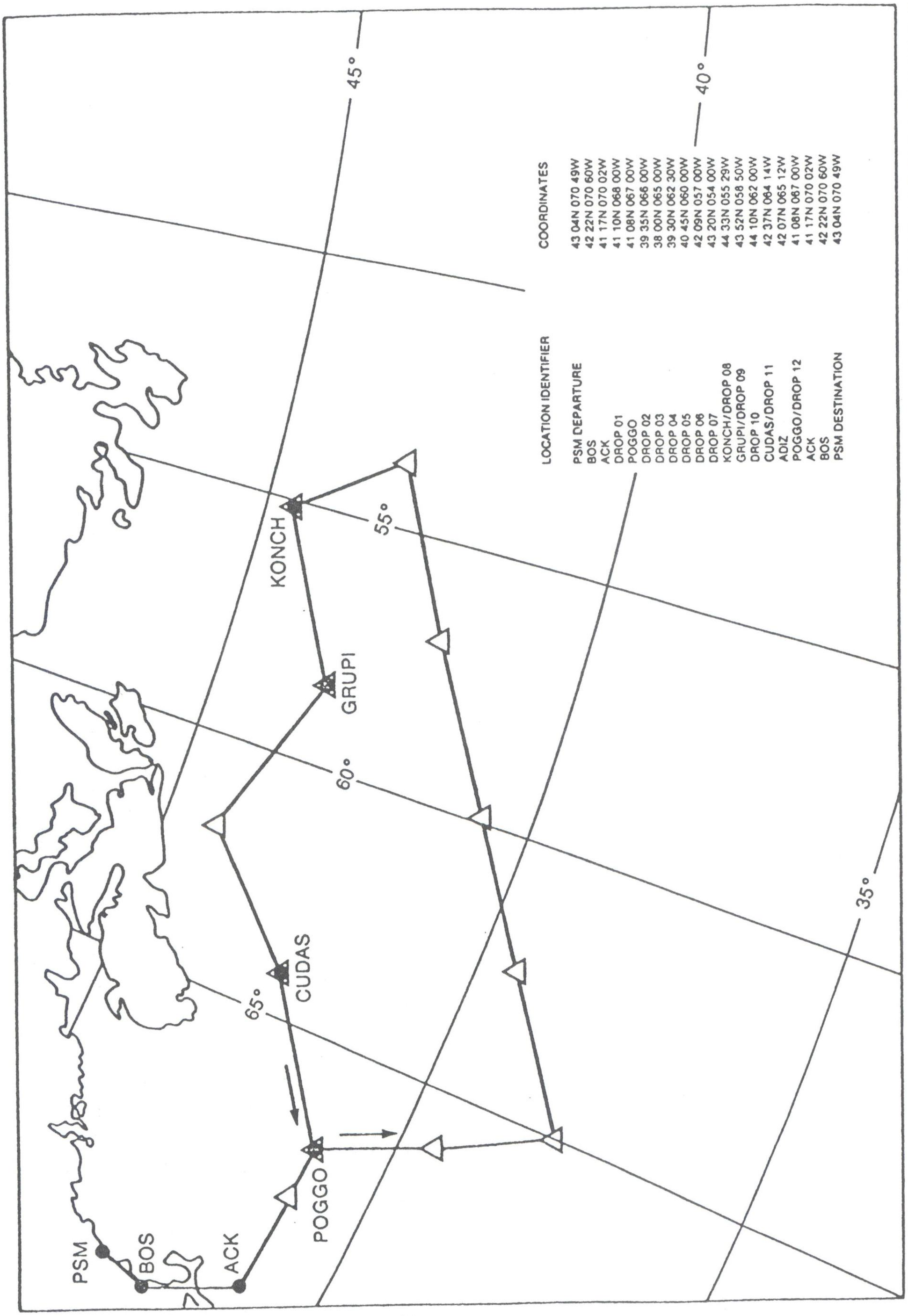


Figure F-1-20. Air Force track 20.

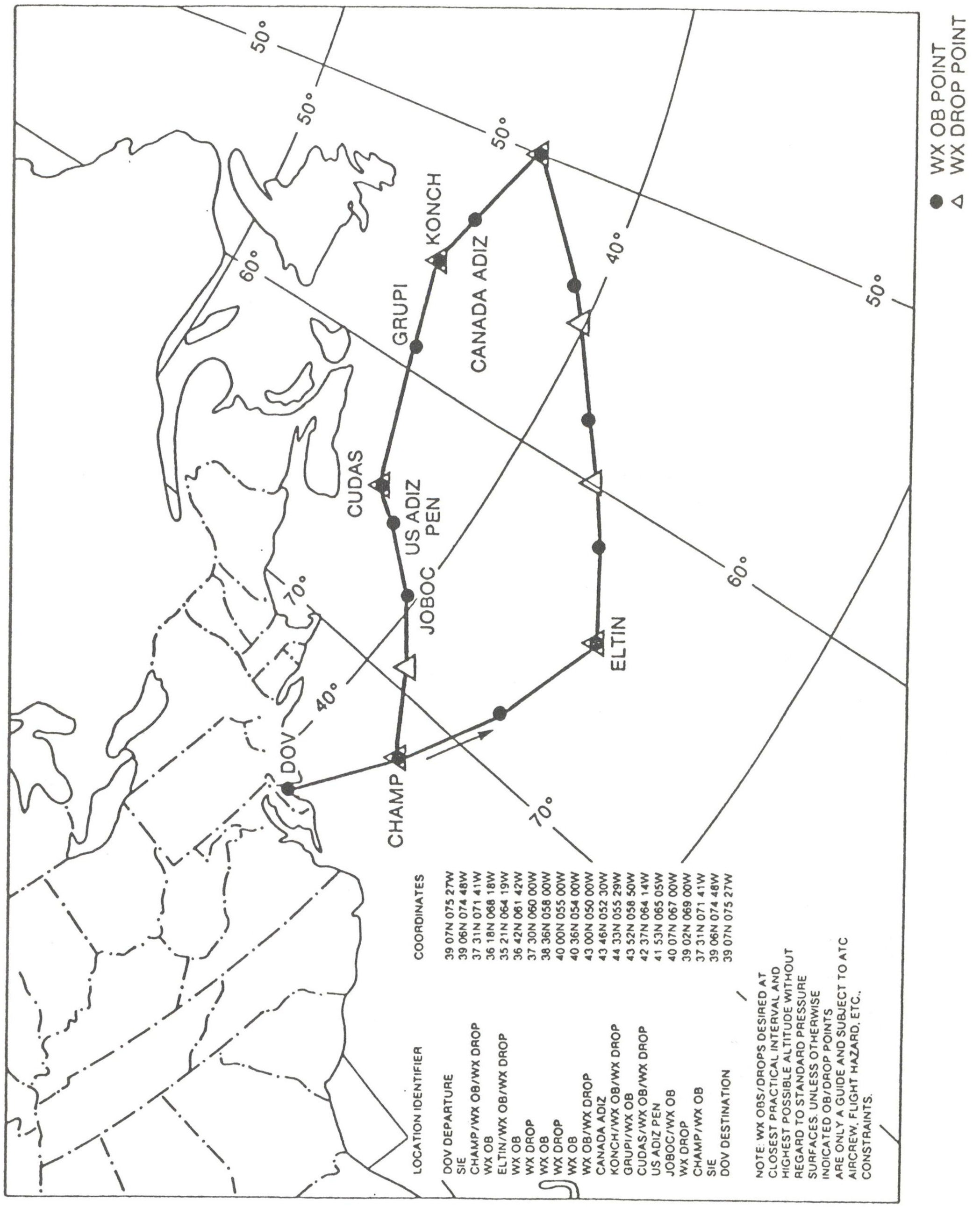


Figure F-1-21. Air Force track 21.

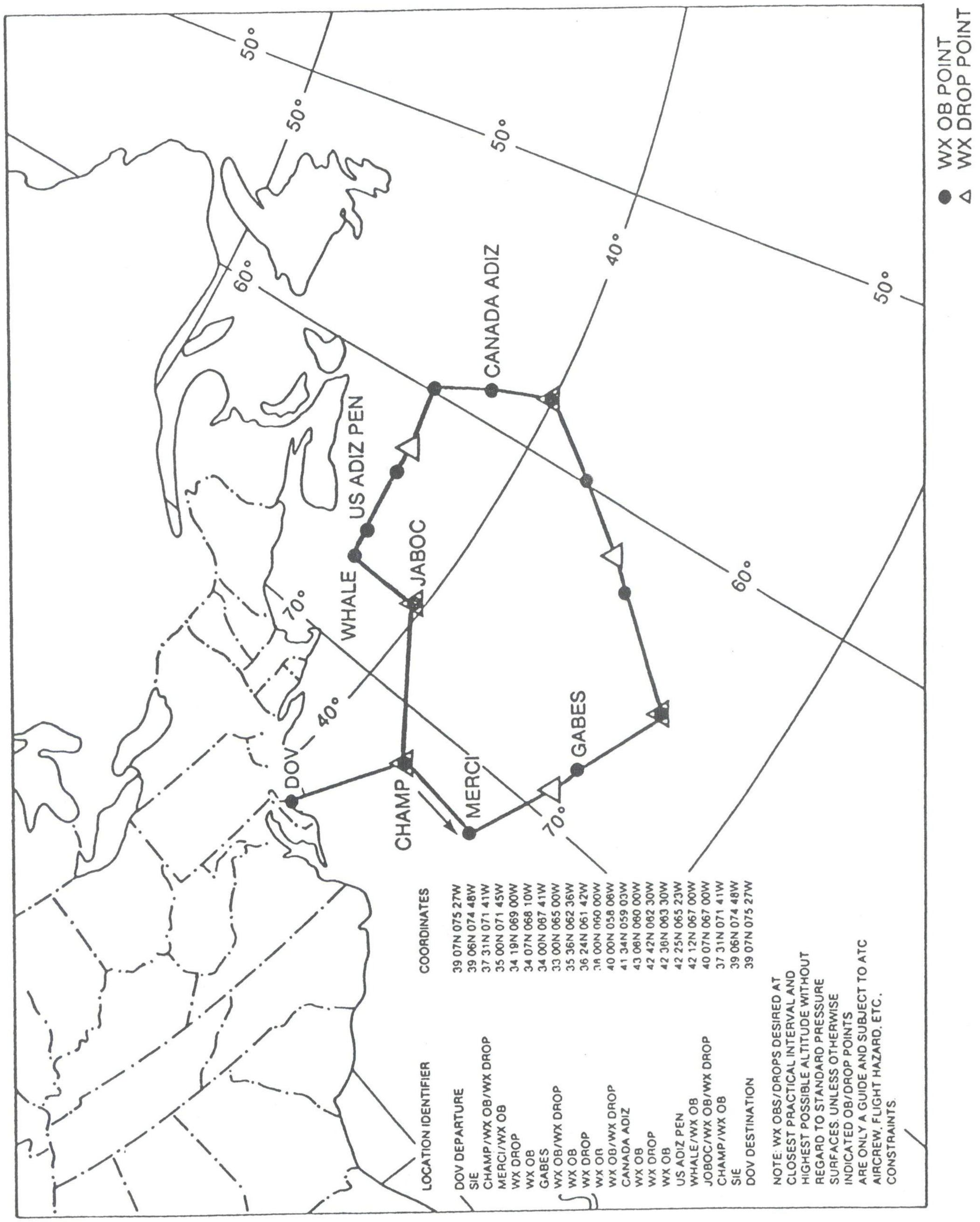


Figure F-1-22. Air Force track 22.

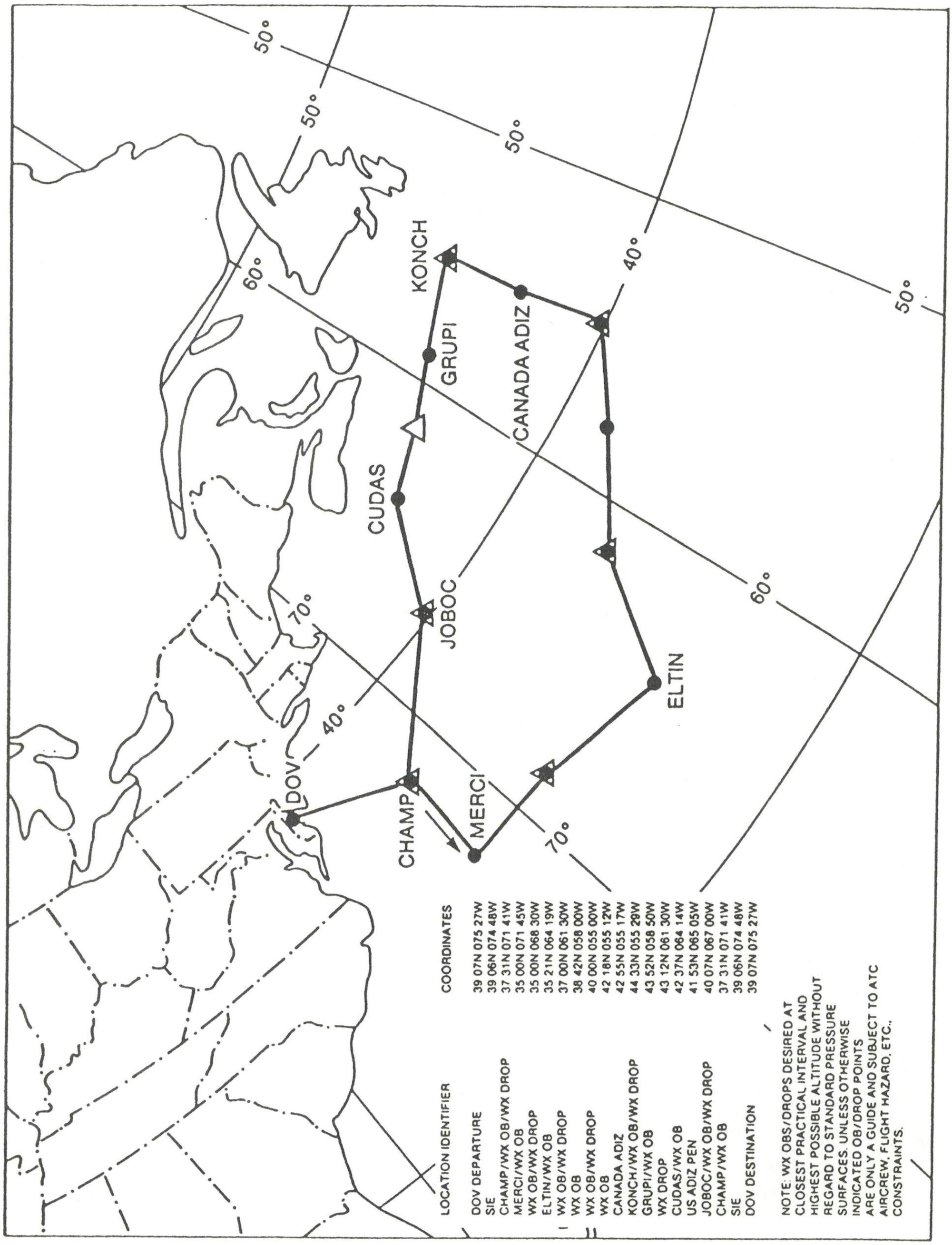


Figure F-1-23. Air Force track 23.

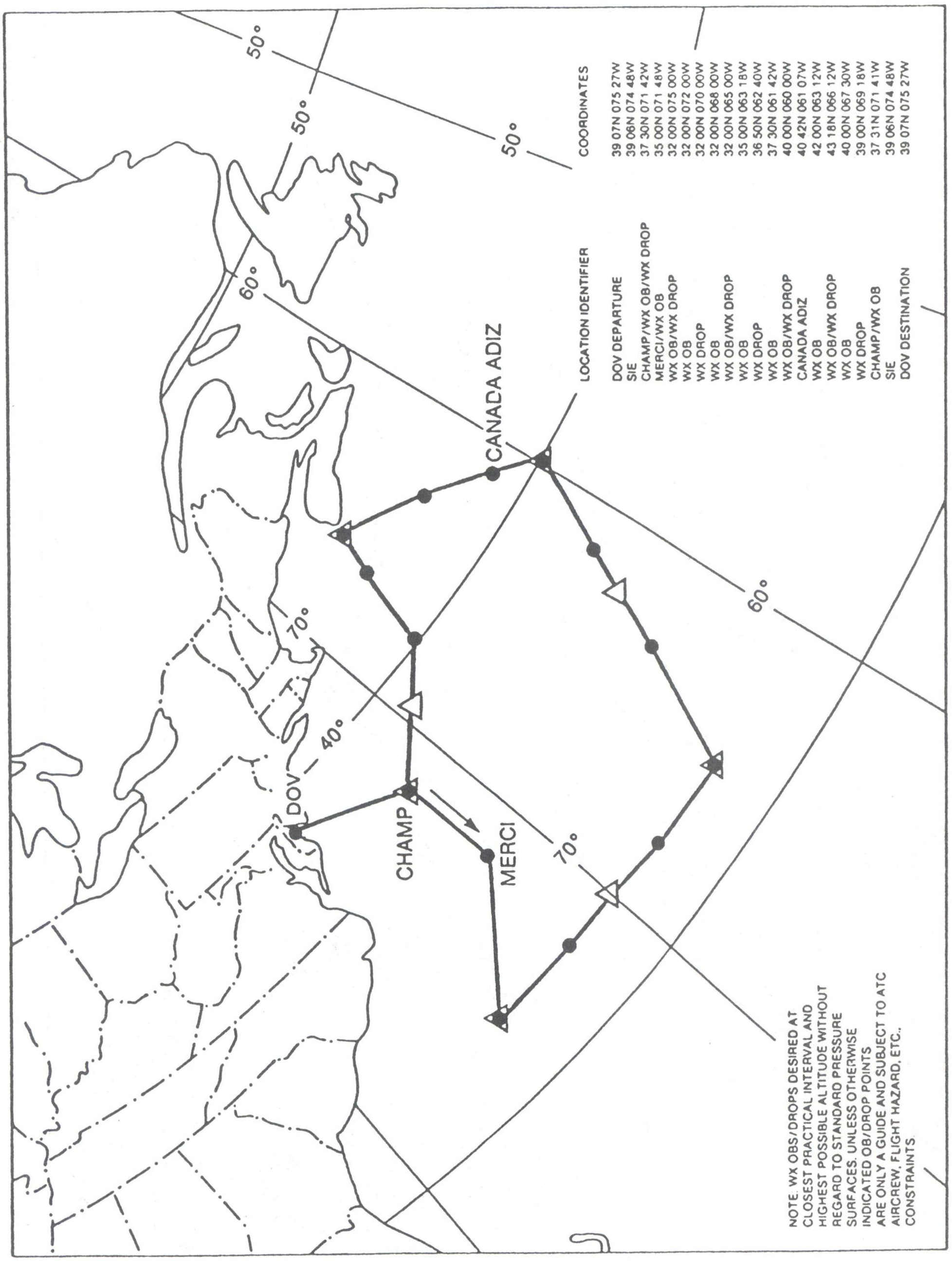


Figure F-1-24. Air Force track 24.

APPENDIX G

WEST COAST STORM TRACKS

These west coast storm tracks were developed during support to STORMFEST in February/March 1992. Reverse tracks are not depicted. Also, the weather observation points are not depicted; these will be determined by the tasking agency.

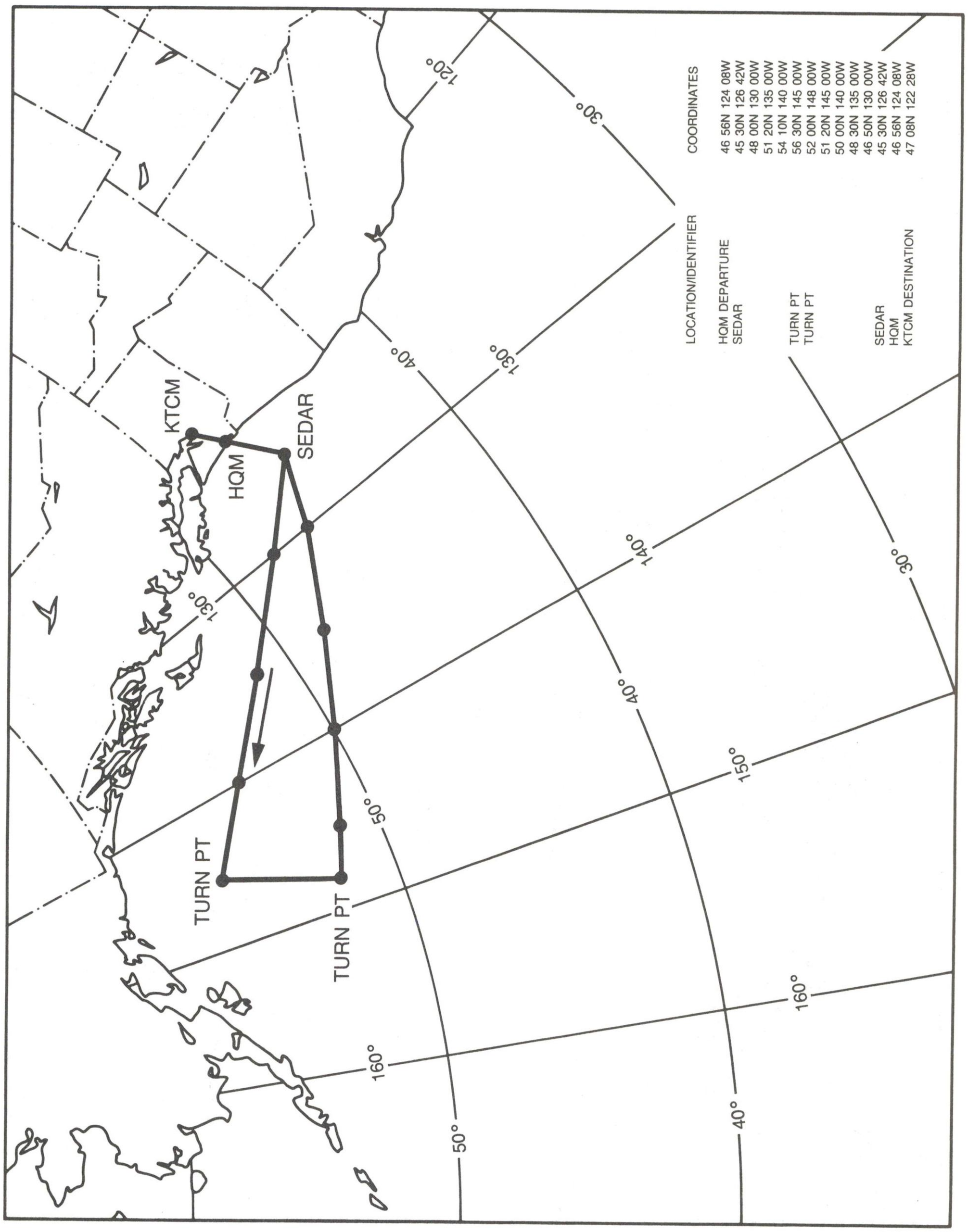


Figure G-1. Air Force track 01.
Weather observation frequency determined by Tasking Agency.

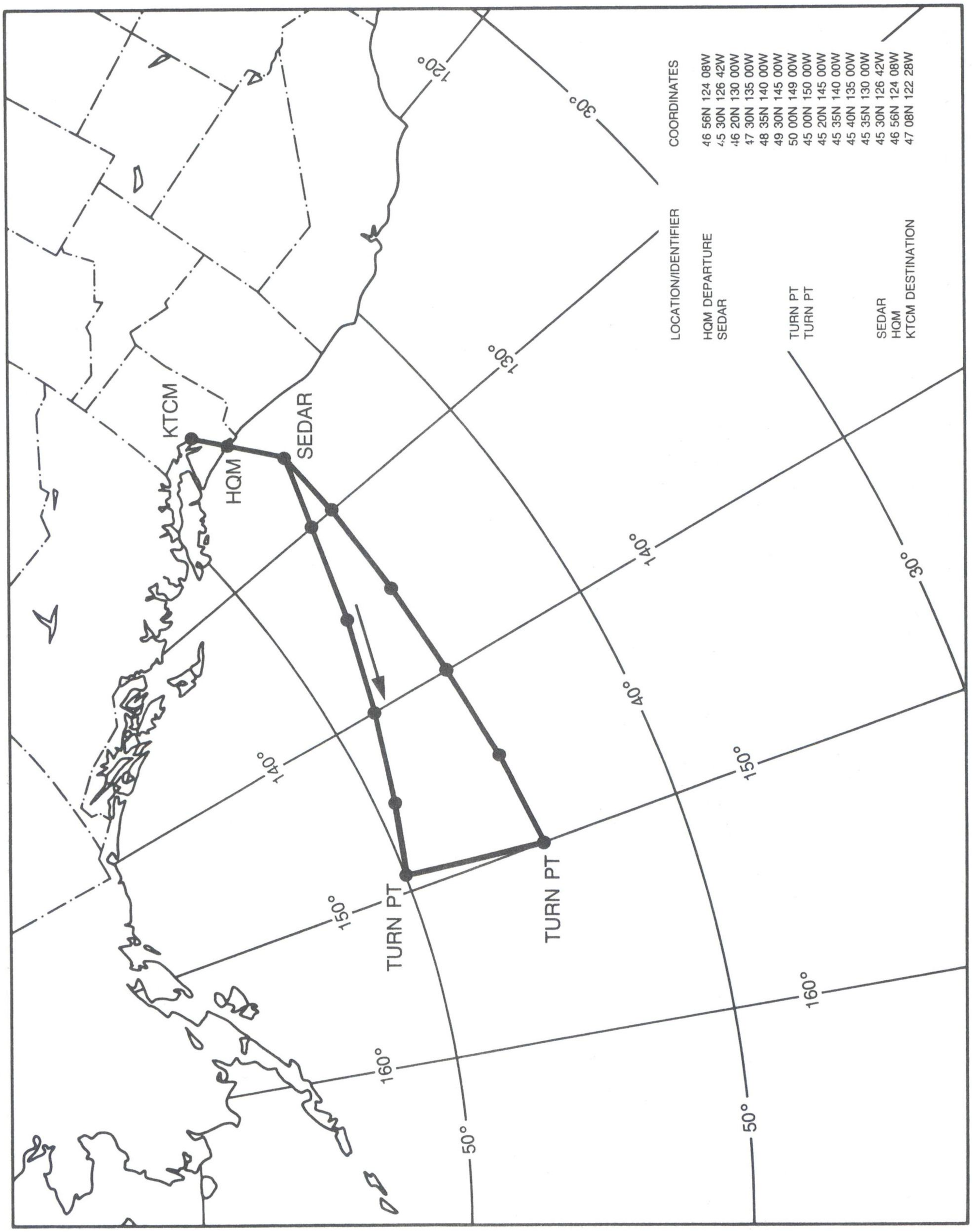


Figure G-2. Air Force track 02.
Weather observation frequency determined by Tasking Agency.

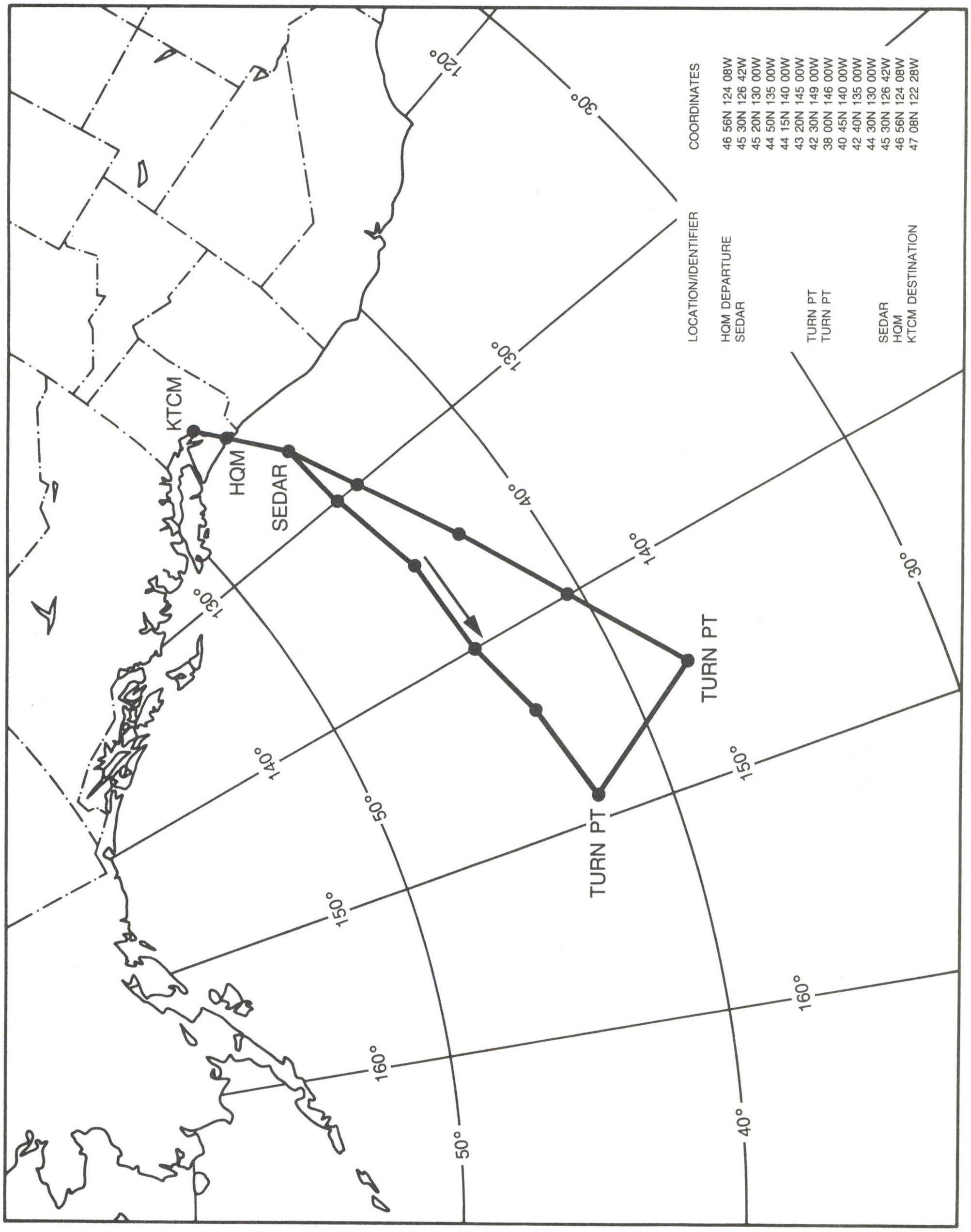


Figure G-3. Air Force track 03.
Weather observation frequency determined by Tasking Agency.

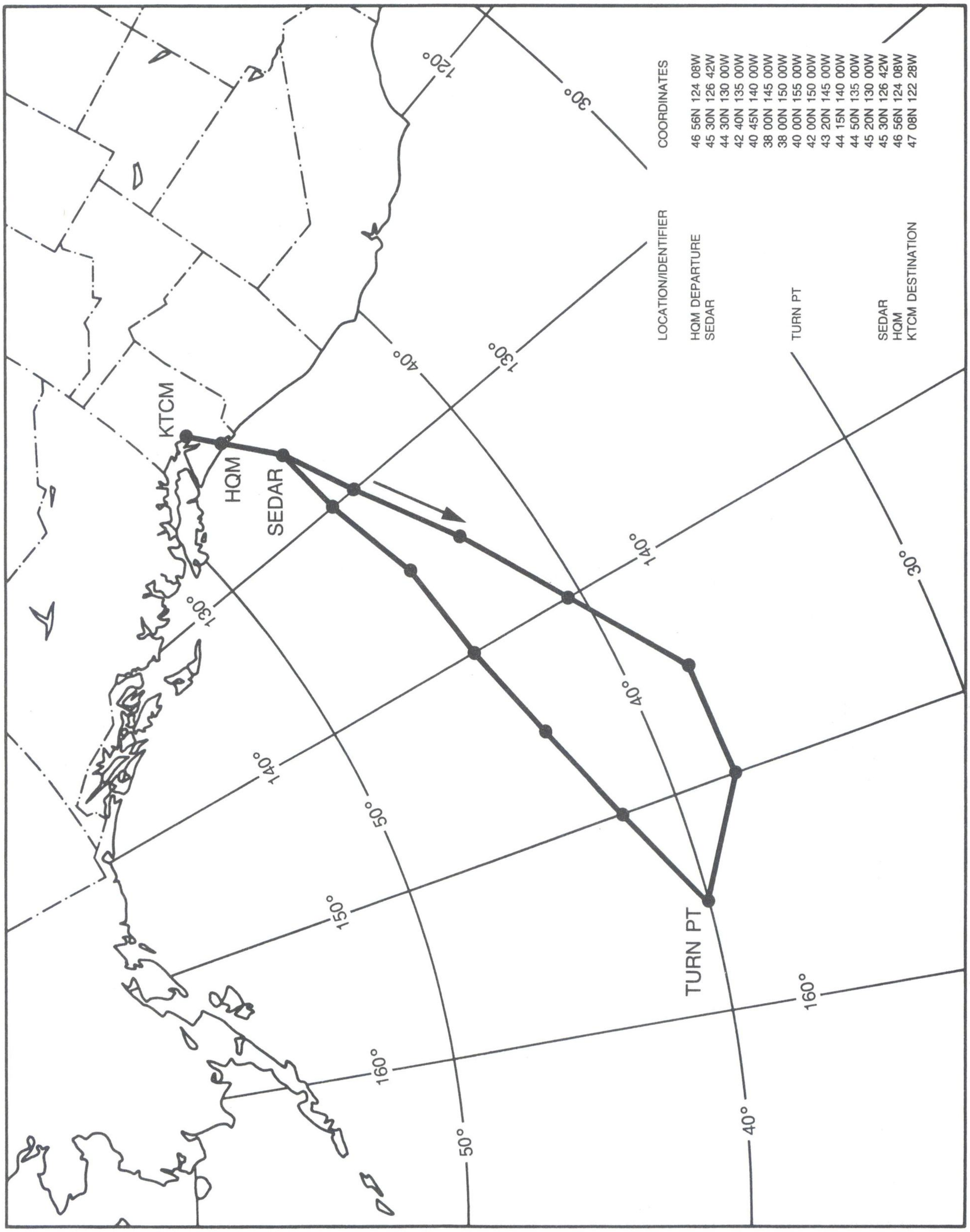


Figure G-4. Air Force track 04.
Weather observation frequency determined by Tasking Agency.

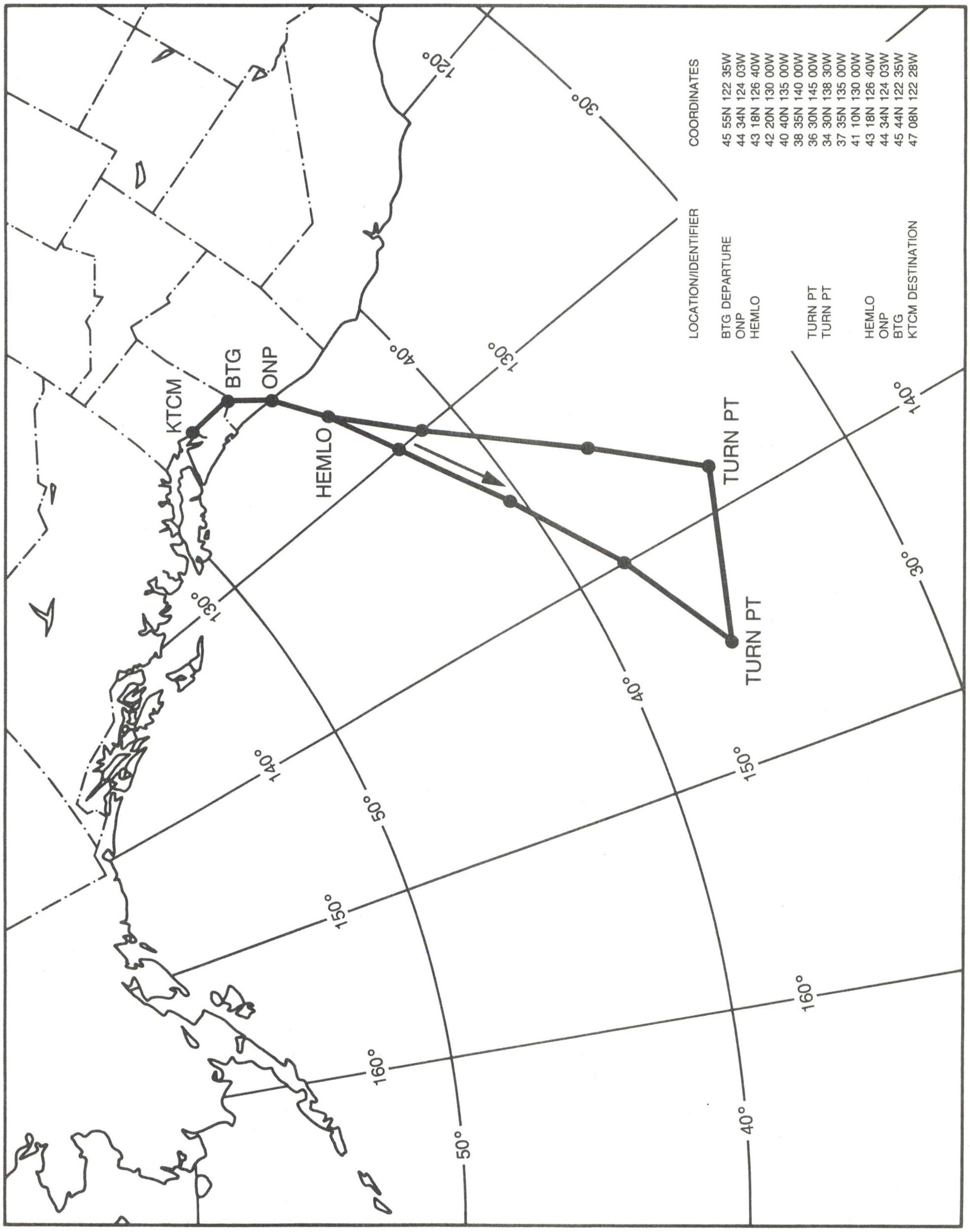


Figure G-5. Air Force track 05.
Weather observation frequency determined by Tasking Agency.

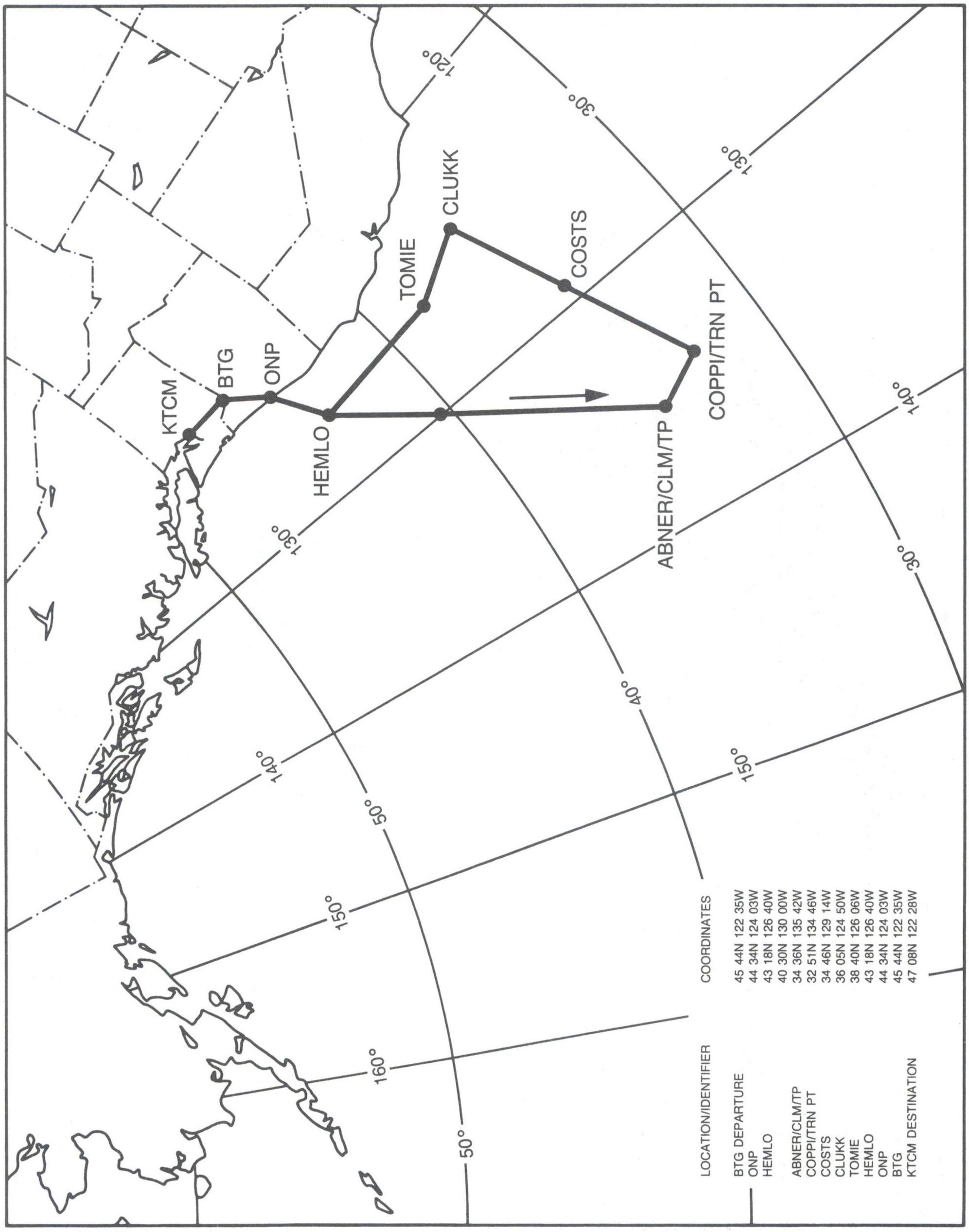


Figure G-6. Air Force track 06.
Weather observation frequency determined by Tasking Agency.

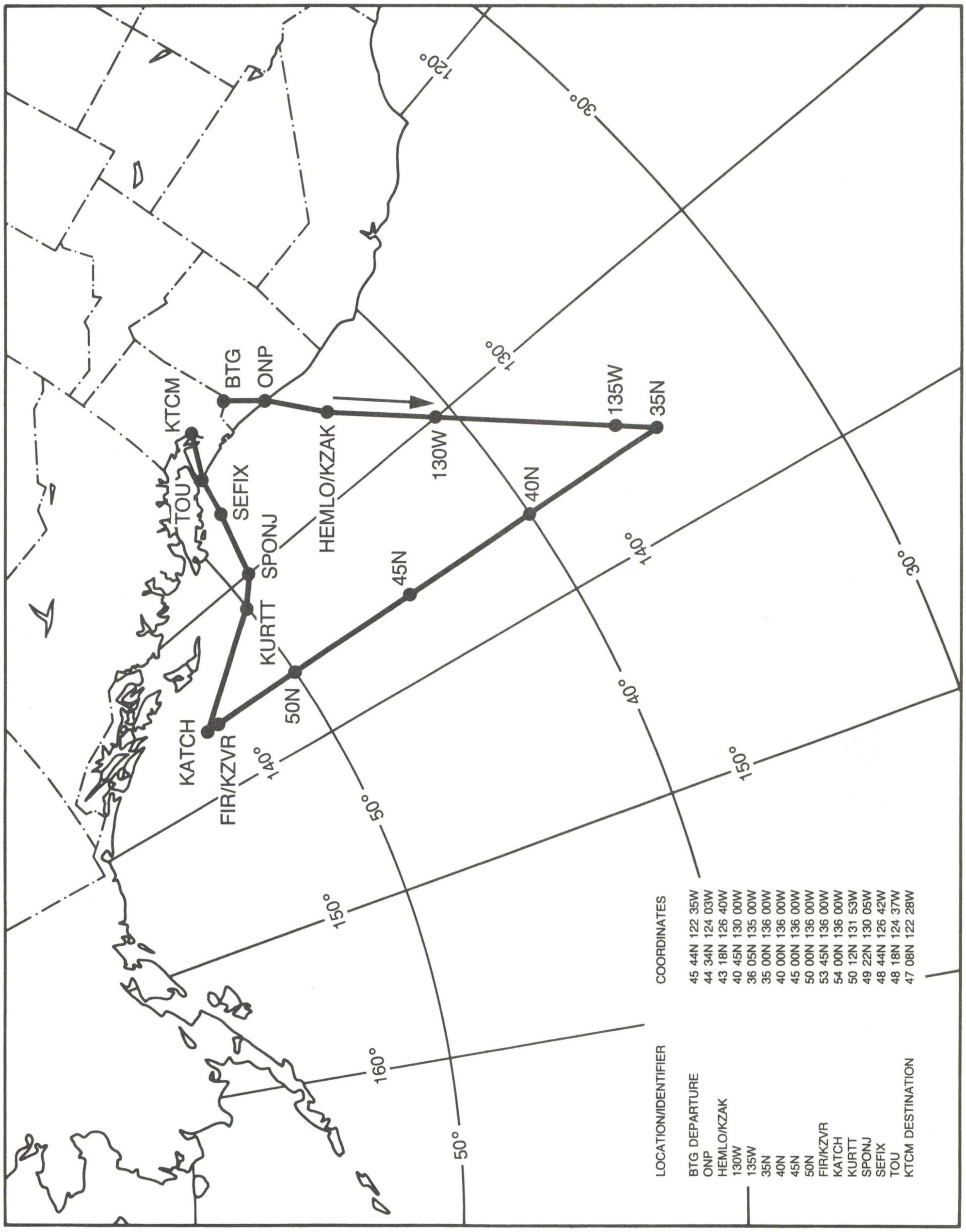


Figure G-7. Air Force track 07.
Weather observation frequency determined by Tasking Agency.

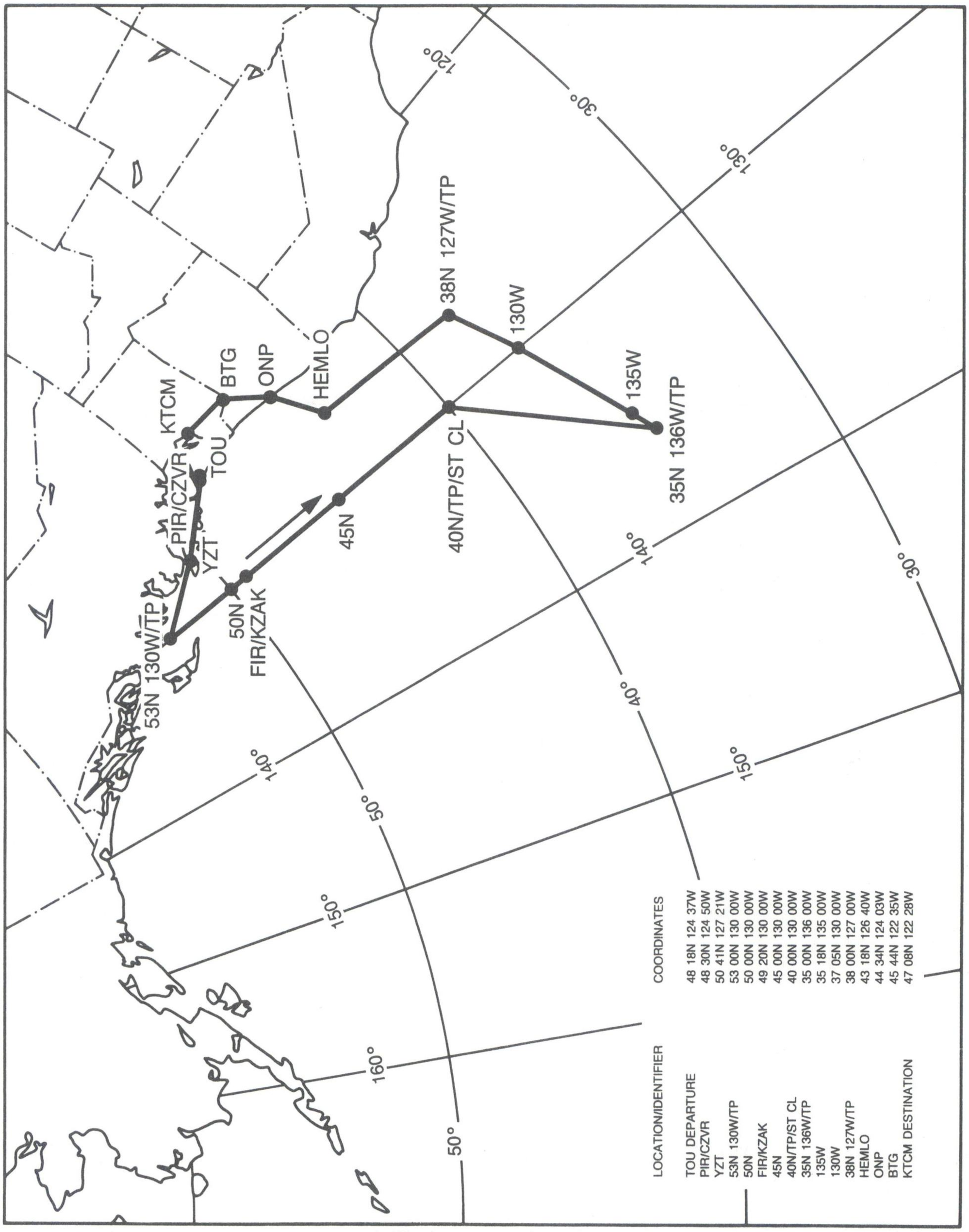


Figure G-8. Air Force track 08.
Weather observation frequency determined by Tasking Agency.

* U.S. GP.O.:1992-341-834:60539

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