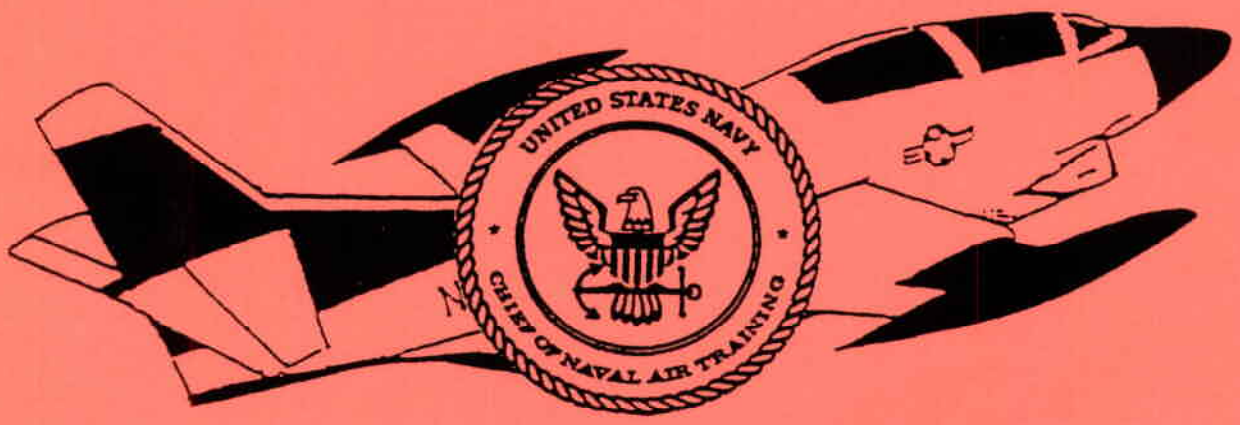
NAVAL AIR TRAINING COMMAND

NAS CORPUS CHRISTI, TEXAS

CNAT P-607 (REV. 1-97) PAT

INSTRUMENT GROUND TRAINING

(STRIKE)



STUDENT GUIDE

1997

DEPARTMENT OF THE NAVY
CHIEF OF NAVAL AIR TRAINING
CNATRA
250 LEXINGTON BLVD SUITE 102
CORPUS CHRISTI TX 78419-5041

1542
N3123

CNATRA P-607 (Rev. 01-97) PAT, "INSTRUMENT GROUND TRAINING (STRIKE)", is issued for information, standardization, and guidance of instructors and students in the Naval Air Training Command. This publication is listed in Section IV of CNATRAINST 1542.56 series and is required Course Curriculum material.

2. This publication will be used to augment the T-2C strike training academic syllabus at Naval Air Station, Meridian, Mississippi, and support the T-2C portion of the E2/C2 academic training syllabus.

3. Recommended changes to this publication shall be submitted to the Chief of Naval Air Training via the Strike Academic Stage Manager and Course Curriculum Model Manager. Questions concerning Advanced Strike Academic Training Instructions should be referred to Mr. Larry Wardle, CNATRA N3123, DSN 861-3894.

4. CNATRA P-607 (Rev. 07-96) is hereby canceled and superseded.

Glenn J. Pittman

GLENN J. PITTMAN
Assistant Chief of Staff for
Training and Operations

Distribution:
CNATRA (05)
COMTRAWING ONE (245)

INSTRUMENT GROUND TRAINING

(STRIKE)

FLIGHT TRAINING ACADEMIC INSTRUCTION STUDENT GUIDE

Q-2A-0005

PREPARED FOR

CHIEF OF NAVAL AIR TRAINING

NAVAL AIR STATION

CORPUS CHRISTI, TEXAS 78419-5100

02 JANUARY 1997

INSTRUMENT GROUND TRAINING (STRIKE)
ACADEMIC FLIGHT TRAINING STUDENT GUIDE

CHANGE SUMMARY PAGE

DATE	CHANGE NUMBER	AFFECTED PAGES	TOPIC
17 SEP 98	1	NUMEROUS	INCORPORATED

SAFETY/HAZARD AWARENESS NOTICE

Students will not attempt to operate classroom computer systems without qualified instructor supervision.

FORWARD

TERMINAL OBJECTIVE:

To provide beginning Intermediate Strike Phase Student Naval Aviators with a thorough understanding of formal flight rules, procedures, and regulations, including Federal Rules and Regulations, DOD and OPNAV Rules and Procedures, and Instrument Navigation Procedures in general which are pertinent to operations in tactical jet type aircraft.

STANDARDS:

Upon completion of this course, the student will demonstrate knowledge of instrument procedures by completing an end-of-course examination with a minimum raw score of eighty (80) percent correct responses.

INSTRUCTIONAL PROCEDURES:

1. This is a lecture course using graphics displayed on a 30-inch color television monitor.
2. The lecture will follow the format of this student guide; however, the guide is designed to reinforce the lecture and should not be considered an all inclusive study guide.
3. The study guide consists of sixteen parts, including two practical problems in air navigation. Each part contains the enabling objective and the specific instructional objectives pertinent to the topic of that part.
4. You should ask questions concerning any topic which is not clearly understood.

INSTRUCTIONAL REFERENCES:

1. DOD FLIP Publications.
2. Aeronautical Information Manual (AIM).

3. **OPNAVINST 3710.7 series.**
4. **Federal Aviation Regulations - Parts 71,75, 91, and 95.**
5. **NATOPS Instrument Flight Manual, NAVAIR 00-80T-112.**
6. **Air Traffic Control Manual, FAA 7110.65 series.**
7. **Federal Aviation Act of 1958.**
8. **Department of Transportation Act of 1966.**
9. **Airport and Airways Development Act of 1970.**
10. **Transportation Safety Act of 1974.**

TABLE OF CONTENTS

It is recommended this study guide be retained for future reference.

DOD FLIGHT INFORMATION PUBLICATION PROGRAM (FLIP)

ENABLING OBJECTIVE: **Demonstrate an understanding of that portion of the Department of Defense (DOD) Flight Information Publications (FLIP) Program applicable to flights in tactical jet type aircraft.**

SPECIFIC OBJECTIVES:

1.1 Recall the general scope of information contained in each applicable publication of the FLIP Program.

1.2 List the FLIP Publications which would normally be carried on all IFR flights in tactical jet type aircraft.

1.3 State the method by which each applicable FLIP Publication is updated and kept current between issue dates.

1.4 List the FLIP Publications which have provisions for Special Notices.

1.5 State the objective of the NOTAM System.

INTRODUCTION

To successfully complete a mission flight and comply with all the FAA and military procedures and regulations, an instrument pilot must have necessary information available for the planning, departure, enroute, and terminal phases of flight. The Department of Defense has developed a system of disseminating this information to pilots in an updated and organized form. This system is designated as the Department of Defense (DOD) Flight Information Publications (FLIP) Program.

The FLIP Program consists of the following publications:

* **FLIP PLANNING**
* **FLIP (ENROUTE) IFR/VFR SUPPLEMENTS**
* **FLIP (ENROUTE) FLIGHT INFORMATION HANDBOOK**
* **FLIP ENROUTE HIGH/LOW ALTITUDE CHARTS**
* **FLIP AREA CHARTS**
* **FLIP AREA ARRIVAL CHARTS**
* **FLIP (TERMINAL) HIGH/LOW ALTITUDE INSTRUMENT APPROACH PROCEDURES**
* **U.S. AIR FORCE FOREIGN CLEARANCE GUIDE**

The publications of the FLIP Program are updated with revisions, additions, and deletions between issues so that pilots always obtain current information by means of:

* ENROUTE CHANGE NOTICES (ECN's)
* TERMINAL CHANGE NOTICES (TCN's)
* PLANNING CHANGE NOTICES (PCN's)
* URGENT CHANGE NOTICES (UCN's)
* DMA AERONAUTICAL CHART UPDATING MANUAL (CHUM)

Pilots are kept current on temporary conditions affecting the status of enroute and airport NAVAIDs and facilities, on proposed changes to FAA procedures, and on major military training exercises by:

* NOTICES TO AIRMEN (NOTAMs)
* SPECIAL NOTICES

In addition to the above listed FLIP Publications, the following publications are published by the National Oceanic and Atmospheric Administration and the Defense Mapping Agency in accordance with interagency agreements and are approved by the DOD for use by military pilots. They are normally available in most airport flight planning areas:

* SECTIONAL AERONAUTICAL CHARTS
* VFR TERMINAL AREA CHARTS (CLASS B AIRSPACE)
* FLIP (TERMINAL) UNITED STATES (TWO VOLUMES):

    CIVIL AIRPORT DIAGRAMS

    CIVIL STANDARD INSTRUMENT DEPARTURES (SIDs)

    CIVIL STANDARD TERMINAL ARRIVAL ROUTES (STARs)

    CIVIL PROFILE DESCENT PROCEDURES

This program was designed using the concept that there are basically three separate phases of flight - planning, enroute operations, and terminal operations. No one document contains all the information which may be required by a pilot. All applicable publications and the NOTAM files should be referenced when preparing for a flight.

Strike pilots should be thoroughly familiar with those publications applicable to flights in tactical jet type aircraft.

FLIP PLANNING

FLIP Planning is, by design, a back-up document for enroute and terminal operations, and is used primarily in flight planning areas for preparation of flights. The Planning Publication for use in the United States is divided into four sections (Figure 1-1):

* **GENERAL PLANNING (GP)**
* **NORTH AND SOUTH AMERICA AREA PLANNING (AP/1)**
* **NORTH AND SOUTH AMERICA AREA PLANNING (AP/1A) SPECIAL USE AIRSPACE**
* **NORTH AND SOUTH AMERICA AREA PLANNING (AP/1B) MILITARY TRAINING ROUTES**

NOTE

The appropriate FLIP Planning package for operations in other parts of the world can be determined from the reference map located on the back cover of each Planning section.

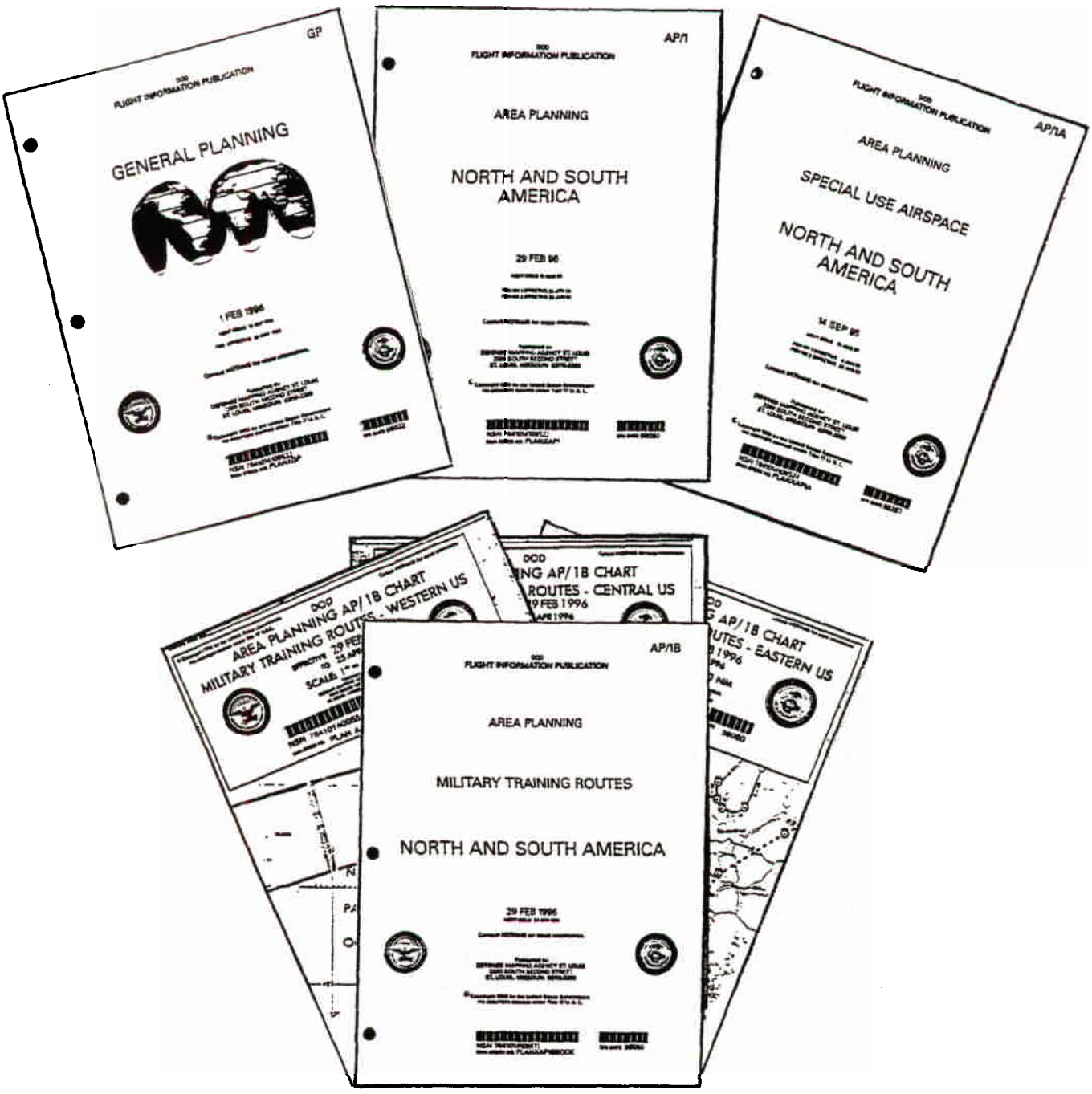
GENERAL PLANNING (GP)

General Planning (GP) contains pertinent planning data and procedural information in support of its companion enroute and terminal publications. It contains information such as:

* **An index for aeronautical information**
* **An explanation of terms**
* **An outline of the FLIP Program**
* **Methods for completing various types of flight plans**
* **General pilot procedures while operating under both FAA and ICAO rules, and divided into preflight, departure, enroute, and arrival phases of flight**

NOTE

Specific INFLIGHT pilot procedures will be located in the FLIP (Enroute) Flight Information Handbook.



FLIP PLANNING
Figure 1-1

NORTH AND SOUTH AMERICA AREA PLANNING (AP/1)

Area Planning (AP/1) contains planning and procedures information for a specific geographical area, that is, for the area into which you are flying on a cross-country flight, such as:

* **Major divisions of controlled airspace along with a list of CLASS B AIRSPACE, CLASS C AIRSPACE, and pilot/equipment requirements for operations within that airspace.**
* **Flight hazards, restrictions to flight, and supplemental remarks for airports of destination, which is information not normally found elsewhere.**
* **Preferred routing into and out of high density areas.**

NORTH AND SOUTH AMERICA AREA PLANNING (AP/1A) SPECIAL USE AIRSPACE

Area Planning (AP/1A) contains a complete tabulation and description of all Special Use Airspace areas:

* **Prohibited (P) Areas**
* **Restricted (R) Areas**
* **Warning (W) Areas**
* **Alert (A) Areas**
* **Military Operations Areas (MOA)**

NOTE

Essential flight information for entering Special Use Airspace can be located in an abbreviated form on the outside panels of the FLIP High Altitude Enroute Charts.

NORTH AND SOUTH AMERICA AREA PLANNING (AP/1B) MILITARY TRAINING ROUTES

Area Planning (AP/1B) contains complete information relative to Low Level Military Training Routes. These routes are designated as IFR Military Training Routes (IR System) and VFR Military Training Routes (VR System). This section contains:

* A numerical listing of IR and VR Routes.

* Checkpoints for laying out routes on ONC/TPC Charts.

* Weather requirements for flying IR/VR Routes.

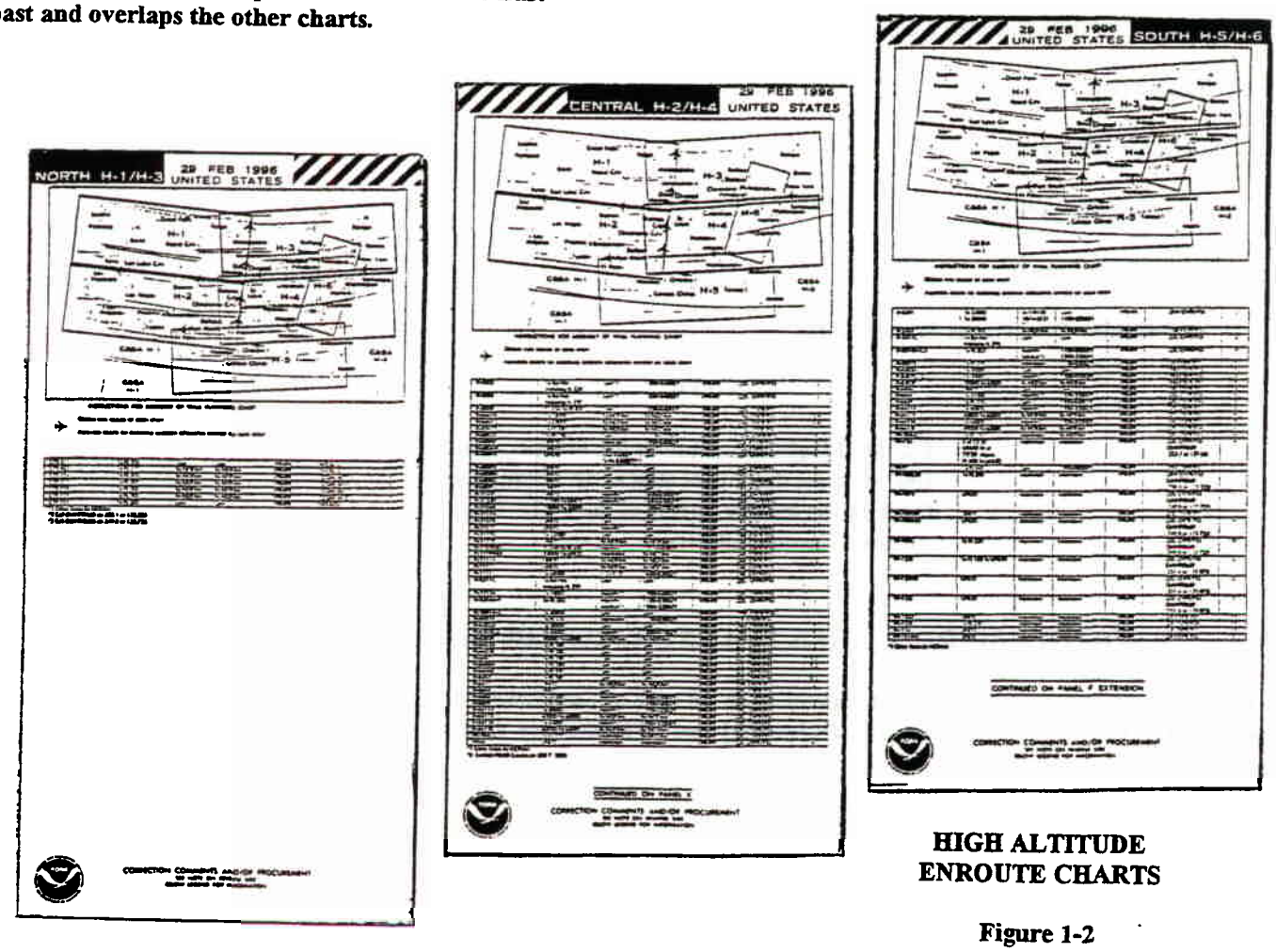
* Scheduling activities for route briefings.

* A listing of Nuclear Power Plant avoidance locations.

Included are six (6) charts on three (3) sheets with a graphic depiction of published routes.

FLIP IFR ENROUTE HIGH ALTITUDE CHARTS

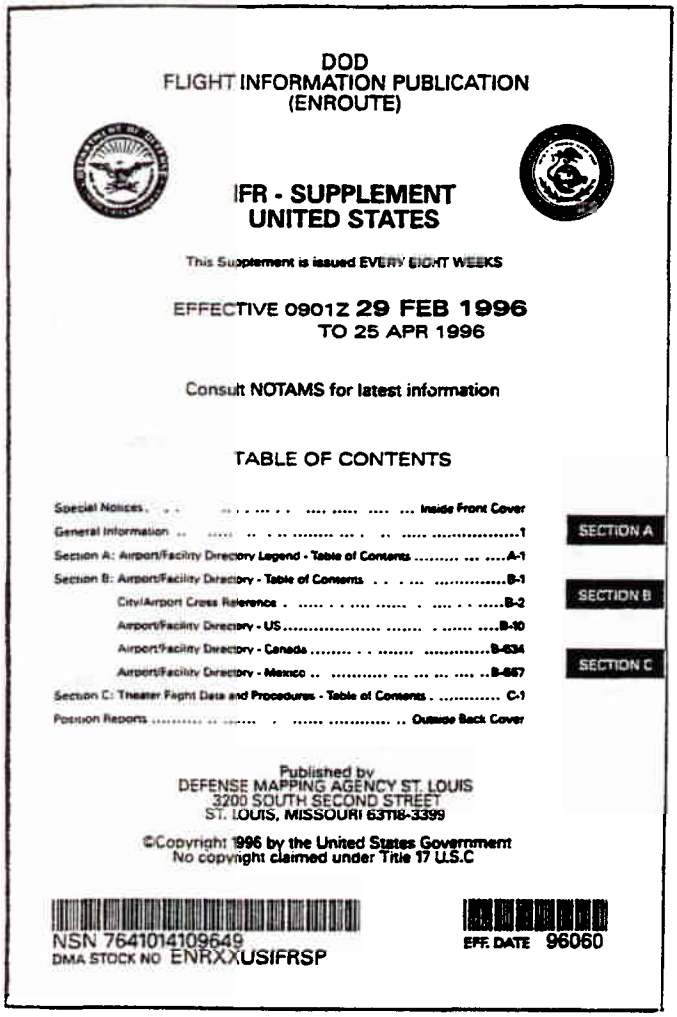
There are six (6) High Altitude Enroute Charts printed on three (3) sheets (Figure 1-2) for use in the Jet Route System, which extends from 18,000' MSL through Flight Level 450. Each Chart has a complete legend for interpretation. Chart number 6 is a vertical depiction of most of the East coast and overlaps the other charts.



HIGH ALTITUDE ENROUTE CHARTS

Figure 1-2

FLIP (ENROUTE) IFR SUPPLEMENT



DOD
FLIGHT INFORMATION PUBLICATION
(ENROUTE)

IFR - SUPPLEMENT
UNITED STATES

This Supplement is issued EVERY EIGHT WEEKS

EFFECTIVE 0901Z 29 FEB 1996
TO 25 APR 1996

Consult NOTAMS for latest information

TABLE OF CONTENTS

SECTION A
SECTION B
SECTION C

Published by
DEFENSE MAPPING AGENCY ST. LOUIS
3200 SOUTH SECOND STREET
ST. LOUIS, MISSOURI 63118-3399

NSN 7641014109649
DMA STOCK NO ENRXXUSIFRSP

EFF. DATE 96060

IFR SUPPLEMENT

Figure 1-3

The FLIP (Enroute) Supplements consist of two books which provide separate IFR and VFR airport directories. Together, they form a complete directory of all airports available to military aircraft. Tactical type aircraft pilots are primarily concerned with the IFR Supplement (Figure 1-3) for normal operations; however, the VFR Supplement is used extensively for planning Operational Navigation (ONAV) missions.

The Airport/Facility Directory of the IFR Supplement contains an alphabetical listing of:

* **All U.S. airports having a published DOD Instrument Approach Procedure and/or Radar capability.**
* **Radio Aids to Navigation (NAVAIDs).**
* **Flight Service Stations (FSS).**
* **Air Route Traffic Control Centers (ARTCC) and their sector frequencies.**

Additional information is provided for:

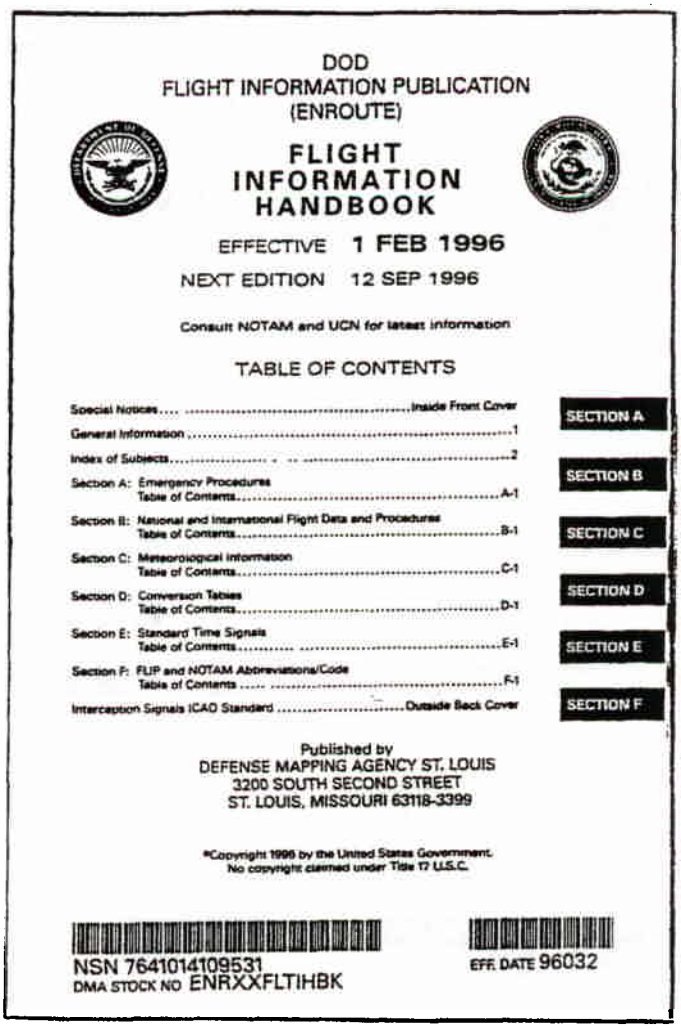
* **Canadian and Mexican airports for emergency use.**
* **ADIZ penetration procedures.**
* **Coordinating activities for Warning (W) Areas.**
* **Procedures for filing or changing flight plans inflight.**

FLIP (ENROUTE) FLIGHT INFORMATION HANDBOOK

The Flight Information Handbook (Figure 1-4) is designed for worldwide use in conjunction with Enroute Supplements. It contains worldwide specific pilot procedures to be followed in both normal and emergency operating situations. This is information which is not subject to frequent change and is of a nature normally required by DOD and ICAO pilot operating procedures.

The Flight Information Handbook contains:

- **Emergency procedures.**
- **International Flight Data and Procedures.**
- **Meteorology Information.**
- **Conversion Tables.**
- **Standard Time Signals.**
- **FLIP and NOTAM Abbreviations.**
- **ICAO Standard Interception Signals.**



DOD
FLIGHT INFORMATION PUBLICATION
(ENROUTE)

FLIGHT INFORMATION HANDBOOK

EFFECTIVE 1 FEB 1996
NEXT EDITION 12 SEP 1996

Consult NOTAM and UCN for latest information

TABLE OF CONTENTS

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SECTION F

Published by
DEFENSE MAPPING AGENCY ST. LOUIS
3200 SOUTH SECOND STREET
ST. LOUIS, MISSOURI 63118-3399

NSN 7641014109531
DMA STOCK NO ENRXXFLTIHBK
EFF. DATE 96032

FLIGHT INFORMATION HANDBOOK

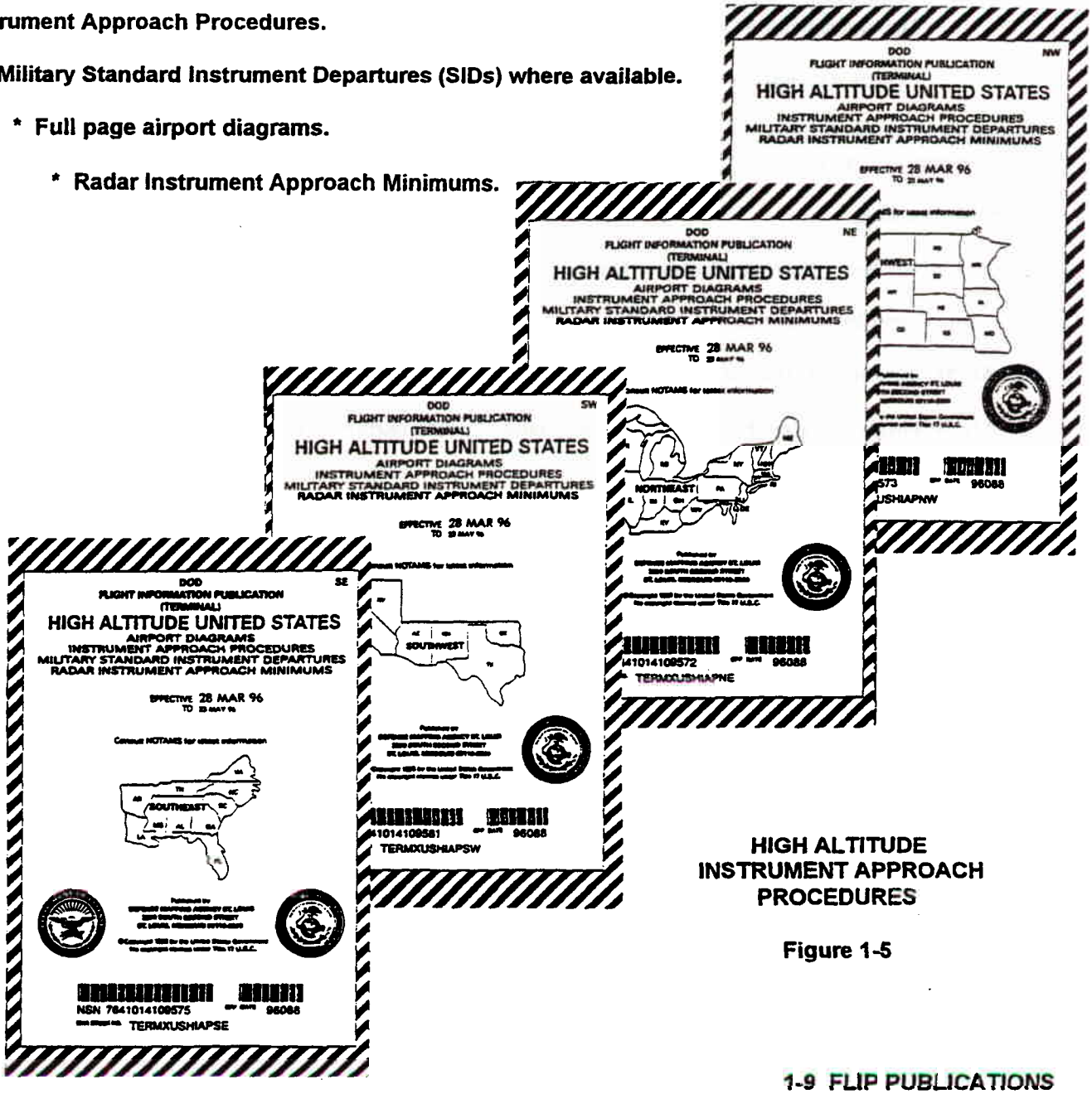
Figure 1-4

FLIP (TERMINAL) HIGH ALTITUDE INSTRUMENT APPROACH PROCEDURES

There are four (4) booklets of DOD FLIP (Terminal) High Altitude Instrument Approach Procedures (Figure 1-5). They contain Instrument Approach Procedures for those airports depicted in BLUE color on the FLIP Enroute High Altitude Charts.

Contained in each booklet are:

- **Instrument Approach Procedures.**
- **Military Standard Instrument Departures (SIDs) where available.**
- **Full page airport diagrams.**
- **Radar Instrument Approach Minimums.**



HIGH ALTITUDE INSTRUMENT APPROACH PROCEDURES

Figure 1-5

IFR FLIGHTS IN TACTICAL JET TYPE AIRCRAFT

For every IFR flight outside the local training area, there are four publications which should be carried aboard tactical jet type aircraft:

- **FLIP (Enroute) IFR Supplement.**
- **FLIP (Enroute) Flight Information Handbook.**
- **The appropriate FLIP High Altitude Enroute Charts.**
- **The appropriate FLIP (Terminal) High Altitude Instrument Approach Procedures/Military SIDs.**

Two other FLIP Publications are applicable to tactical jet type aircraft, but are used for preflight planning as a back-up to enroute and terminal publications; therefore, they are not carried aboard aircraft:

- **FLIP Planning.**
- **U.S. Air Force Foreign Clearance Guide.**

Always apply two basic rules to the everyday use of these FLIP Publications:

1. **Always use current issues of the applicable publications.**
2. **Always obtain the latest FLIP Program information by referencing all applicable Change Notices, Special Notices, and NOTAMs.**

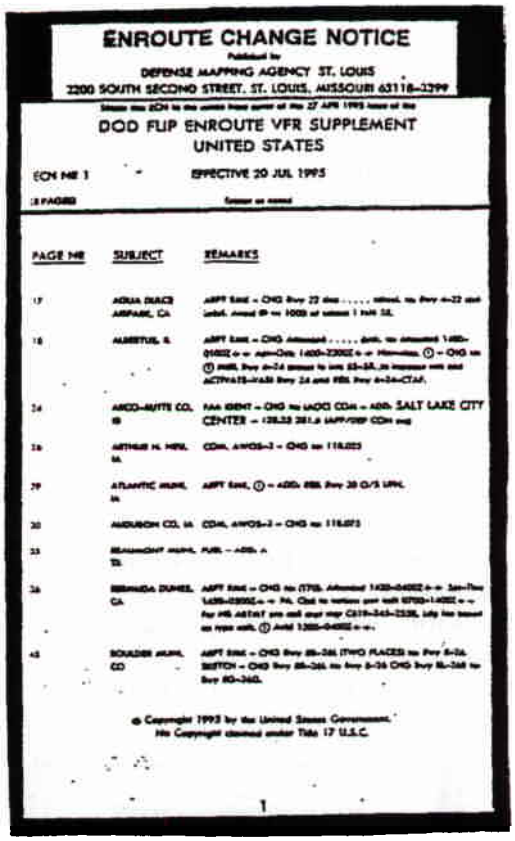
FLIP UPDATE SYSTEM

The FLIP Program publications are maintained in a continual updated status between issues by several means:

- **Enroute Change Notices (ECNs).**
- **Terminal Change Notices (TCNs).**
- **Planning Change Notices (PCNs).**
- **Urgent Change Notices (UCNs).**
- **Special Notices.**
- **Notices to Airmen (NOTAMs).**

ENROUTE CHANGE NOTICE (ECN)

Published on a scheduled basis, ECNs (Figure 1-6) disseminate revisions, additions, and deletions to the current issues of Enroute Charts, Supplements, and the Flight Information Handbook.


ENROUTE CHANGE NOTICE

Published by
DEFENSE MAPPING AGENCY ST. LOUIS
2200 SOUTH SECOND STREET, ST. LOUIS, MISSOURI 63118-3399

DOD FLIP ENROUTE VFR SUPPLEMENT
UNITED STATES

ECN NR 1 EFFECTIVE 20 JUL 1995

PAGE NR	SUBJECT	REMARKS
17	ADSA (RACE AIRPARK, CA	
18	ALBERTUS, IL	
24	ARCO-BUTTE CO, ID	SALT LAKE CITY CENTER
26	ARTHUR N. NEIL, VA	
29	ATLANTIC (MUNI, VA	
30	AUDUBON CO, IA	
33	BEAVERCREEK (MUNI, TX	
36	BERMUDA DUNES, CA	
45	BOULDER (MUNI, CO	

1

ENROUTE CHANGE NOTICE (ECN)

FIGURE 1-6

TERMINAL CHANGE NOTICE (TCN)

Published on a scheduled basis, TCNs (Figure 1-7) dissiminate revisions to the current Instrument Approach Procedure booklets, that is, a new Instrument Approach Procedure to an airport to replace the current Procedure.


TCN TCN TCN TCN

DOD
FLIGHT INFORMATION PUBLICATION
(TERMINAL)

LOW ALTITUDE UNITED STATES

AIRPORT DIAGRAMS
INSTRUMENT APPROACH PROCEDURES
MILITARY STANDARD INSTRUMENT DEPARTURES
RADAR INSTRUMENT APPROACH MINIMUMS

EFFECTIVE 7 DEC 95
TO 4 JAN 96

Consult NOTAMS for latest information

TERMINAL CHANGE NOTICE
TCN

SEE INSIDE FRONT COVER FOR INSTRUCTIONS

DEPARTMENT OF DEFENSE • • DEPARTMENT OF COMMERCE
FEDERAL AVIATION ADMINISTRATION

Published by
DEFENSE MAPPING AGENCY ST. LOUIS
2200 SOUTH SECOND STREET
ST. LOUIS, MISSOURI 63118-3399

Stock No. TERMXUSLIAPT SPP Date 95341

TCN TCN TCN TCN

TERMINAL CHANGE NOTICE (TCN)

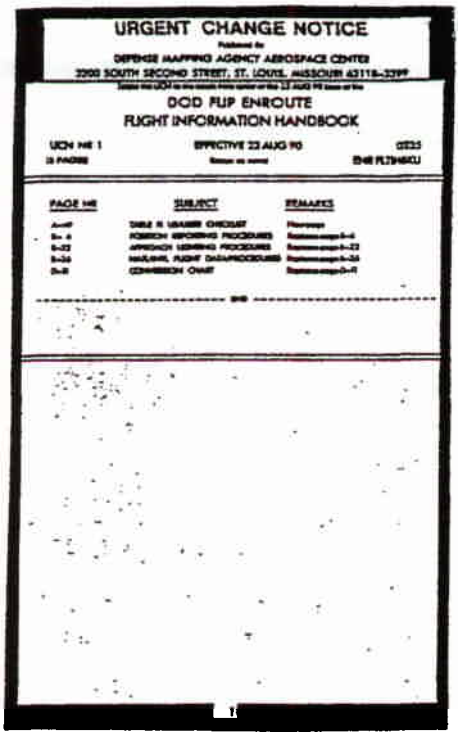
Figure 1-7

PLANNING CHANGE NOTICE (PCN)

Published on a scheduled basis, PCNs (Figure 1-8) disseminate revisions, additions, and deletions to the current issues of the four sections of the FLIP Planning publication.

URGENT CHANGE NOTICE (UCN)

ECNs, TCNs, and PCNs are published on a scheduled basis. Safety of flight information requiring an unscheduled amendment to the Enroute Charts, Supplements, Flight Information Handbook, Instrument Approach Procedures, and Planning publication is disseminated in the form of an UCN (Figure 1-9).


URGENT CHANGE NOTICE

DEFENSE MAPPING AGENCY AEROSPACE CENTER
3200 SOUTH SECOND STREET, ST. LOUIS, MISSOURI 63118-3399

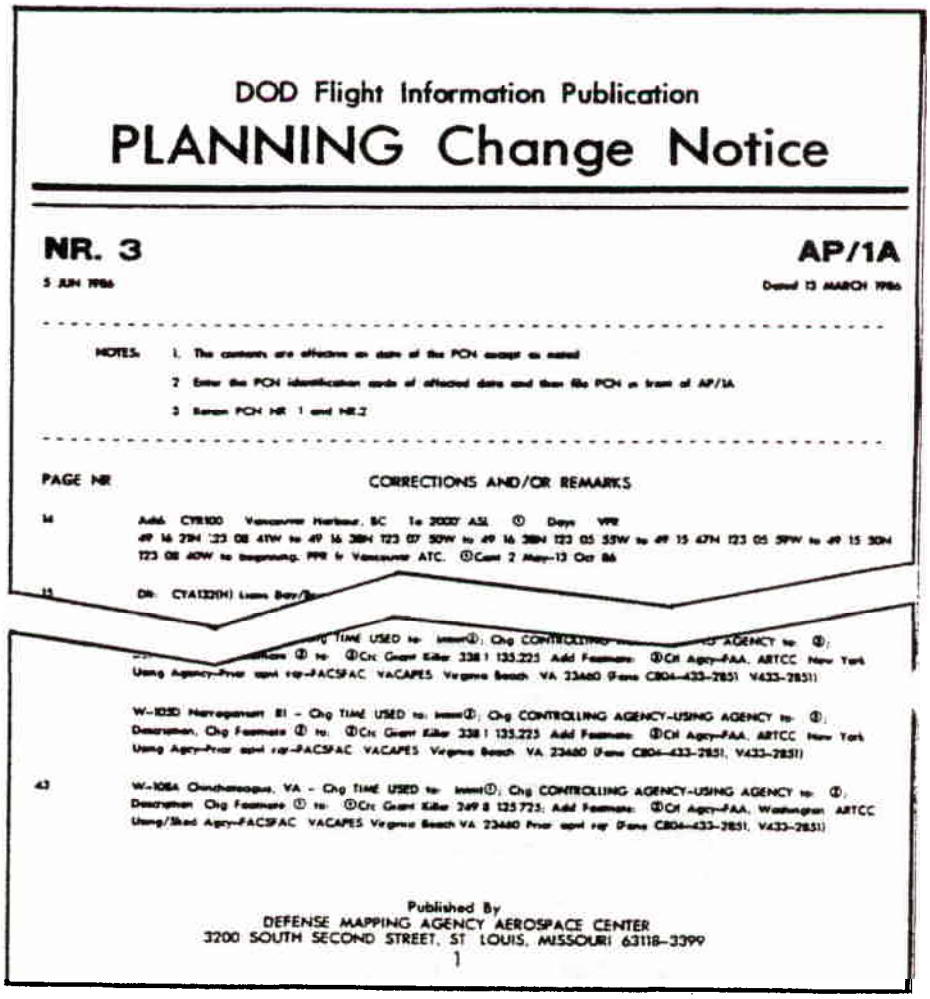
DOD FLIP ENROUTE
FLIGHT INFORMATION HANDBOOK

UCN NR 1 EFFECTIVE 23 AUG 90

PAGE NR | SUBJECT | REMARKS

URGENT CHANGE NOTICE (UCN)

Figure 1-9


DOD Flight Information Publication

PLANNING Change Notice

NR. 3 AP/1A

5 JUN 1986 Dated 13 MARCH 1986

NOTES: 1. The contents are effective on date of the PCN except as noted
2 Enter the PCN identification cards of affected data and then file PCN in front of AP/1A
3 Remove PCN NR 1 and NR 2

PAGE NR CORRECTIONS AND/OR REMARKS

14 Add: CYR100 Vancouver Harbour, BC 1a 20007 ASL ① Days VFR 49 16 29N 123 08 41W to 49 16 38N 123 07 50W to 49 16 38N 123 05 55W to 49 15 47N 123 05 59W to 49 15 50N 123 08 40W to beginning. PPR to Vancouver ATC. ②Cont 2 May-13 Oct 86

15 DR: CYA132(H) Lions Bay/[illegible]

[illegible] TIME USED to: Insert①; Chg CONTROLLING AGENCY to: ①; [illegible] ② to: ①Ctc Grant Killer 338 1 135.225 Add Footnote: ①Ctl Agcy-FAA, ARTCC New York Using Agency-Prior apvl rqr-PACSPAC VACAPES Virginia Beach VA 23460 Phone CB04-433-2851, V433-2851)

W-103D Reinstatement El - Chg TIME USED to: Insert①; Chg CONTROLLING AGENCY-USING AGENCY to: ①; Description, Chg Footnote ② to: ①Ctc Grant Killer 338 1 135.225 Add Footnote: ①Ctl Agcy-FAA, ARTCC New York Using Agcy-Prior apvl rqr-PACSPAC VACAPES Virginia Beach VA 23460 Phone CB04-433-2851, V433-2851)

43 W-106A Chinchateague, VA - Chg TIME USED to: Insert①; Chg CONTROLLING AGENCY-USING AGENCY to: ①; Description Chg Footnote ① to: ①Ctc Grant Killer 349 8 125 725; Add Footnote: ①Ctl Agcy-FAA, Washington ARTCC Using/Shed Agcy-FACSPAC VACAPES Virginia Beach VA 23460 Prior apvl rqr Phone CB04-433-2851, V433-2851)

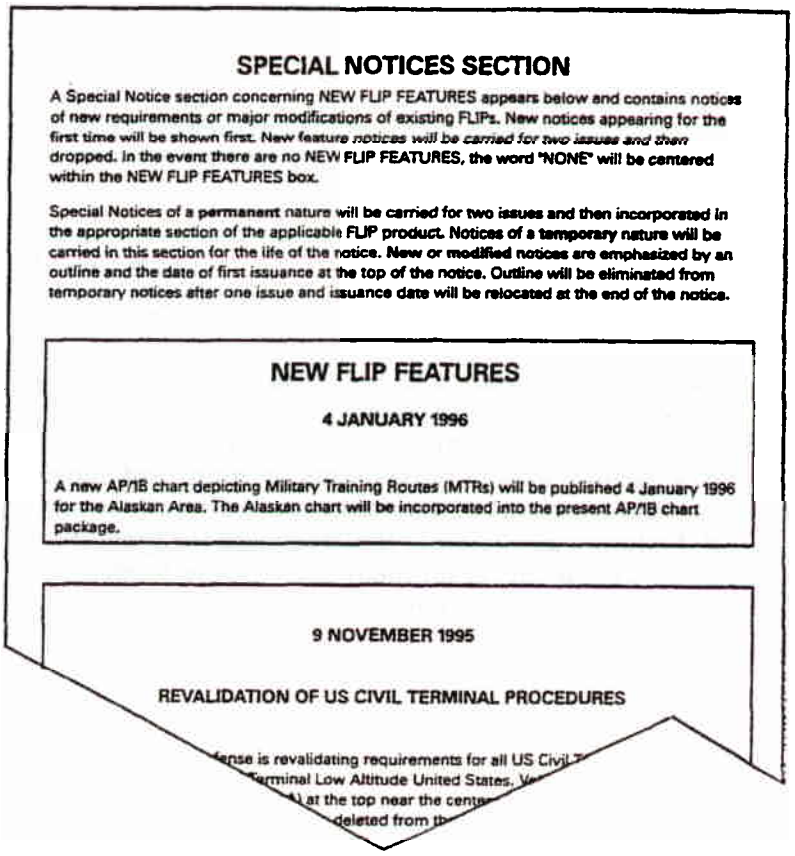
Published By
DEFENSE MAPPING AGENCY AEROSPACE CENTER
3200 SOUTH SECOND STREET, ST LOUIS, MISSOURI 63118-3399

PLANNING CHANGE NOTICE (PCN)

Figure 1-8

SPECIAL NOTICES

ECNs, TCNs, PCNs, and UCNs are the methods by which publications are actually revised between issues; however, pilots are kept current concerning new FLIP features, modifications to the FLIP publications formats, proposed changes to FAA rules, major military training exercises, etc., by Special notices (Figure 1-10). They are located on the inside front cover of the Planning sections, Supplements, and Flight Information Handbook.



SPECIAL NOTICES SECTION

A Special Notice section concerning NEW FLIP FEATURES appears below and contains notices of new requirements or major modifications of existing FLIPs. New notices appearing for the first time will be shown first. New feature notices will be carried for two issues and then dropped. In the event there are no NEW FLIP FEATURES, the word "NONE" will be centered within the NEW FLIP FEATURES box.

Special Notices of a permanent nature will be carried for two issues and then incorporated in the appropriate section of the applicable FLIP product. Notices of a temporary nature will be carried in this section for the life of the notice. New or modified notices are emphasized by an outline and the date of first issuance at the top of the notice. Outline will be eliminated from temporary notices after one issue and issuance date will be relocated at the end of the notice.

NEW FLIP FEATURES

4 JANUARY 1996

A new AP/1B chart depicting Military Training Routes (MTRs) will be published 4 January 1996 for the Alaskan Area. The Alaskan chart will be incorporated into the present AP/1B chart package.

9 NOVEMBER 1995

REVALIDATION OF US CIVIL TERMINAL PROCEDURES

...fense is revalidating requirements for all US Civil T...
...erminal Low Altitude United States. V...
...) at the top near the cent...
...deleted from th...

SPECIAL NOTICES

Figure 1-10

Information limited to temporary conditions which may be hazardous to flight affecting navigational aids and terminal facilities is disseminated to pilots in a timely manner by teletype NOTAMs.

There are two NOTAM Systems - the DOD System and the FAA System.

DOD NOTAM SYSTEM: Covers USN, USMC, USAF, USCG, ANG, and most Army facilities along with civil airports having an approved DOD Instrument Approach Procedure. These teletype notices will normally be displayed on a large white wall board (Figure 1-11) in flight planning areas.

NOTICES TO AIRMEN (NOTAM)

(NORTH AMERICAN DISPLAY)	NOTAMS							
SPECIAL NOTICES	A-B	C-D	E-G	H-L	M	N-O	R-S	T-Z
ALL PILOTS CHECK	Facilities/Aerodromes covered by the USAF NOTAM System are listed only when there is an active NOTAM.							

DOD NOTAM DISPLAY BOARD

Figure 1-11

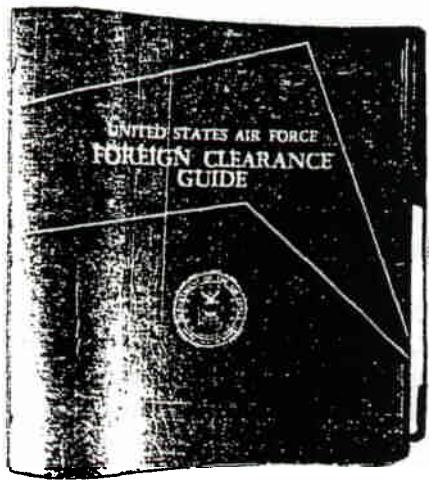
FAA NOTAM SYSTEM: Covers FAA operated facililties, that is, public use civil airports, and some Army airports. If your planned flight is to terminate at an airport not covered by the DOD System, request the Dispatcher at Base Operations obtain the NOTAMs for you from a Flight Service Station (FSS).

NOTE

The Dispatcher has a direct telephone line to the "TIE-IN" FSS serving that airport.

U.S. AIR FORCE FOREIGN CLEARANCE GUIDE

The Foreign Clearance Guide (Figure 1-12) is a group of bound booklets used for disseminating world-wide foreign clearance requirements and information on personnel travel, airports of entry and departure, aircraft movements to, from, and between foreign areas, and transport of material aboard aircraft. Along with the FLIP Planning publication, it is designed for preflight use as a back-up document for terminal and enroute publications; therefore, it is not carried aboard aircraft.



FOREIGN CLEARANCE GUIDE

Figure 1-12

IFR SUPPLEMENT AND FLIGHT INFORMATION HANDBOOK

ENABLING OBJECTIVE: Demonstrate a working knowledge of the contents of the DOD FLIP (Enroute) IFR Supplement and DOD FLIP (Enroute) Flight Information Handbook.

SPECIFIC OBJECTIVES:

2.1 State the criteria for United States airports to be listed in the IFR Supplement.

2.2 Extract specific information from the Airport/Facility Directory.

2.3 Extract specific information from the Flight Data and Procedures Section.

2.4 Recall the location of the formats used for filing/changing flight plans inflight.

2.5 Extract specific information from the Flight Information Handbook.

FLIP (ENROUTE) IFR SUPPLEMENT

The IFR Supplement (Figure 2-1) is used for both preflight and inflight operations, and a current issue should be carried aboard the aircraft for all IFR operations. It contains an alphabetical airport listing of:

* All U.S. airports, with associated data, that have:

    1. A published DOD High/Low Altitude Instrument Approach Procedure; and/or,

    2. Radar capability.

* Canadian and Mexican airports for emergency use.

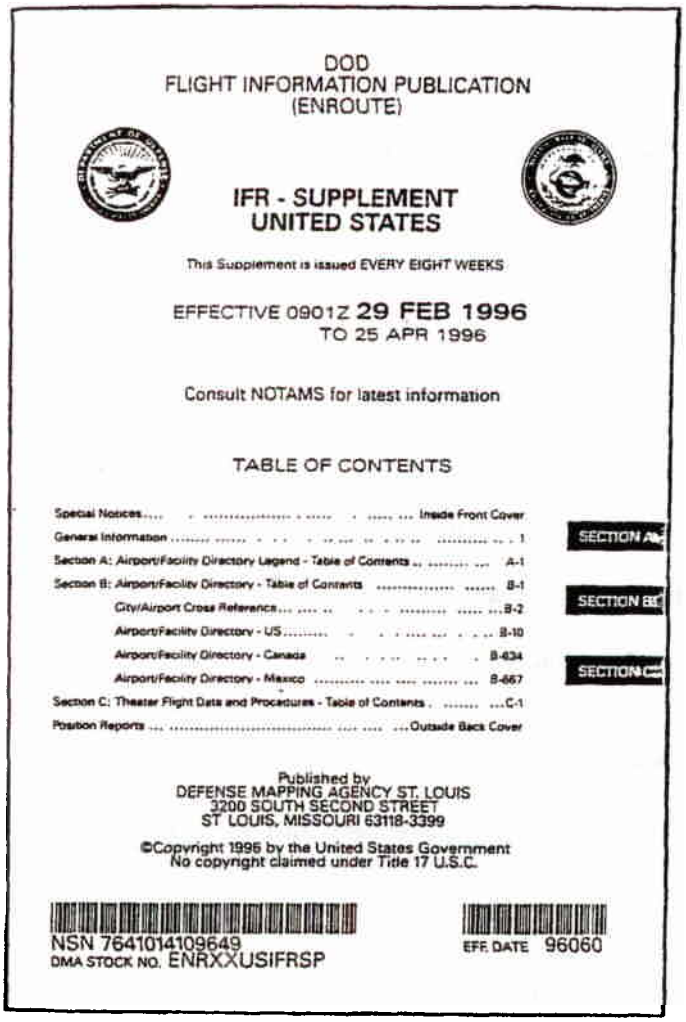
As with the FLIP Planning sections and the FLIP (Enroute) Flight Information Handbook, the inside front cover of the IFR Supplement contains a Special Notices section with permanent notices (carried for two issues) and temporary notices (carried for life of notice) of FLIP modifications, new requirements, military training exercises, and other FLIP features of general interest to pilots.

The Supplement is divided into three basic sections:

* Airport/Facility Directory Legend.

* Airport/Facility Directory.

* Theater Flight Data and Procedures.



DOD
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(ENROUTE)

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UNITED STATES

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Figure 2-1

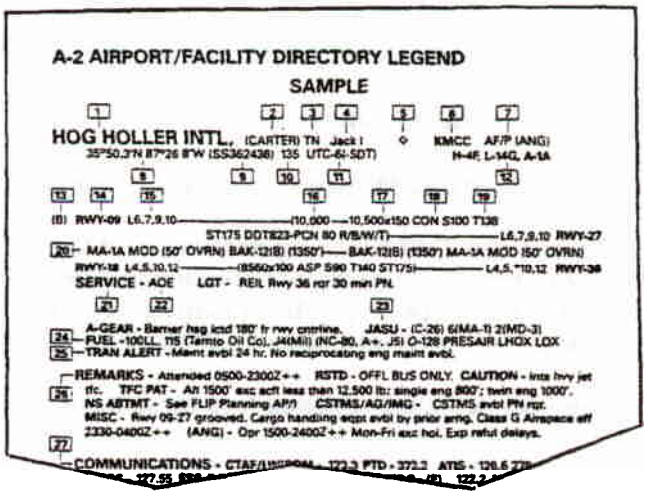
SECTION A
AIRPORT/FACILITY DIRECTORY LEGEND

SECTION B
AIRPORT/FACILITY DIRECTORY

SECTION C
THEATER FLIGHT DATA AND PROCEDURES

SECTION A: AIRPORT/FACILITY DIRECTORY LEGEND

Beginning with a fictitious airport entry which contains typical airport data, the legend consists of several pages. The fictitious airport data has reference numbers, or footnotes, (Figure 2-2) and the several pages of legend contain explanations of this referenced data. A pilot should be able to interpret any entry under an airport name in the Directory by referencing these footnotes and their explanations.



A-2 AIRPORT/FACILITY DIRECTORY LEGEND

SAMPLE

HOG HOLLER INTL, (CARTER) TN Jack I ◇ KMCC AF/P IANG)
35°50.3'N 87°26.8'W (SS362436) 135 UTC-6(-5DT) H-4F, L-14G, A-1A

(B) RWY-09 L6,7,9,10——(10,000—10,500x150 CON S100 T138
ST175 DDT823-PCN 80 R/B/W/T)——L6,7,9,10 RWY-27
MA-1A MOD (50' OVRN) BAK-12(B) (1350')—— BAK-12(B) (1350') MA-1A MOD (50' OVRN)
RWY-18 L4,5,10,12——(8560x100 ASP S90 T140 STT175)——L4,5,*10,12 RWY-36
SERVICE - AOE LGT - REIL Rwy 36 ctr 30 min PN.

A-GEAR - Barrier hsg icsd 180' fr rwy centrline. JASU - (C-26) 6(MA-1) 2(MD-3)
FUEL -100LL, 115 (Tarnto Oil Co), J4(Mil) (NC-80, A+, J5) O-128 PRESAIR LHOX LOX
TRAN ALERT - Maint avbl 24 hr. No reciprocating eng maint avbl.

REMARKS - Attended 0500-2300Z++ RSTD - OFFL BUS ONLY. CAUTION - Intx hvy jet tfc. TFC PAT - Alt 1500' exc acft less than 12,500 lb; single eng 800'; twin eng 1000'. NS ABTMT - See FLIP Planning AP/1 CSTMS/AG/IMG - CSTMS avbl PN rqr. MISC - Rwy 09-27 grooved. Cargo handling eqpt avbl by prior arng. Class G Airspace eff 2330-0400Z++ (ANG) - Opr 1500-2400Z++ Mon-Fri exc hol. Exp refut delays.

COMMUNICATIONS - CTAF/[illegible] 122.3 FTD - 372.3 ATIS - 126.6 27[illegible]
[illegible] 127.95 [illegible] [illegible] 122.2

DIRECTORY LEGEND

Figure 2-2

SECTION B: AIRPORT/FACILITY DIRECTORY

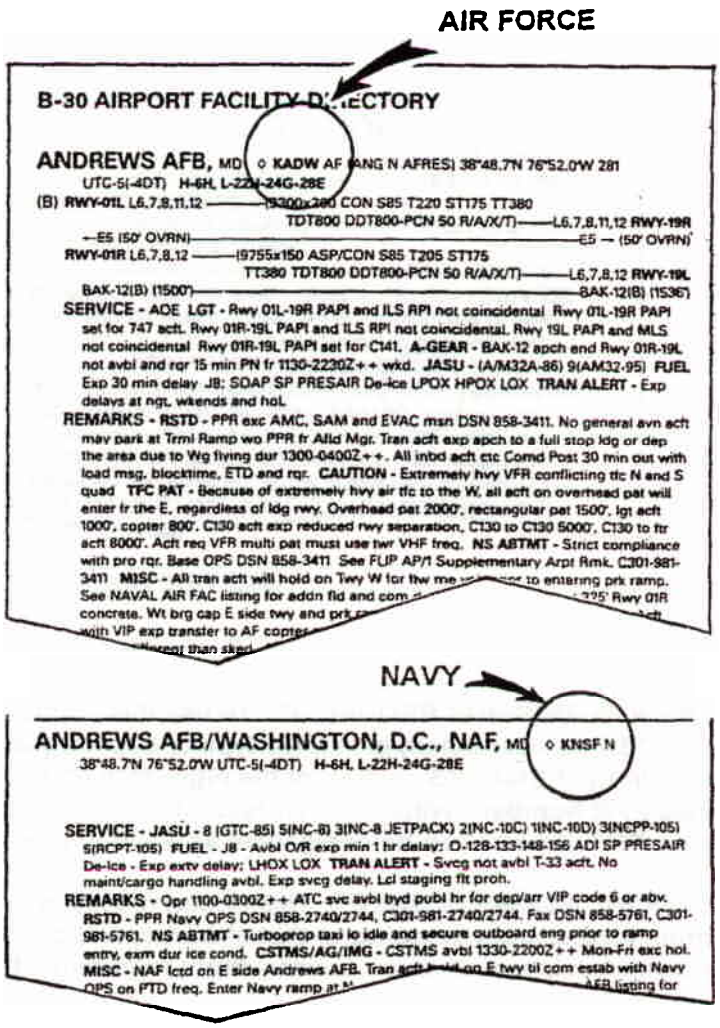
The Directory contains an alphabetical listing of airports, Air Route Traffic Control Centers, NAVAIDs, and Flight Service Stations. There are certain entries with which you should be thoroughly familiar and warrant a review in this topic.

LOCATION IDENTIFIER

Airports and NAVAIDs have 3-letter FAA location identifiers or 4-letter ICAO location identifiers. These are used for flight plans, charts, and clearances. When flying within the United States on a military flight plan, do not use the first letter of an ICAO identifier. This designates the country, that is, "K" for the United States. All information on the flight plan will be transmitted to the identifier in the "TO" block of the flight plan.

CAUTION

Joint-use airports such as ATLANTA NAS and WASHINGTON NAF will have an identifier for the Air Force side of the airport and a separate identifier for the Navy side of the airport.



LOCATION IDENTIFIER

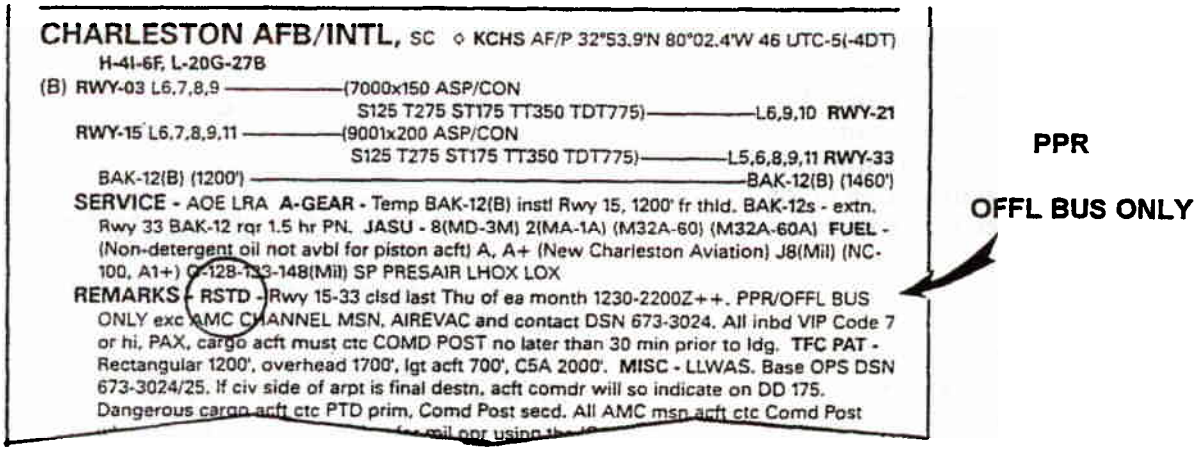
Figure 2-3

AIRPORT RESTRICTIONS

Under the REMARKS section, there is a sub-section labeled RESTRICTIONS (RSTD) (Figure 2-4). Among other things, airport restrictions may include:

1. **PRIOR PERMISSION REQUIRED (PPR); and/or,**
2. **OFFICIAL BUSINESS ONLY (OFFL BUS ONLY).**

Very seldom co-listed, usually one or the other is in effect at an airport.



RESTRICTIONS

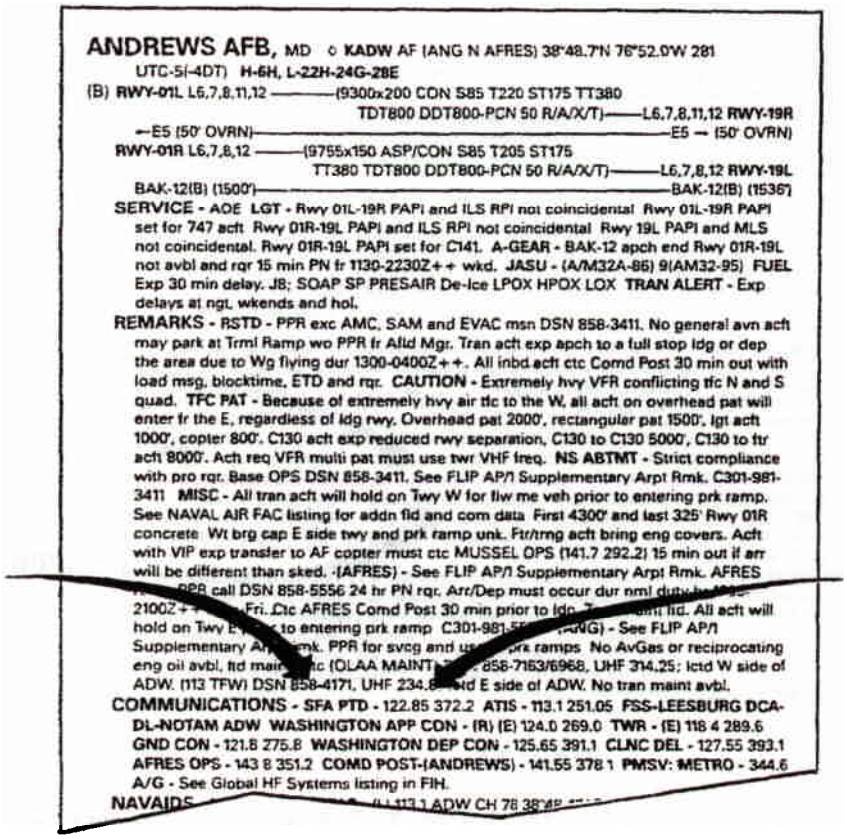
Figure 2-4

"PRIOR PERMISSION REQUIRED": To use this airport, a pilot must call Base Operations on the Autovon/DSN number listed, give ETA, type of aircraft, pilot name, nature of business, and obtain a PPR Number. In the REMARKS section of the flight plan (DD Form 175), enter the airport location identifier and the assigned PPR Number. Without other restrictions, a PPR airport can be used as a fuel stop if a PPR Number is obtained. PPR airports can be designated as weather alternates without obtaining a PPR Number.

"OFFICIAL BUSINESS ONLY": This airport is closed to all military transient aircraft and cannot be used as a fuel stop. A pilot must be going to that airport specifically to contact a person or group of persons on official government business. A cross-country flight requiring a fuel stop is not official business.

Any airport listed in the IFR Supplement can always be used in an emergency or designated as a weather alternate; otherwise, official business restrictions will apply if in effect. USAF personnel require written orders to use restricted airports, however, Navy pilots do not.

COMMUNICATIONS



ANDREWS AFB, MD ◇ KADW AF (ANG N AFRES) 38°48.7'N 76°52.0'W 281
UTC-5(-4DT) H-6H, L-22H-24G-28E
(B) RWY-01L L6,7,8,11,12 ——(9300x200 CON S85 T220 ST175 TT380
TDT800 DDT800-PCN 50 R/A/X/T)——L6,7,8,11,12 RWY-19R
←E5 (50' OVRN)——E5 → (50' OVRN)
RWY-01R L6,7,8,12 ——(9755x150 ASP/CON S85 T205 ST175
TT380 TDT800 DDT800-PCN 50 R/A/X/T)——L6,7,8,12 RWY-19L
BAK-12(B) (1500')——BAK-12(B) (1536')
SERVICE - AOE LGT - Rwy 01L-19R PAPI and ILS RPI not coincidental Rwy 01L-19R PAPI set for 747 acft Rwy 01R-19L PAPI and ILS RPI not coincidental Rwy 19L PAPI and MLS not coincidental. Rwy 01R-19L PAPI set for C141. A-GEAR - BAK-12 apch end Rwy 01R-19L not avbl and rqr 15 min PN fr 1130-2230Z++ wkd. JASU - (A/M32A-86) 9(AM32-95) FUEL Exp 30 min delay. J8; SOAP SP PRESAIR De-Ice LPOX HPOX LOX TRAN ALERT - Exp delays at ngt, wkends and hol.
REMARKS - RSTD - PPR exc AMC, SAM and EVAC msn DSN 858-3411. No general avn acft may park at Trml Ramp wo PPR fr Afld Mgr. Tran acft exp apch to a full stop ldg or dep the area due to Wg flying dur 1300-0400Z++. All inbd acft ctc Comd Post 30 min out with load msg, blocktime, ETD and rqr. CAUTION - Extremely hvy VFR conflicting tfc N and S quad. TFC PAT - Because of extremely hvy air tfc to the W, all acft on overhead pat will enter fr the E, regardless of ldg rwy. Overhead pat 2000', rectangular pat 1500', lgt acft 1000', copter 800'. C130 acft exp reduced rwy separation, C130 to C130 5000', C130 to ftr acft 8000'. Acft req VFR multi pat must use twr VHF freq. NS ABTMT - Strict compliance with pro rqr. Base OPS DSN 858-3411. See FLIP AP/1 Supplementary Arpt Rmk. C301-981-3411 MISC - All tran acft will hold on Twy W for flw me veh prior to entering prk ramp. See NAVAL AIR FAC listing for addn fld and com data. First 4300' and last 325' Rwy 01R concrete. Wt brg cap E side twy and prk ramp unk. Ftr/trng acft bring eng covers. Acft with VIP exp transfer to AF copter must ctc MUSSEL OPS (141.7 292.2) 15 min out if arr will be different than sked. -(AFRES) - See FLIP AP/1 Supplementary Arpt Rmk. AFRES [illegible] PPR call DSN 858-5556 24 hr PN rqr. Arr/Dep must occur dur nml duty hrs [illegible] 2100Z++ Mon-Fri. Ctc AFRES Comd Post 30 min prior to ldg. [illegible] fld. All acft will hold on Twy E [illegible] to entering prk ramp. C301-981-[illegible]-ANG) - See FLIP AP/1 Supplementary Arpt Rmk. PPR for svcg and use of prk ramps. No AvGas or reciprocating eng oil avbl, fld maint [illegible]tc (OLAA MAINT) [illegible] 858-7163/6968, UHF 314.25; lctd W side of ADW. (113 TFW) DSN 858-4171, UHF 234.8 [illegible]ld E side of ADW. No tran maint avbl.
COMMUNICATIONS - SFA PTD - 122.85 372.2 ATIS - 113.1 251.05 FSS-LEESBURG DCA-DL-NOTAM ADW WASHINGTON APP CON - (R) (E) 124.0 269.0 TWR - (E) 118.4 289.6 GND CON - 121.8 275.8 WASHINGTON DEP CON - 125.65 391.1 CLNC DEL - 127.55 393.1 AFRES OPS - 143.8 351.2 COMD POST-(ANDREWS) - 141.55 378.1 PMSV: METRO - 344.6 A/G - See Global HF Systems listing in FIH.
NAVAIDS [illegible] (L) 113.1 ADW CH 78 38°48' [illegible]

SFA PTD

Figure 2-5

"SINGLE FREQUENCY APPROACH (SFA)": A service provided to single-piloted jet aircraft at night or in instrument conditions which allows the use of a single UHF frequency throughout approach to landing. If available and listed under the COMMUNICATIONS heading (Figure 2-5), it will be provided by ATC to the maximum extent that communications capability and traffic conditions will permit. If not available, frequency and Mode/Code shifts will be kept to a minimum below 2,500' AGL on approach.

NOTE

For purposes of providing this service, ATC treats any tandem-seated aircraft as if it were single-piloted.

T2C COMMUNICATIONS CAPABILITY: The T2C aircraft is only equipped for UHF communications. Any published frequency in a 200 or 300 series with four or five digits is usable. The T2C is not equipped for 100 series frequencies (VHF) or three-digit frequencies (MF).

"PILOT-TO-DISPATCHER (PTD)": If this service is available, it will be listed under the COMMUNICATIONS heading (Figure 2-5). The Dispatcher is located in the flight clearance center of Base Operations to file flight plans with ATC and handle routine non-control communications with pilots. The call sign at Air Force installations is "OPERATIONS", and the call sign at Naval installations is "BASE OPS".

EXAMPLES: "ANDREWS OPERATIONS"

"NAVY WASHINGTON BASE OPS"

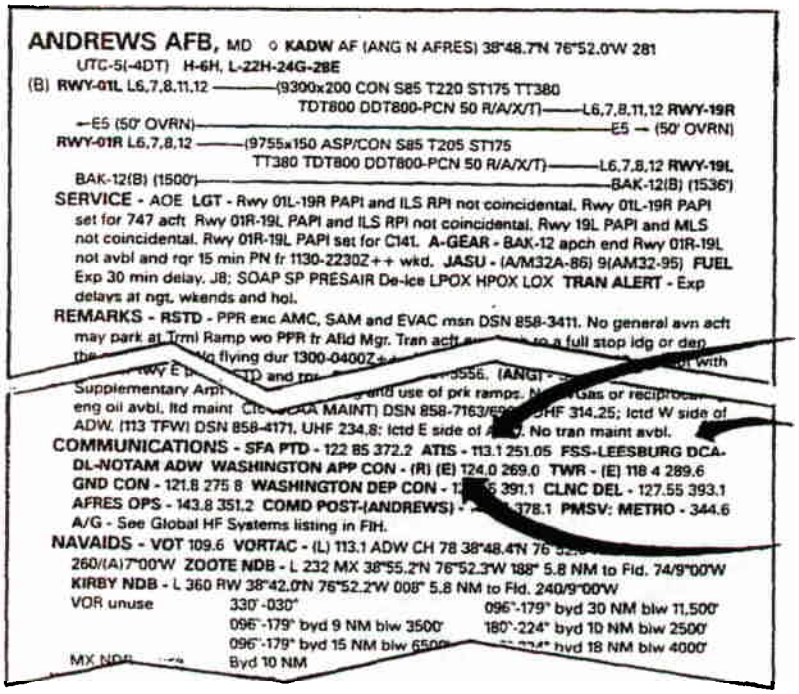


Figure 2-6

"AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)" (Figure 2-6): The continuous broadcast of routine, but essential, non-control information, such as weather, altimeter, runway in use, etc. Absence of a ceiling and visibility indicates at lest 5000' ceiling and 5 miles visibility exists. The primary purpose of ATIS is to reduce frequency congestion on Ground Control and Approach Control frequencies.

NOTE

The pilot statement "HAVE NUMBERS" does not indicate receipt of ATIS. Inform Ground Control for taxi or Approach Control on arrival that you "HAVE INFORMATION ALFA, BRAVO, etc." from the ATIS broadcast.

"TIE-IN FLIGHT SERVICE STATION" (Figure 2-6): A Tie-in Flight Service Station is tied in by direct telephone line (DL) to the Base Operations Dispatcher. It provides services to that airport such as relaying flight plans to ARTCC, relaying clearances back to the airport, providing NOTAM services, etc. It may or may not be located on the airport. All Flight Service Stations monitor UHF frequency 255.4 and the call sign is "RADIO".

EXAMPLE: "LEESBURG RADIO"

"APPROACH CONTROL" (Figure 2-6): Approach Control facilities, and their function Departure Control, are responsible for coordinating with Air Route Traffic Control Centers and Airport Traffic Control Towers for the control of IFR traffic between the enroute structure and the airport. Absence of a name indicates the same name as the airport.

If not under ATC control, Approach Control should be contacted on the appropriate designated frequency for practice approaches, etc. In some high density areas, specific Approach Control frequencies will be footnoted for use according to the geographical sector in which the aircraft is physically located (Figure 2-7), not according to aircraft heading.

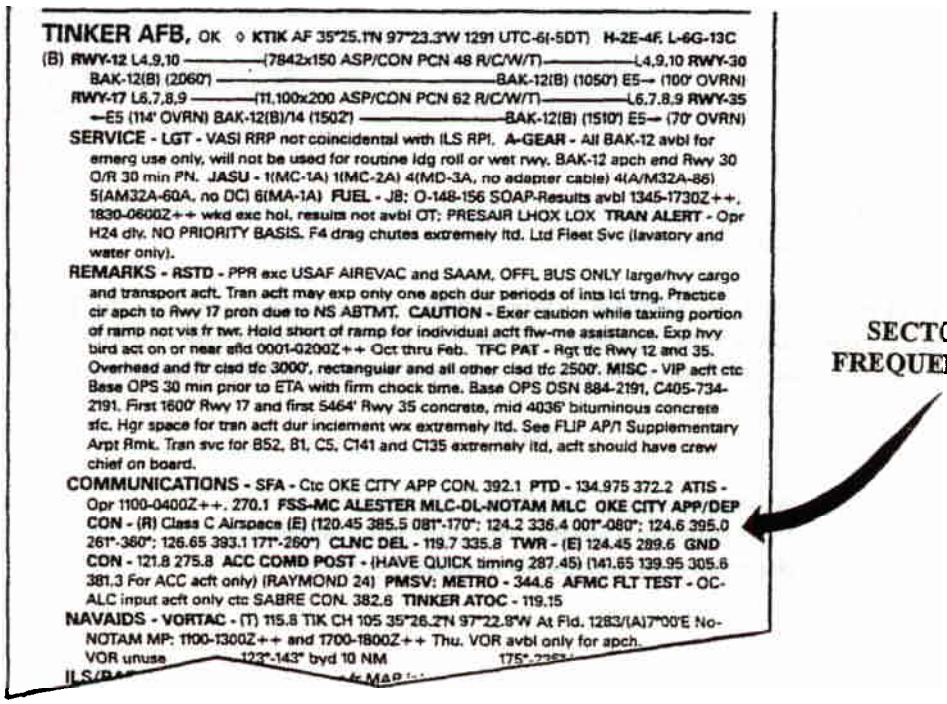


Figure 2-7

"DEPARTURE CONTROL" (Figure 2-8): A function of Approach Control, Departure Control is responsible for coordinating with Air Route Traffic Control Center and the Airport Traffic Control Tower for the safe and expeditious flow of IFR traffic from the airport to the enroute structure. Again, absence of a name indicates same name as the airport.

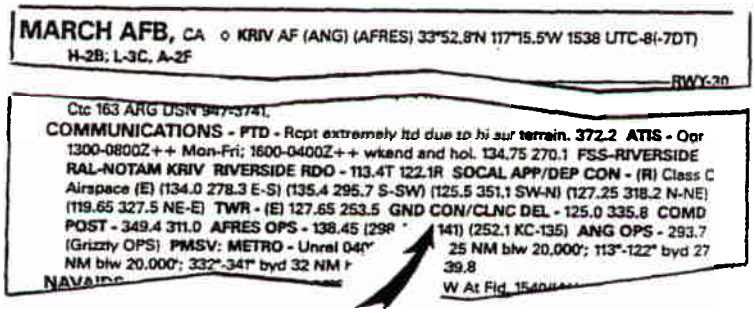
"CLEARANCE DELIVERY" (Figure 2-8): A special non-control branch of the Tower set up to relay clearances to pilots. Its purpose is to relieve frequency congestion on Tower and Ground Control frequencies. If available, it is the primary frequency for requesting an IFR clearance. If not available, an IFR clearance should be requested on Ground Control frequency.

NOTE

Some airports may use the same frequency for both Ground Control and Clearance Delivery; however, when calling for a clearance, call "CLEARANCE DELIVERY" to ensure the right personnel obtain and pass the clearance.

EXAMPLE:

SAME FREQUENCY



"GROUND CONTROL" (Figure 2-8): A control branch of the Air Traffic Control Tower, it is responsible for control of all traffic on the ground at the airport except on the active runway.

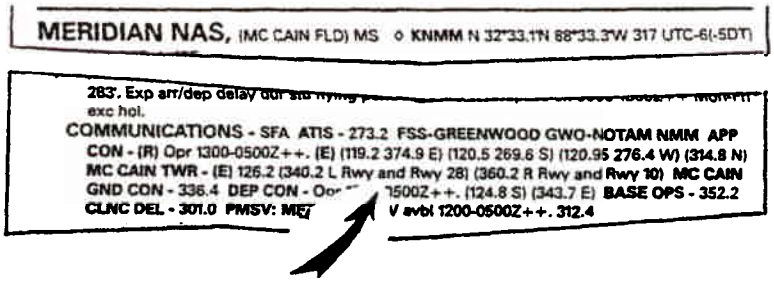
"AIRPORT TRAFFIC CONTROL TOWER" (Figure 2-8): At controlled airports, the Tower has control responsibility for traffic in its area. It coordinates with Approach/Departure Control for the safe and efficient flow of traffic into and out of that airspace area. Do not taxi onto or across an assigned runway without Tower approval.

NOTE

At some airports, the Tower frequencies may be footnoted for a special use, such as for arrival or departure, or for use on a specific runway.

EXAMPLE:

USE BY RUNWAY



"PILOT-TO-FORECSTER" (Figure 2-8): In the Weather Service Office at Base Operations, the forecaster has a radio. When flying in the local area, you can keep abreast of changing weather conditions, request an extension on your IFR Weather Briefing (DD Form 175-1) Void time, give PIREPs, or obtain various other weather services by calling the forecaster. The call Sign is "METRO".

EXAMPLE: "ANDREWS METRO"

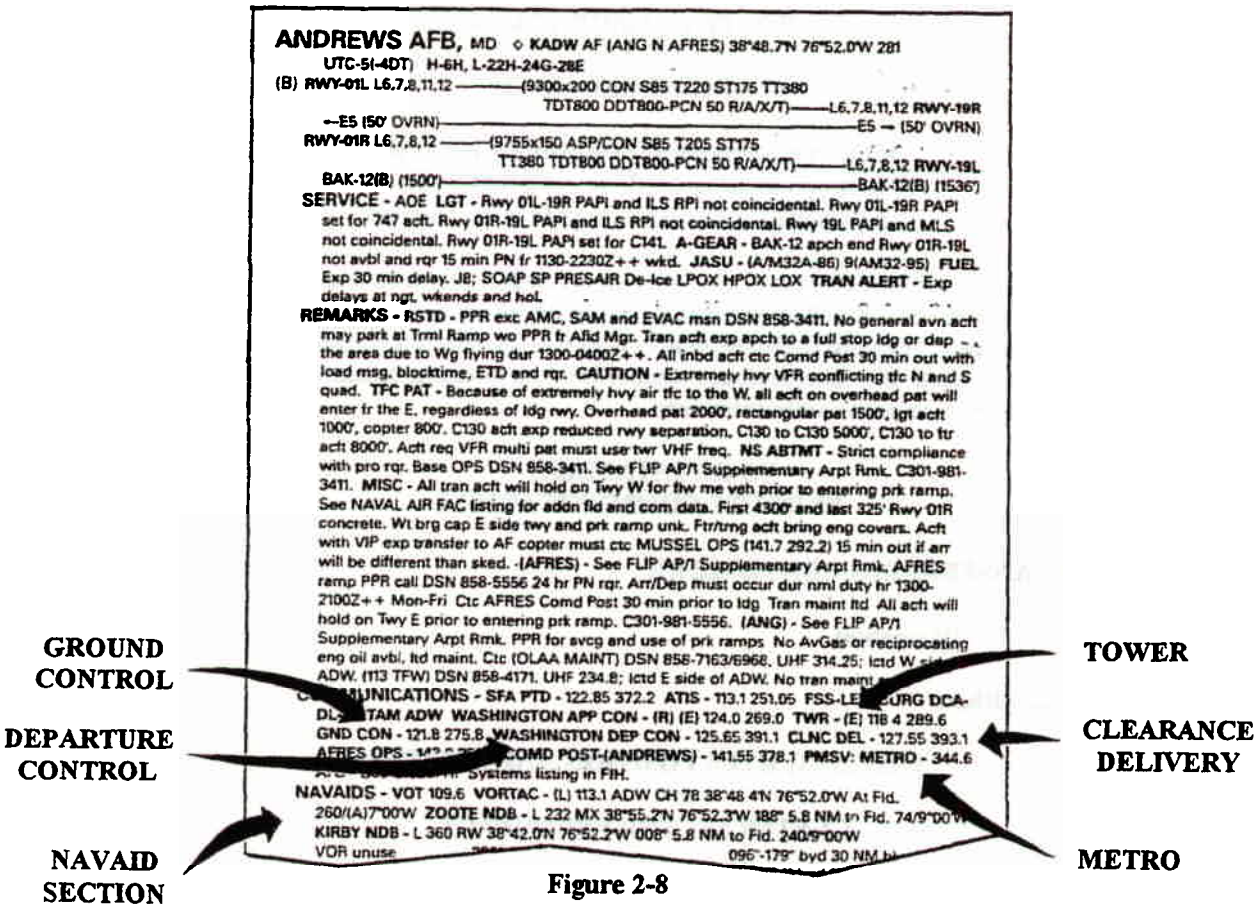


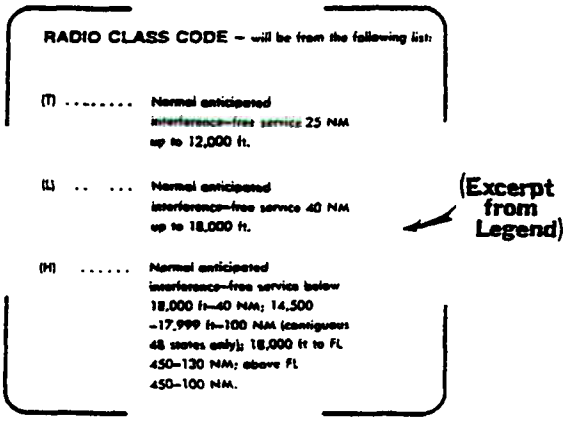
Figure 2-8

NAVAIDS

"CLASS CODES": The NAVAID section (Figure 2-8) lists all the NAVAIDs serving an airport, their locations in relation to the airport, their frequencies and channels, and their CLASS CODES. As depicted in Figure 2-9, the Class Code indicates interference free reception ranges for (T), (L), and (H) class NAVAIDs. When on a published Jet Route or a published "Feeder Route" on an Instrument Approach Procedure Chart, you are not concerned about distance; however, these ranges should not be exceeded for flight planning purposes:

1. On a "DIRECT" flight departure leg; or,
2. On enroute "DIRECT" flight legs.

Once inflight, ATC can vector an aircraft to exceed any distance if radar monitoring service is provided.



RADIO CLASS CODES

Figure 2-9

ENROUTE COMMUNICATIONS

(PROCEDURAL NOTE)

This enroute procedure requires the use of the IFR Supplement and will be reviewed again in the Enroute Procedures Chapter of the course.

There may be times when you will not be able to contact a new ARTCC controller on assigned frequency. This may occur for various reasons, such as weather conditions, being out of sector controller transmission range, or the controller not being on frequency. The latter situation may occur when you have been directed to contact a new controller at a certain fix or time on the clock. If you experience temporary loss of communications with ARTCC, there are certain steps you should follow to re-gain communications.

TO RE-ESTABLISH ENROUTE COMMUNICATIONS

1. **TRANSFERRING CONTROLLER**

(If unable)

2. **Either:**

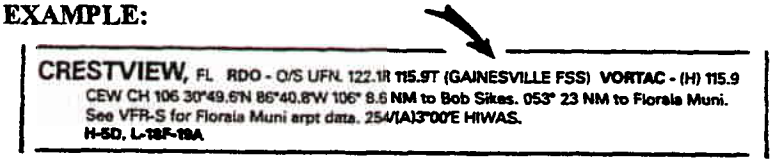
FSS (255.4) WITH POSITION AND ALTITUDE
or
CENTER SECTOR FREQUENCY

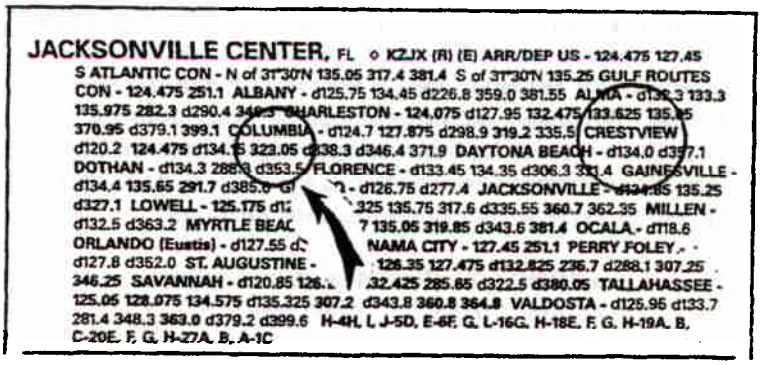
If unable to contact the transferring controller, you could obtain an ARTCC frequency from the FSS serving the area in which your aircraft is located by referencing the Enroute Chart and look up the nearest NAVAID, city, or airport in in the IFR Supplement.

You could bypass FSS, as tactical jet usually do, and go directly to *sector controller* frequency. This is found by looking up the ARTCC name in the Supplement, reference the Enroute Chart for the nearest NAVAID, city, or airport listed under the Center name, and use the first BOLD PRINT UHF frequency listed (Figure 2-10). If there is not a BOLD PRINT, then use a light print frequency.

ARTCC will not keep you on this frequency, but it willl be for initial contact to re-gain communications.

EXAMPLE:





ARTCC SECTOR FREQUENCIES

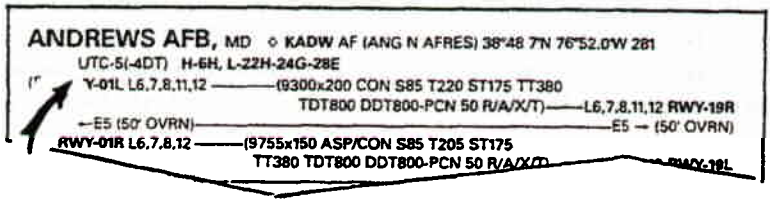
Figure 2-10

Not all airport entries are discussed in this chapter. You should be thoroughly familiar with all entries for your planned destination and alternate airports. The following are just some examples of entries which will vary from airport to airport.

EXAMPLE: TIME ZONES

CONVERSION AT ADW

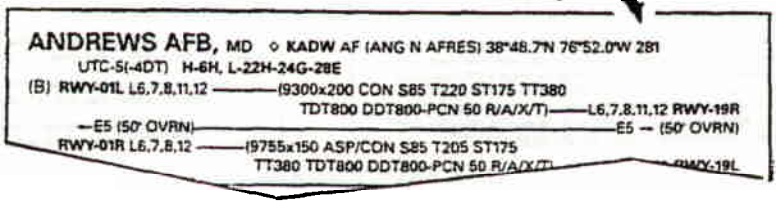
DAYLIGHT TIME
+ 4 HOURS
= Z TIME



STANDARD TIME
+ 5 HOURS
= Z TIME

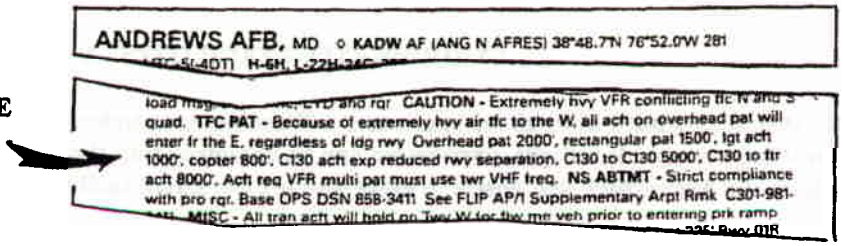
EXAMPLE: AIRPORT ELEVATION

AIRPORT
(HIGHEST ELEVATION ON
ANY LANDING SURFACE)



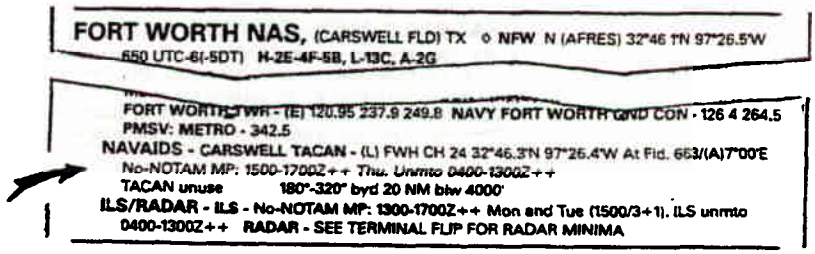
EXAMPLE: AIRPORT REMARKS

SPECIAL ARRIVAL/DEPARTURE
PROCEDURES, ETC.



EXAMPLE: NO-NOTAM PREVENTIVE MAINTENANCE FOR NON-PRECISION NAVAIDs

VORTACs AND ADF(NDBs)

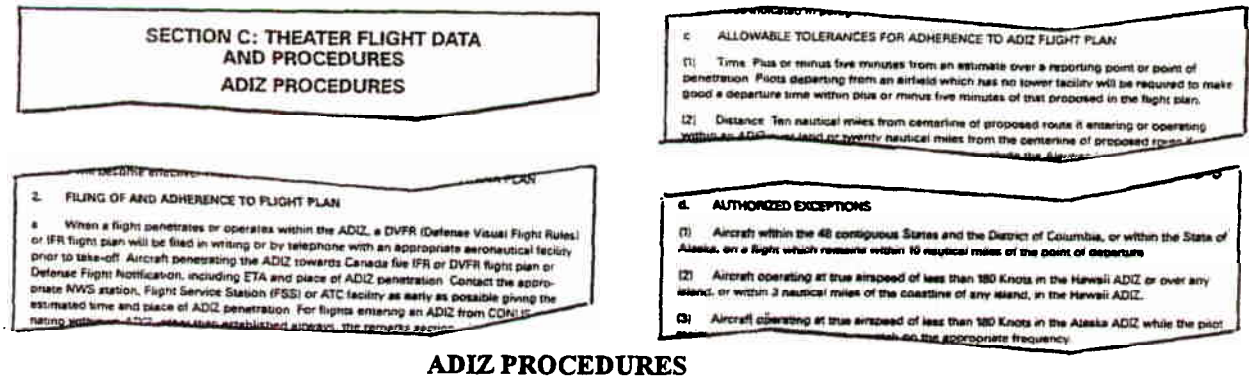


SECTION C: THEATER FLIGHT DATA AND PROCEDURES

This section contains flight data and procedures for entering certain segments of the airspace.

ADIZ PROCEDURES

You should be thoroughly familiar with ADIZ penetration procedures (Figure 2-11) prior to a fleet tour. This is controlled airspace surrounding the continental United States and Hawaii in which the ready location, identification and control of aircraft is required for national defense. There are certain estimating procedures you must follow and certain penetration tolerances of time, distance and altitude to which you must adhere to penetrate these zones.

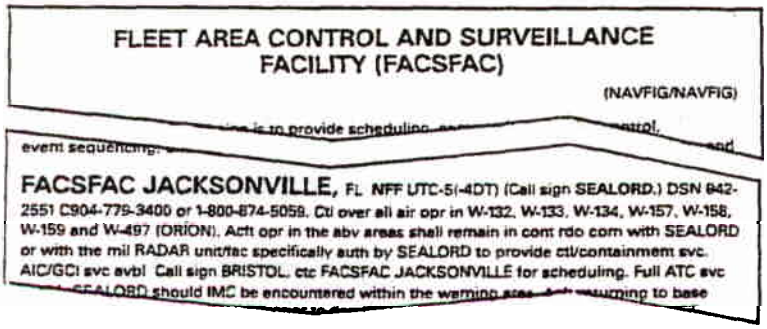


ADIZ PROCEDURES

Figure 2-11

COORDINATING FACILITIES - WARNING (W) AREAS

DOD states military aircraft will not enter a Warning Area unless prior permission is obtained from the using or controlling agency. If inflight, permission can be obtained from the coordinating facility listed in this section (Figure 2-12). Look up the Area which you desire to enter and use the stated facility call sign.



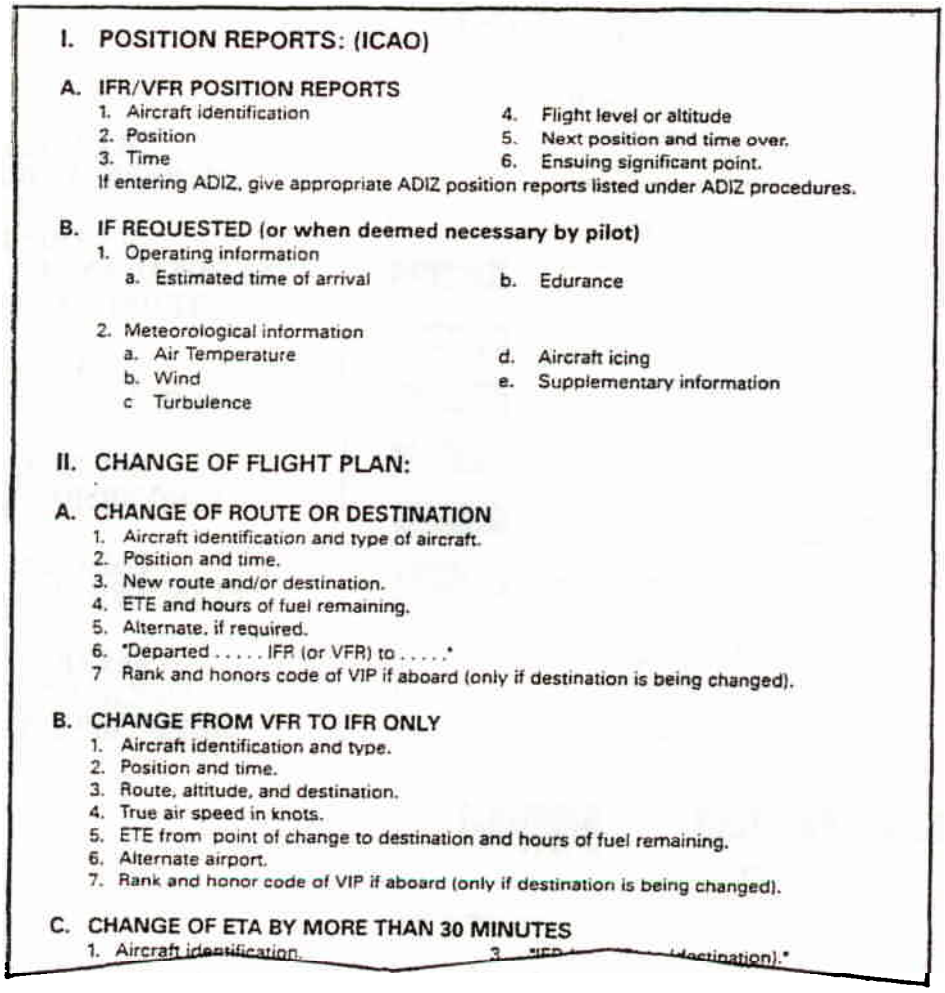
COORDINATING FACILITIES - WARNING (W) AREAS

Figure 2-12

VOICE PROCEDURE FORMATS

The back cover of the IFR Supplement (Figure 2-13) contains the voice procedure formats for:

* **POSITION REPORTS**
* **CHANGING FLIGHT PLANS INFLIGHT**
* **FILING FLIGHT PLANS INFLIGHT**



I. POSITION REPORTS: (ICAO)

A. IFR/VFR POSITION REPORTS
1. Aircraft identification
2. Position
3. Time
4. Flight level or altitude
5. Next position and time over.
6. Ensuing significant point.

If entering ADIZ, give appropriate ADIZ position reports listed under ADIZ procedures.

B. IF REQUESTED (or when deemed necessary by pilot)
1. Operating information
   a. Estimated time of arrival
   b. Edurance
2. Meteorological information
   a. Air Temperature
   b. Wind
   c Turbulence
   d. Aircraft icing
   e. Supplementary information

II. CHANGE OF FLIGHT PLAN:

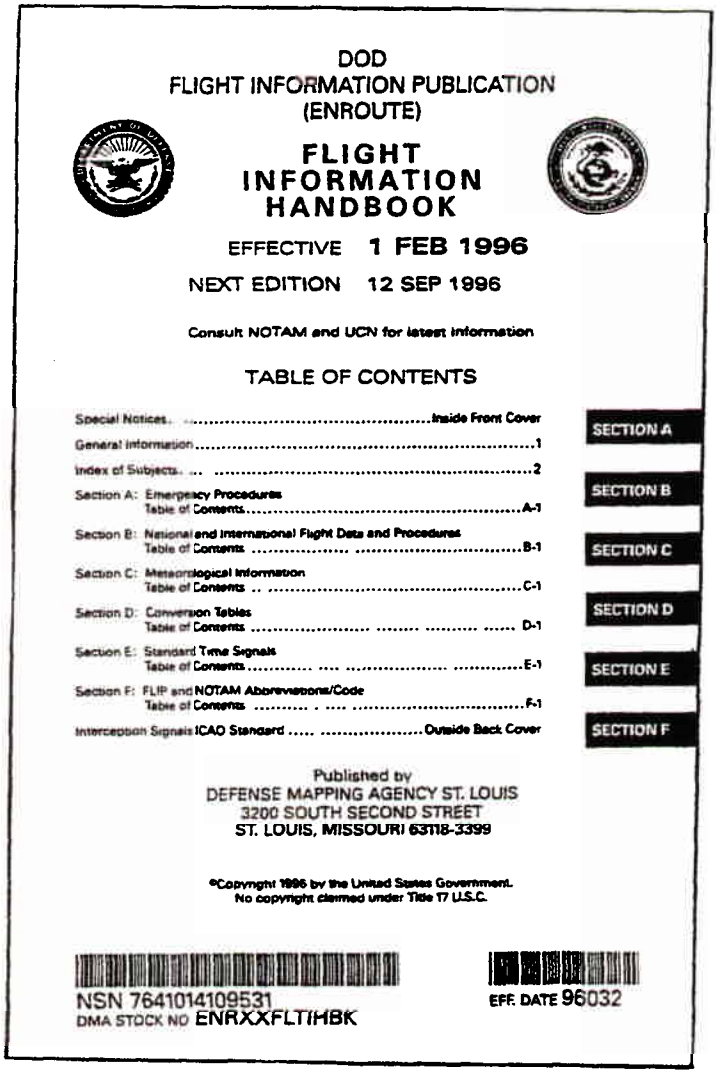
A. CHANGE OF ROUTE OR DESTINATION
1. Aircraft identification and type of aircraft.
2. Position and time.
3. New route and/or destination.
4. ETE and hours of fuel remaining.
5. Alternate, if required.
6. "Departed . . . . . IFR (or VFR) to . . . . ."
7 Rank and honors code of VIP if aboard (only if destination is being changed).

B. CHANGE FROM VFR TO IFR ONLY
1. Aircraft identification and type.
2. Position and time.
3. Route, altitude, and destination.
4. True air speed in knots.
5. ETE from point of change to destination and hours of fuel remaining.
6. Alternate airport.
7. Rank and honor code of VIP if aboard (only if destination is being changed).

C. CHANGE OF ETA BY MORE THAN 30 MINUTES
1. Aircraft identification.

VOICE PROCEDURE FORMATS
Figure 2-13

FLIP (ENROUTE) FLIGHT INFORMATION HANDBOOK



DOD
FLIGHT INFORMATION PUBLICATION
(ENROUTE)

FLIGHT INFORMATION HANDBOOK

EFFECTIVE 1 FEB 1996

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Consult NOTAM and UCN for latest information

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FLIP AND NOTAM ABBREVIATIONS/CODES

Designed for worldwide use, the Flight Information Handbook is issued to coincide with the issue of the worldwide FLIP General Planning (GP), and is used in conjunction with the appropriate theater IFR Supplement. It contains specific pilot procedures to be followed in all parts of the world under both normal and emergency operating conditions.

NOTE

The procedures contained in the Handbook will not be discussed in this chapter of the course. Rather, specific pilot procedures will be discussed as they apply to each specific phase of flight, that is, departure, enroute, and arrival phases of flight.

ENROUTE
HIGH ALTITUDE CHARTS

ENABLING OBJECTIVE: Demonstrate a working knowledge of the Enroute High Altitude Charts - U.S. and their contents.

SPECIFIC OBJECTIVES:

3.1 State the standard units of measurement used on the Charts for altitudes, mileages, radials/bearings, and time.

3.2 Select proper cruising altitudes/FLs when given the Magnetic Course of flight.

3.3 Determine the applicable MEA/MAA for Jet Route segments.

3.4 Identify airport types as being Civil, Joint Civil-Military, or Military.

3.5 State the specific criteria for airports to be depicted on the Enroute High Altitude Charts.

3.6 Interpret identification and communication information for Radio Aids to Navigation/Flight Service Stations.

3.7 Determine distances by referring to mileage indicators on the route segments, or by direct measurement using the NM scales.

3.8 Identify "Compulsory Reporting Points".

3.9 State the three types of TACAN Channel changeover points (COPs).

3.10 Determine flight routes using Jet Route identifiers.

3.11 State the purpose of Preferred Single-Direction Jet Routes.

3.12 State the condition for a NAVAID to be part of a Jet Route segment.

3.13 Identify boundaries of Air Route Traffic Control Centers (ARTCCs).

3.14 Determine the applicable Magnetic Variation and Standard Time Zone information for preflight planning in a particular area.

3.15 Extract specific information on Special Use Airspace.

INTRODUCTION

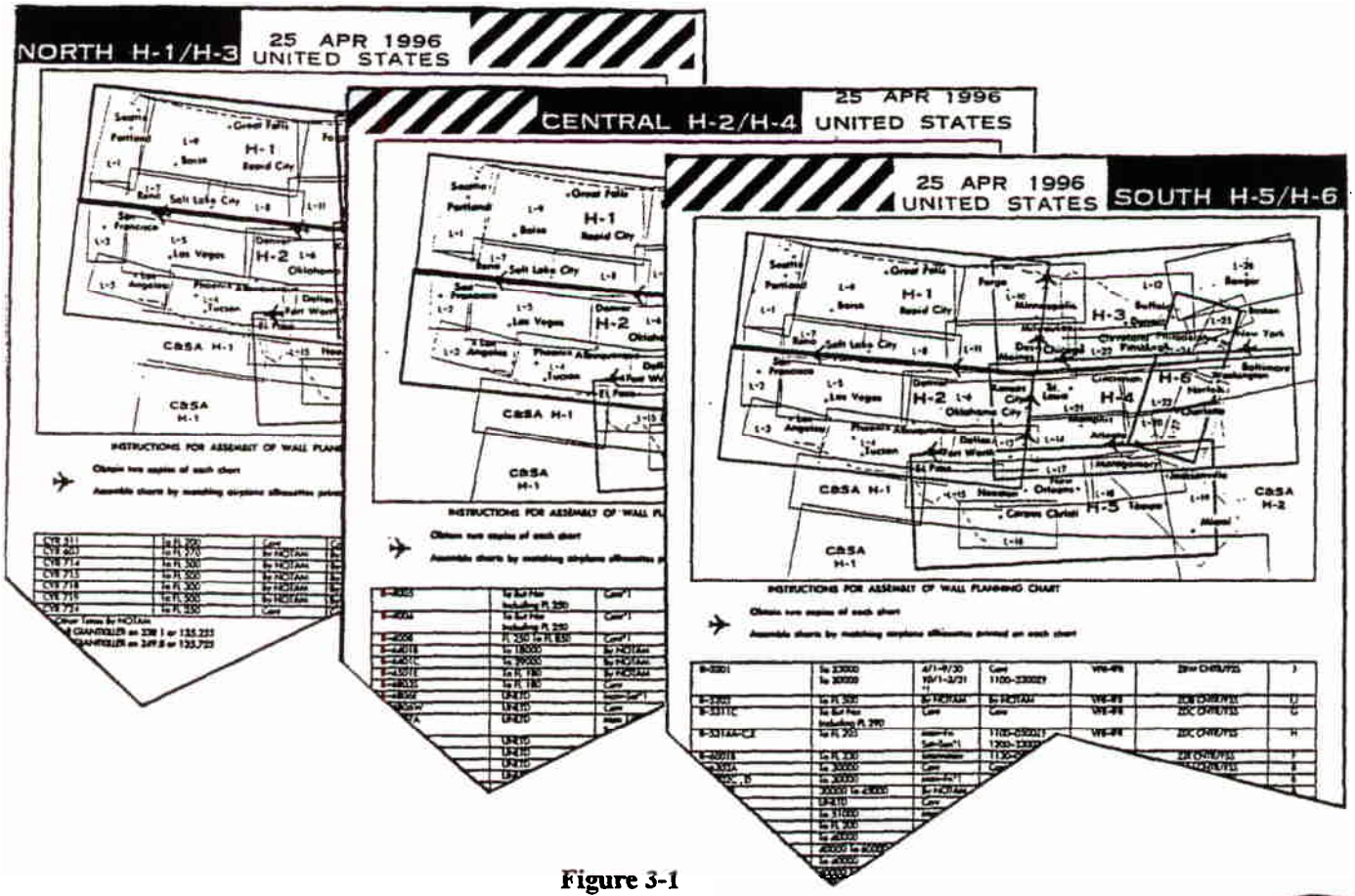


Figure 3-1

There are six (6) High Altitude Charts on three (3) sheets designated as NORTH, SOUTH and CENTRAL (Figure 3-1) which cover the Jet Route System, 18,000' MSL through FL 450.

Never conduct IFR operations with an invalid Chart, since the FAA makes necessary changes to the Jet Routes at 0901Z every 56 days (Figure 3-2).

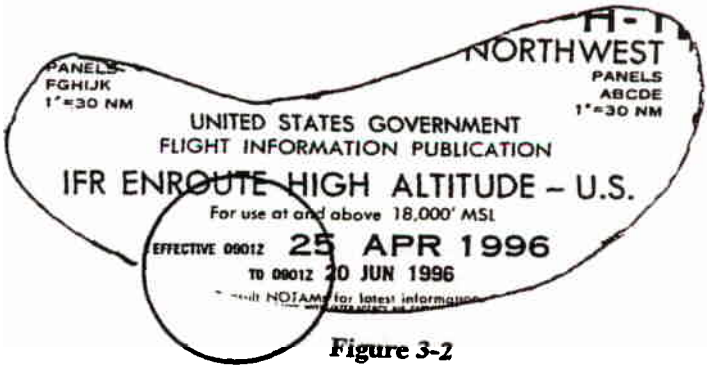


Figure 3-2

NOTE

Since the T2C is "TACAN ONLY" and has only one UHF radio for communications, disregard all information on the Charts pertaining to ILS, VOR, Low Frequency Radio Beacons, and VHF frequencies.

Each of the Chart sheets has a LEGEND (Figure 3-3), which is divided into four (4) sections:

1. **Airports.**
2. **Air Traffic Services.**
3. **Radio Aids to Navigation.**
4. **Special Use Airspace.**

Standard units of measurement provide for direct use of the Charts in the aircraft:

* **Altitudes - MSL.**
* **Mileages - Nautical.**
* **Radials/Bearings - Magnetic.**
* **Times - UTC (Z).**
* **Days - Local.**

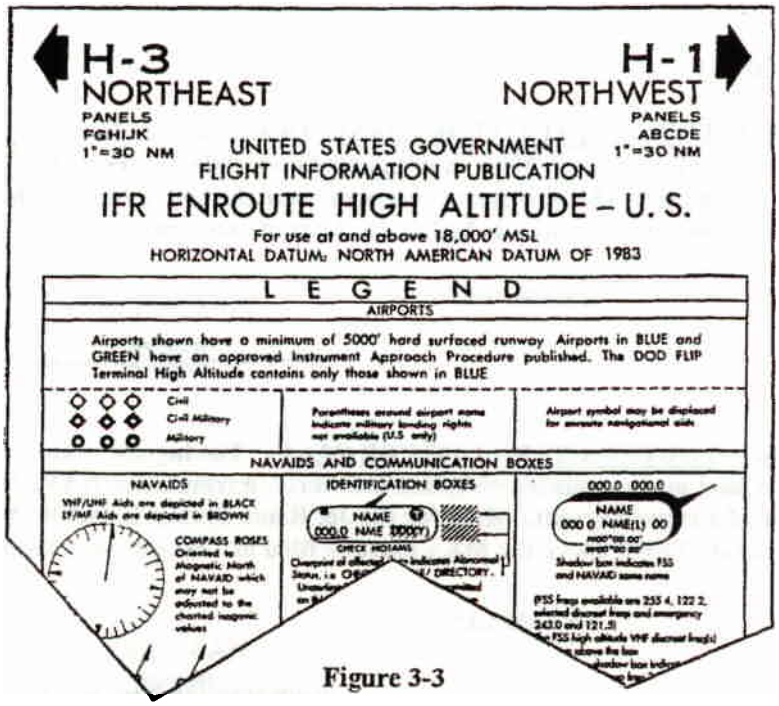


Figure 3-3

APPLICATION

CRUISING ALTITUDE FOR FLIGHT PLAN

Always consult the Chart for your planned route of flight and determine the highest Minimum Enroute Altitude (MEA) and the lowest Maximum Authorized Altitude (MAA) for the entire planned route. Then using the International Hemispheric Cruising Rule Legend (Figure 3-4), file at or above the highest MEA and at or below the lowest MAA.

VFR cruising rules are depicted above 18,000' since these are International Cruising Rules; however, as noted on the Legend, VFR flight is not allowed above 18,000' (Class A Airspace) within the United States.

For an IFR flight, the cruising rules are:

* **Below FL 290:**

  East - odd thousands.
  West - even thousands.

* **Above FL 290:**

  East - 4000' intervals beginning FL 290.
  West - 4000' intervals beginning FL 310.

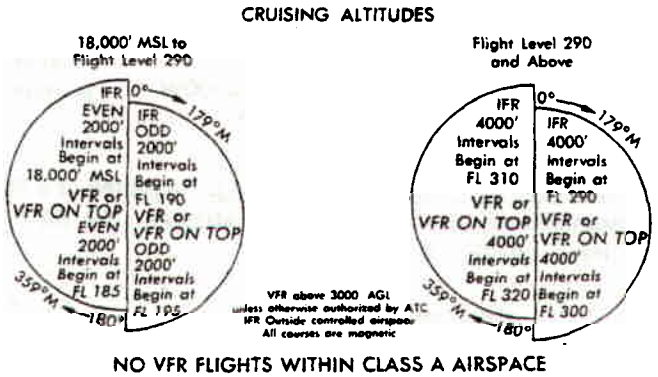
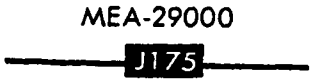


Figure 3-4

MEA AND MAA

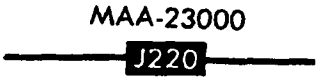
MINIMUM ENROUTE ALTITUDE (MEA): An established altitude along a route segment which provides at least 1000' obstruction clearance, 2000' in designated mountainous areas, over all obstructions and in most areas, guarantees adequate NAVAID signal reception over the entire route segment. MEA for the Jet Route System is 18,000' MSL unless designated as higher on the route segment.

EXAMPLE:



MAXIMUM AUTHORIZED ALTITUDE (MAA): The highest usable altitude along a route segment. Above this altitude, a pilot may encounter reception interference from other NAVAIDs and not be able to determine the centerline of a route segment. MAA for the Jet Route System is 45,000' MSL unless designated as lower on the route segment. Flight above the MAA must be filed as "Direct" on a flight plan, not along a specified Jet Route.

EXAMPLE:

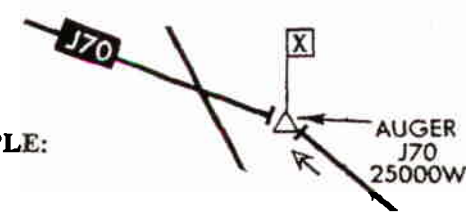


MCA AND MRA

Two other terms which are occasionally necessary on High Altitude Enroute Charts are MINIMUM CROSSING ALTITUDE (MCA) and MINIMUM RECEPTION ALTITUDE (MRA).

MINIMUM CROSSING ALTITUDE (MCA): The lowest MSL altitude at which a fix must be crossed when proceeding in the direction of a higher Minimum Enroute Altitude. MCA is depicted by a flag containing an "X", along with the Jet Route identifier, the crossing altitude, and the direction of flight to which the crossing altitude applies. Climb must be commenced in order to cross the fix at or above the crossing altitude and climb continued to the MEA for that segment.

EXAMPLE:

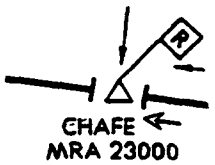


CAUTION

Climb must be commenced early for obstruction clearance and/or NAVAID signal reception purposes.

MINIMUM RECEPTION ALTITUDE (MRA): Depicted at a NAVAID or intersection by a flag containing an "R" along with the minimum altitude, It is not a crossing altitude. It is the lowest MSL altitude at which adequate NAVAID signals can be received to determine that specified fix.

EXAMPLE:



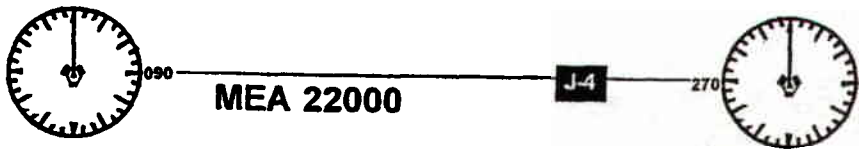
(VERY SELDOM NECESSARY ON HIGH ALTITUDE CHARTS)

ROUTE SEGMENTS

A route "SEGMENT" may extend:

1. Between NAVAIDs

GRAPHIC EXAMPLE:

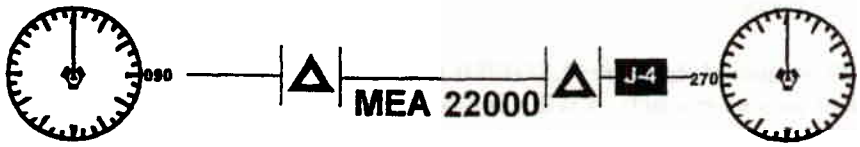


2. Between a NAVAID and an ENDPOINT, which is a DME fix depicted by a vertical black line across the Jet Route (normally an intersection)

GRAPHIC EXAMPLE:

3. Between two ENDPOINTS

GRAPHIC EXAMPLE:



Unless designated as a MINIMUM CROSSING ALTITUDE (MCA), climbs and descents are commenced where a route segment begins or terminates with obstruction clearance based on standard climb rates.

Should you experience radio communications failure enroute, you should fly the highest of the following for each route segment:

1. Your last assigned altitude.
2. The exact MEA.
3. The "Expected Higher Altitude" if a specific altitude at a specific time or fix was given.

NOTE

You file a flight plan using the hemispheric cruising rules, but if you should have radio failure and have not been cleared above the MEA, you fly the EXACT MEA regardless of flight direction.

CHART H-6

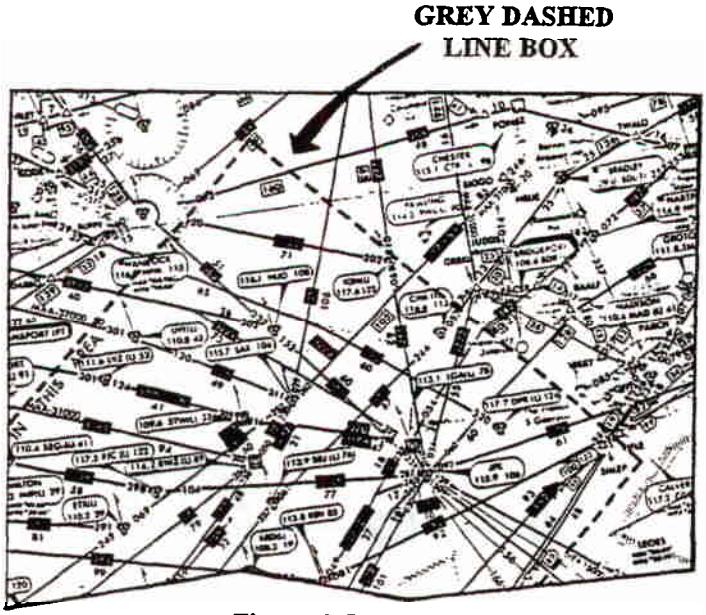


Figure 3-5

Charts H-3 and H-4 contain a grey dashed line box (Figure 3-5). The area inside this box contains essential information for navigation; however, no detailed information is depicted, such as airport symbols, compass roses, distance boxes, etc. For detailed information in this area, refer to Chart H-6 (Figure 3-6), which is depiction of most of the East coast. It overlaps the other Charts and has a different scale.

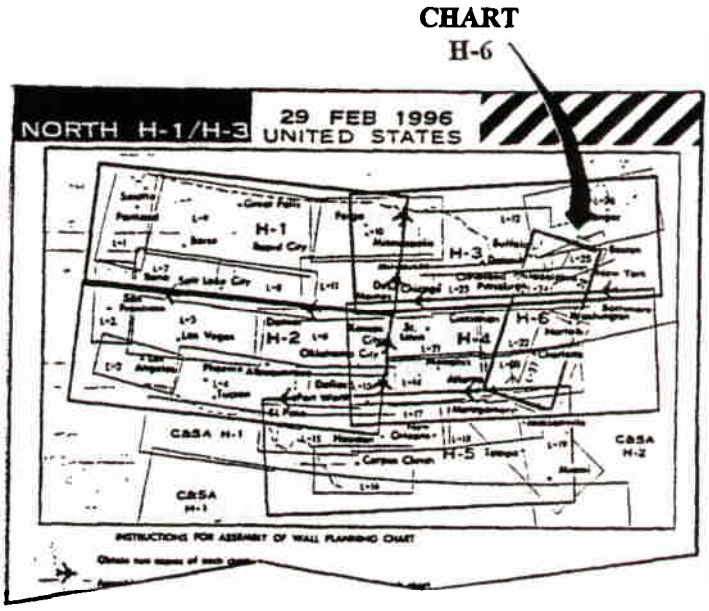


Figure 3-6

AIRPORT DEPICTIONS

The AIRPORT section of the Chart LEGEND (Figure 3-7) depicts the type of airport symbols - Civil, Civil-Military joint use, and Military. All airports depicted on the Charts must have at least 5000' of hard-surfaced runway.

The Charts have a color code of BROWN, GREEN and BLUE. Airport symbols in BROWN indicate VFR airports, that is, they do not have an Instrument Approach Procedure. Airports depicted in GREEN and BLUE do have Instrument Approach Procdures; however, the FLIP (Terminal) High Altitude Instrument Approach Procedure booklets contain approaches only for those airports depicted by BLUE symbols.

Figure 3-7

MILITARY LANDING RIGHTS

In accordance with current airport legislation, airports which use federal funds for expansion, construction or development must be available to military aircraft without monetary charges. These are the "P" fields listed in the IFR Supplement (Figure 3-8). If it is not a "P" field, the name of the airport will be depicted in parentheses on the Enroute Chart indicating no military landing rights. To use an airport which has no military landing rights, prior coordination must be conducted with airport authorities, and that airport may still charge landing/handling/servicing fees.

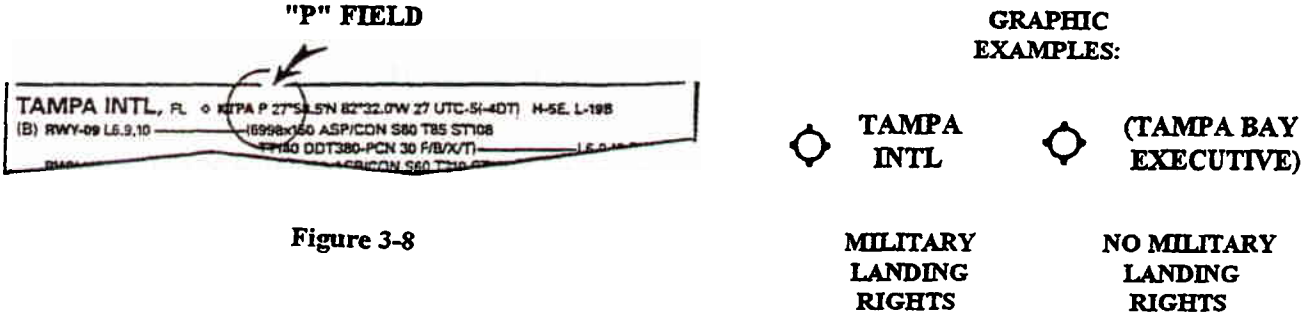
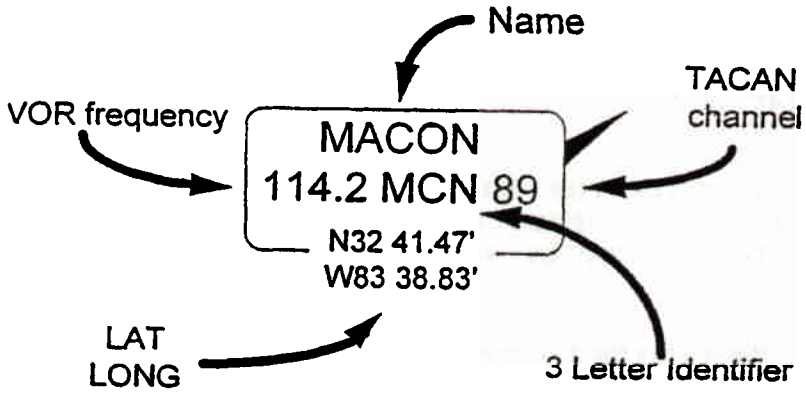


Figure 3-8

NAVAID AND COMMUNICATION BOXES

NAVAID Communication boxes, such as the graphic depiction in Figure 3-9, contain VOR, TACAN, and Radio Beacon data along with geographical coordinates for use with certain types of navigation equipment.

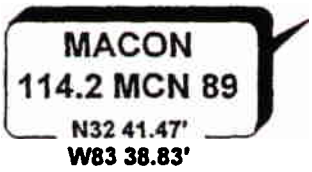


NAVAID COMMUNICATION BOX

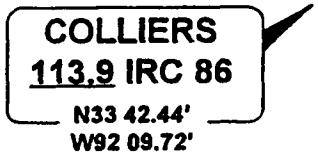
Figure 3-9

Pilots use Flight Service Stations (FSS) to pass messages, file/change flight plans, obtain weather conditions, obtain frequencies, etc. If a NAVAID Communication Box has a shadowed outline, the Flight Service Station serving that general area has the same name as the NAVAID. If the communication data is contained in a thin line box, there is no Flight Service Station by that NAVAID name. The FSS serving that general area is located by referencing the NAVAID name in the IFR Supplement.

GRAPHIC EXAMPLES:



SHADOWED BOX: FSS SAME NAME AS NAVAID - "MACON RADIO"



THIN LINE BOX: NO FSS BY NAVAID NAME. REFERENCE NAVAID NAME IN SUPPLEMENT FOR APPROPRIATE FSS.

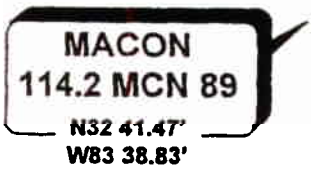
NAVAID COMMUNICATIONS

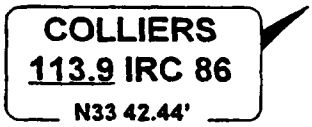
All VOR and Radio Beacon facilities have voice capability unless the frequency is underlined. Underline indicates no voice capability. TACAN facilities are without voice capability, but are not underlined.

REMINDER

The T2C only has UHF capability, that is, published frequencies in 200 or 300 series containing four or five digits. Three digit frequencies (MF) and 100 series frequencies (VHF) are unusable.

GRAPHIC EXAMPLES:





VOR - VOICE CAPABILITY
TACAN - NO VOICE CAPABILITY

VOR - NO VOICE CAPABILITY (FREQUENCY UNDERLINED)
TACAN - NO VOICE CAPABILITY

RADIO BEACON - VOICE CAPABILITY

The AN/ARR-40 Auxiliary UHF Receiver in the T2C provides direction finding and communication reception (no transmit capability) on twenty (20) preset channels between frequencies 265.0 and 284.9. If you should experience UHF radio failure enroute, you can monitor certain Airport Traffic Control Tower and Approach Control frequencies and receive ATIS information when you arrive in your terminal area on the Auxiliary UHF Receiver. Subtracting sixty-four (64) from the second and third digits of the UHF frequency will indicate the preset reception channel to select on the AN/ARR-40. The ATIS frequency and UHF Radio Beacon (if one is available) will normally be the same frequency.

EXAMPLES:

273.2	379.75	253.5	
- 64	- 64	- 64	
9	15	-9	(NOT usable)

DISTANCE (Figure 3-10)

Distance boxes depicted on Jet Routes display total distance between NAVAIDs and/or between compulsory reporting points.

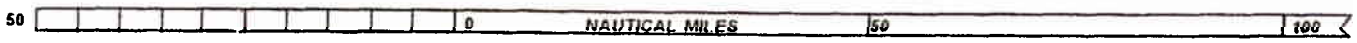
NOTE

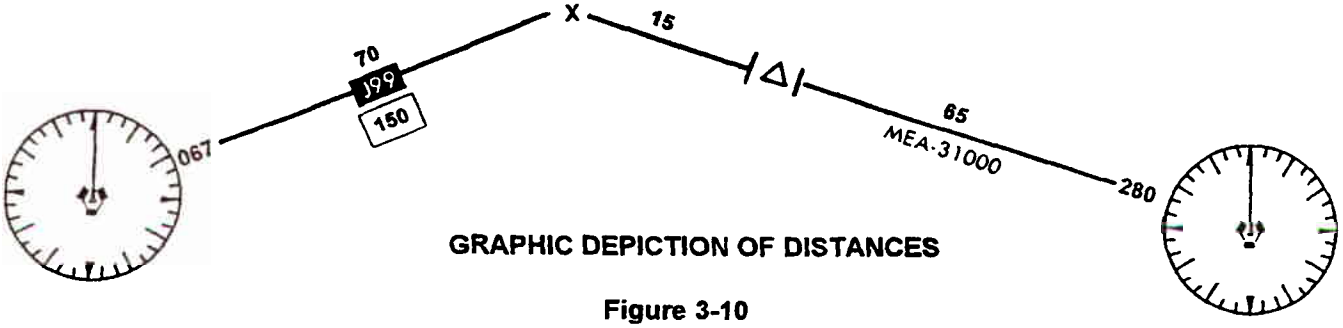
"Compulsory Reporting Points" by definition are solid triangles on the Chart or the end point of a direct leg. Except for ATC boundaries of control over international waters, all solid triangles have been eliminated from Enroute U.S. Charts.

"Direct" leg distance can be determined by using a straight edge, marking off the distance, and applying the marked off distance to the convenient 250 NM scale at the top or bottom of the Chart. Note that the additional 50 NM scale is divided into five (5) mile increments.

Distances which are not enclosed in boxes and depicted along Jet Routes indicate distance between intersections, "dogleg" points, or termination points of MEAs and MAAs.

DISTANCE SCALE AT TOP AND BOTTOM OF CHART





GRAPHIC DEPICTION OF DISTANCES

Figure 3-10

CHANGEOVER POINTS (COPs)

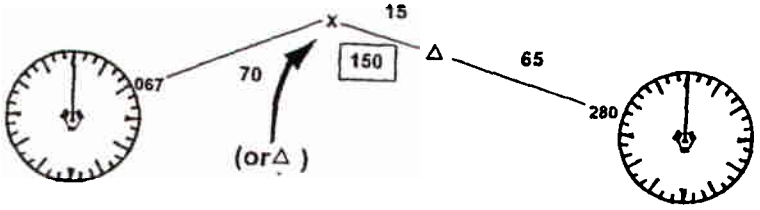
To ensure all pilots fly the centerline of Jet Routes and achieve maximum navigational signal reception, there are three (3) types of definite changeover points (COPs) prescribed by the FARs where pilots should change TACAN Channels and reset their Course Selector to the inbound course for the next NAVAID along each route segment.

1. On a relatively straight leg, change half-way, which is the point of equal signal strength between NAVAIDs.

GRAPHIC EXAMPLE:

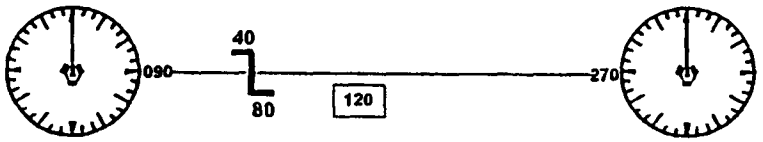
2. Where the Jet Route takes a significant turn, change at the point of turn. This may be depicted by the letter "X", or it may just be an intersection symbol where the turn is obvious.

GRAPHIC EXAMPLE:



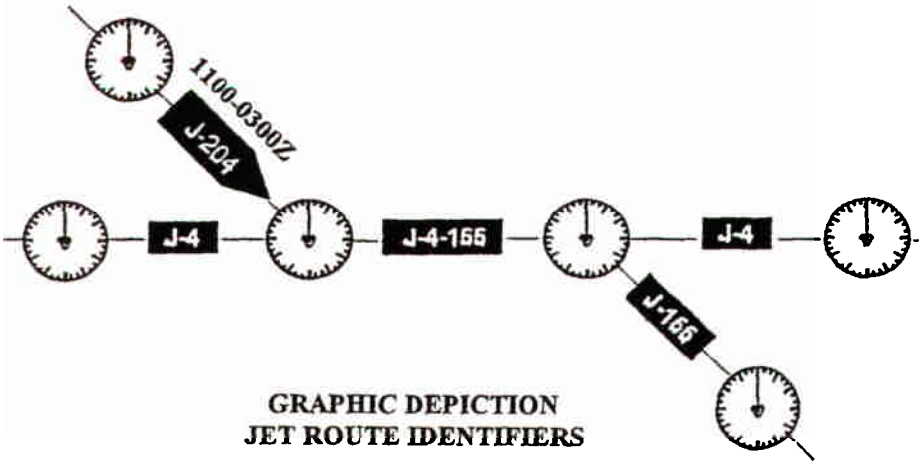
3. If the point of equal signal strength is not half-way between NAVAIDS, such as in mountainous areas, a designated VORTAC DME Changeover Point will be depicted. The barb will point to the facility to which the DME applies.

GRAPHIC EXAMPLE:



JET ROUTE DESIGNATIONS (Figure 3-11)

Many times, the paths of two or more Jet Routes will coincide on the Chart along a segment with the "J" being printed only once. Always file for whichever of these Jet Routes that extends farthest along the planned profile of flight. Preferred single-direction Jet Routes are established for an orderly and expeditious flow of traffic during peak traffic periods and/or in high density areas of the country. Those Jet Routes should be filed only for the indicated direction of flight during the effective hours indicated adjacent to the Jet Route identifier.



GRAPHIC DEPICTION
JET ROUTE IDENTIFIERS

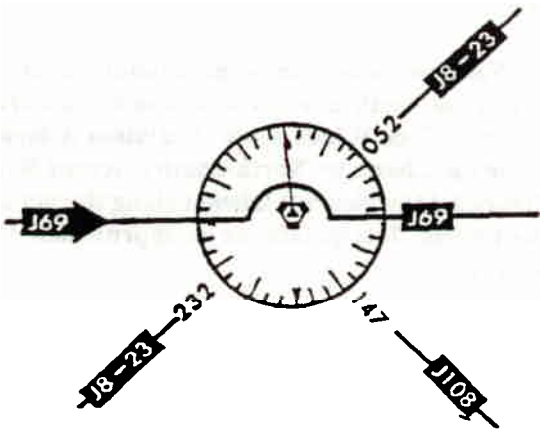
Figure 3-11

NAVAID NOT PART OF JET ROUTE

Jet Routes, unlike Low Altitude Airways, have no defined width. Their centerlines terminate at the outer edges of the NAVAID compass roses. A Jet Route depicted as extending through a compass rose around a NAVAID indicates the NAVAID is not a part of that Jet Route. It is not used for navigation along the penetrating Jet Route and would not be listed in the ROUTE-OF-FLIGHT section of a flight plan unless filing "DIRECT" to that NAVAID. For a NAVAID to be part of a designated Jet Route segment, there must be a course depicted on <u>both sides</u> of the compass rose, or the Jet Route terminates at the compass rose.

GRAPHIC EXAMPLE:

- *** NOT PART OF J69 (ROUTE EXTENDS THROUGH THE COMPASS ROSE)**
- *** PART OF J8-23 (COURSE DEPICTED ON BOTH SIDES OF COMPASS ROSE)**
- *** PART OF J108 (ROUTE TERMINATES AT EDGE OF COMPASS ROSE)**



NOTE OF CAUTION

Those NAVAIDs with compass roses are <u>enroute NAVAIDs</u> used to define the Jet Routes and are <u>not associated with any airport</u>. An airport may or may not utilize that NAVAID, but always refer to the Instrument Approach Procedure Charts to determine the appropriate NAVAID for an Instrument Approach - DO NOT USE A NAVAID DEPICTED ON THE ENROUTE CHART.

EXAMPLE (Figure 3-12): On the Enroute Charts, MERIDIAN VORTAC Channel 117 is used to define the Jet Routes; whereas, NAS MERIDIAN uses TACAN Channel 56 for Instrument Approach Procedures and it is not depicted on the Enroute Charts. This can be extremely critical in mountainous areas.

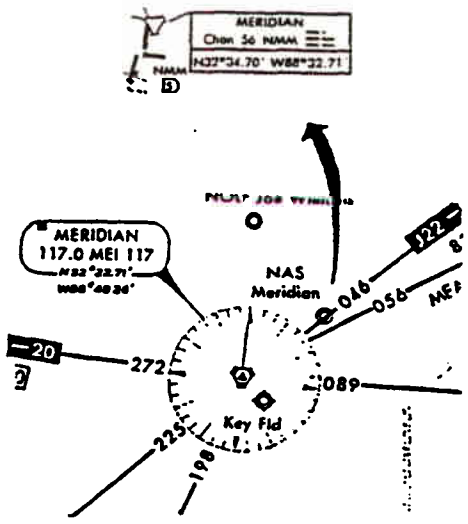
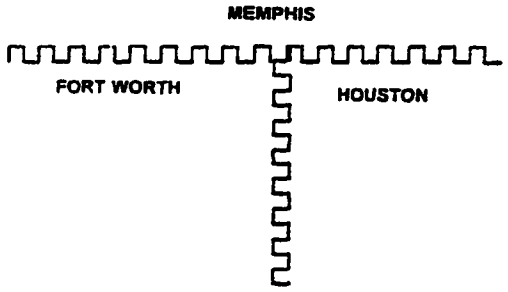


Figure 3-12

AIR ROUTE TRAFFIC CONTROL CENTERS

While proceeding on the enroute portion of an IFR flight plan, you will be directed to change Air Route Traffic Control Center frequencies as you proceed from sector to sector and from Center to Center areas of responsibility. The boundaries for ARTCC areas of responsibility are depicted on Charts by JAGGED BLUE LINES (Figure 3-13).

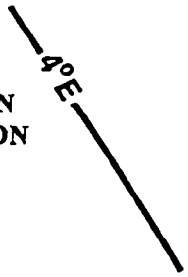


GRAPHIC DEPICTION
ARTCC AREA BOUNDARIES

Figure 3-13

MAGNETIC VARIATION

Magnetic Variation is used in flight planning to align the Flight Computer to True North in order to obtain an aaccurate groundspeed from the forecast True Winds Aloft. Variation is depicted every four (4) degrees on the Charts by North-South oriented SOLID GREEN LINES (Figure 3-14) which are labeled along the top and/or bottom edges of the Charts. Interpolate for an approximate Variation in a particular area.

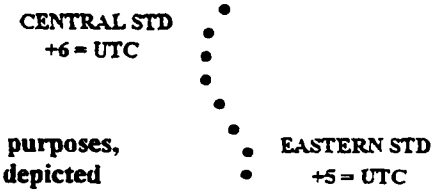


GRAPHIC DEPICTION
MAGNETIC VARIATION

Figure 3-14

TIME ZONES

For flight information purposes, Official Time Zones are depicted on the Charts by North-South oriented DOTTED GREEN LINES (Figure 3-15) to enable conversion between local and UTC (Z) time.



GRAPHIC DEPICTION
TIME ZONES

Figure 3-15

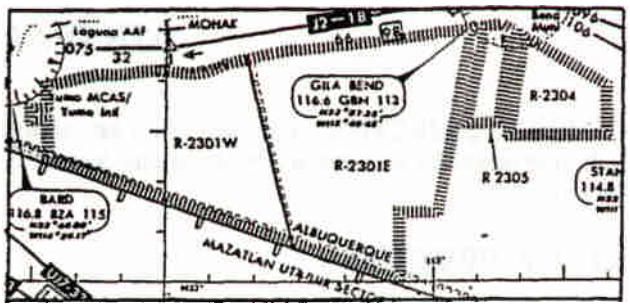
SPECIAL USE AIRSPACE

Airspace depicted in WHITE signifies CONTROLLED AIRSPACE, and airspace depicted in BROWN shade signifies UNCONTROLLED AIRSPACE. The only uncontrolled airspace on High Altitude Charts are Prohibited (P) Areas, some Warning (W) Areas, and some Restricted (R) Areas - which are of two types:

1. "Joint Use" Restricted Areas are controlled airspace. Permission to enter these areas can be obtained while inflight directly from the appropriate Air Route Traffic Control Center (ARTCC); and,

2. "Non-Joint Use" Restricted Areas are uncontrolled airspace, however, they are not depicted in BROWN shade. These areas are without communications support and depicted on the Chart Legend Panels by the letters "NO A/G" next to the Restricted Area number. Permission to enter these areas must be obtained from the Using Agency prior to flight. The Using Agency will be listed in FLIP Planning, Section AP/1A.

Pertinent information concerning Special Use Airspace will be found on the outside panels of the Charts (Figure 3-16).



NUMBER	EFFECTIVE ALTITUDE	TIMES USED, UTC DAYS	HOURS	WEATHER	CONTROLLING AGENCY A/G CALL	PANEL LOCATION
R-2301S	To FL 800	Intermittent	Intermittent	VFR-IFR	ZAB CNTR/FSS	H
R-2301W	To FL 800	Cont	Cont	VFR-IFR	ZLB CNTR/FSS	H
R-2303B	To FL 450	Mon-Sat *1	1400-2300Z	VFR-IFR	ZAB CNTR/FSS	H
R-2304	To FL 240	Cont *1	1400-0500Z			H
	To FL 240	Cont *1				
R-2515				VFR-IFR	ZLA CNTR/FSS	
R-2516	UNLTD		Cont	VFR-IFR	NO A/G	G
R-2517	UNLTD	Cont	Cont	VFR-IFR	NO A/G	G
R-2519	UNLTD	Cont	Cont	VFR-IFR	ZLA CNTR/FSS	G
R-2524	UNLTD	Cont	Cont	VFR-IFR	ZLA CNTR/FSS	G
R-2534A&B	UNLTD	Cont	Cont	VFR-IFR	ZLA CNTR/FSS	G
	To 60000	Cont				

"JOINT USE"

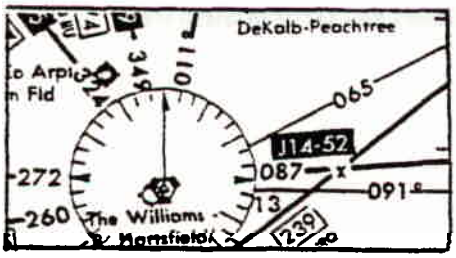
"NON-JOINT USE"

SPECIAL USE AIRSPACE

Figure 3-16

CHART TRIVIA

Any course which can be inadvertently read upside-down will be noted with a degree symbol (Figure 3-17). For example: 011, 091, etc.



COURSE NOTATION

Figure 3-17

AIRSPACE STRUCTURE

ENABLING OBJECTIVE: Demonstrate a knowledge of departure, enroute and terminal airspace structures, including Special Use Airspace, and the pilot/equipment requirements for operations in the various classes of airspace.

SPECIFIC OBJECTIVES:

4.1 State the regulatory functions of the NTSB and FAA regarding aviation and the airspace.

4.2 Define:

- **a. Class A Airspace.**
- **b. Class B Airspace.**
- **c. Class C Airspace.**
- **d. Class D Airspace.**
- **e. Class E Airspace.**
- **f. Class G Airspace.**

4.3 State the special requirements for operations in:

- **a. Class A Airspace.**
- **b. Class B Airspace.**
- **c. Class C Airspace.**

4.4 Define Air Defense Identification Zone (ADIZ).

4.5 State the Mode C requirements for operations within the airspace structure.

4.6 Define:

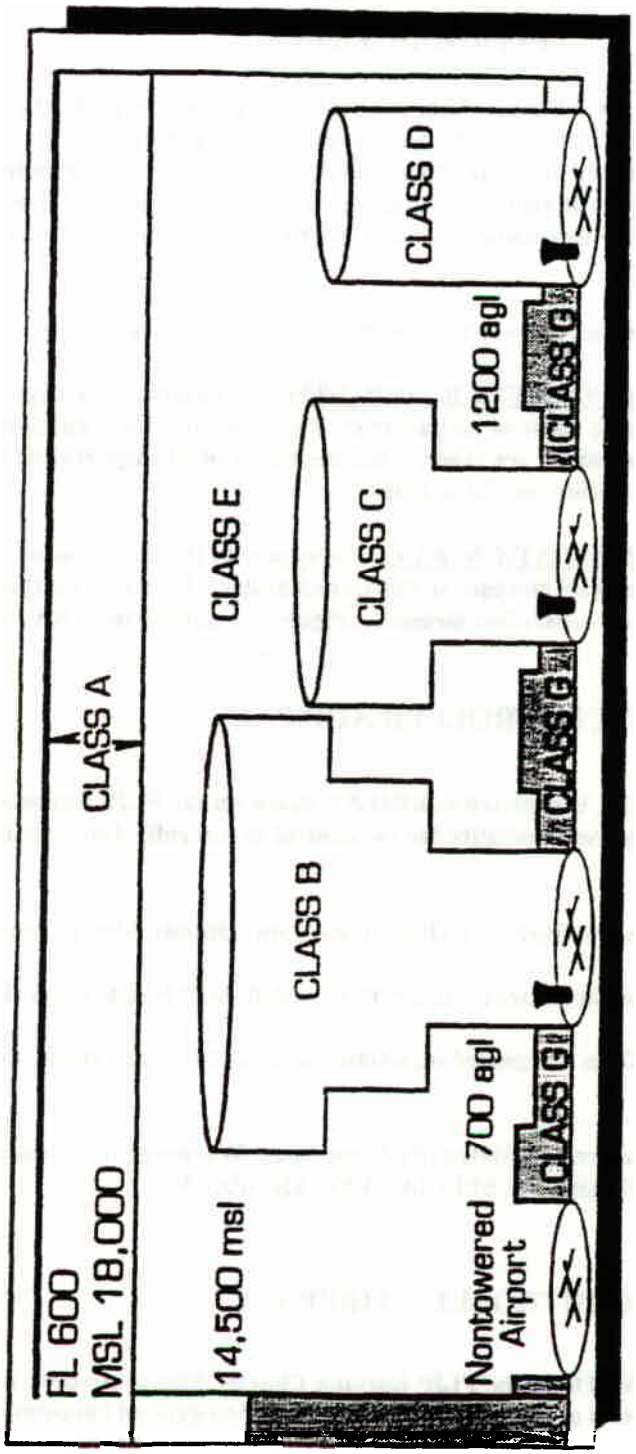
- **a. Federal Airways System (Low Altitude Airway System).**
- **b. Jet Route System.**
- **c. High Altitude Area System.**

4..7 Explain the various types of VFR Routes established within Class B Airspace.

4.8 State the airspeed limitations within the various classes and types of airspace.

4.9 Define the Special Use Airspace areas:

- **a. Prohibited (P) Area.**
- **b. Joint Use Restricted (R) Area.**
- **c. Non-Joint Use Restricted (R) Area.**
- **d. Warning (W) Area.**
- **e. Alert (A) Area.**
- **f. Military Operations Area (MOA).**



FAA AIRSPACE CLASSIFICATIONS

Figure 4-1

INTRODUCTION

The Federal Aviation Act of 1958 and its subsequent amendments guarantees the right of public transit; the Federal Aviation Administration is charged with the responsibility of developing an airways and air traffic control system to best serve the needs of the public and provide for national defense; and, the armed services require space for testing, training, and operations. In order to meet the needs of general aviation, commercial aviation, and the armed forces, different segments of our scarce airspace must have established rules, regulations, and procedures to assure equitable sharing by the users in a safe and efficient manner.

At the present time, there are two agencies in the United States responsible for the safety and regulation of aviation:

1. NATIONAL TRANSPORTATION SAFETY BOARD (NTSB). A completely independent organization responsible for investigating and determining probable cause of all purely civil aviation accidents and joint civil-military aviation accidents. Subsequent safety recommendations are made to the Secretary of Transportation in a continuing effort to improve aviation safety and prevent recurring similar accidents.

2. FEDERAL AVIATION ADMINISTRATION (FAA). An agency of the Department of Transportation responsible for the safe and efficient use of all airspace in the United States. To carry out this responsibility, the FAA has classified the airspace as uncontrolled and controlled airspace. Figure 4-1 depicts the FAA airspace classifications.

UNCONTROLLED AIRSPACE

Uncontrolled, or CLASS G AIRSPACE, is depicted in BROWN shade on the FLIP Enroute Charts. This is airspace in which ATC has neither the authority nor responsibility for the control of aircraft. Uncontrolled airspace is normally located:

* below 1200' AGL under CLASS E AIRSPACE (Base of the Low Altitude Airway System).
* Below 700' AGL around some terminal area CLASS B, C, and D AIRSPACE areas (For transitional purposes).
* From the surface to 14,500' MSL in designated mountainous areas between certain Low Altitude Airways ("Victor" Routes).

Also included as uncontrolled airspace are Prohibited (P) Areas, some Warning (W) areas, and Non-joint Use Restricted (R) Areas. This airspace is classified as SPECIAL USE AIRSPACE.

CONTROLLED AIRSPACE

Controlled airspace is depicted in WHITE on the FLIP Enroute Charts. This is airspace in which ATC has both the authority and responsibility for the control of aircraft. Supported by air-to-ground communications, controlled airspace is classified as:

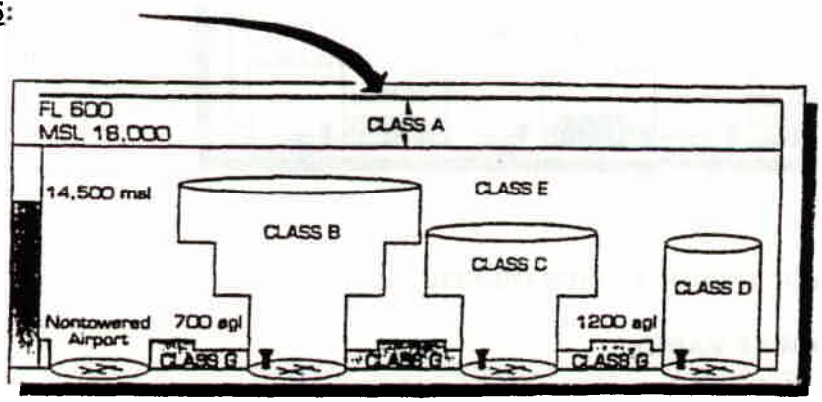
* CLASS A AIRSPACE
* CLASS B AIRSPACE
* CLASS C AIRSPACE
* CLASS D AIRSPACE
* CLASS E AIRSPACE

Also included as controlled airspace are AIR DEFENSE IDENTIFICATION ZONES (ADIZ), and certain areas classified as SPECIAL USE AIRSPACE.

CLASS A AIRSPACE (Figure 4-2)

That airspace over the continental United States extending from 18,000' MSL through FL 600, but not including the airspace less than 1500' AGL in Alaska. VFR or IFR specifying "VFR-On-Top" operations are not allowed in CLASS A AIRSPACE.

REQUIREMENTS:



CLASS A AIRSPACE

Figure 4-2

1. IFR FLIGHT PLAN.
   * Method of navigation not specified.
   * CLASS A AIRSPACE is the only airspace in which the FARs require a flight plan.
   * Filing of an IFR flight plan requires the pilot be instrument rated and the aircraft equipped for instrument flight.
2. TRANSPONDER WITH A MODE C.
3. TWO-WAY RADIO.

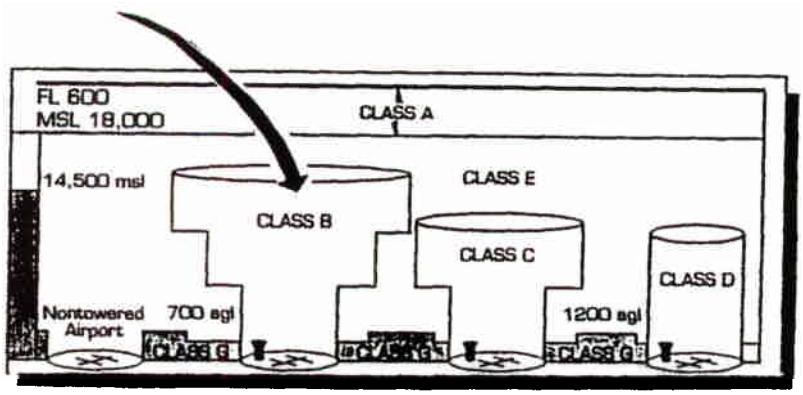
All aircraft operating within CLASS A AIRSPACE are under positive control by ATC.

CLASS B AIRSPACE (Figure 4-3)

CLASS B AIRSPACE areas vary in structure, but in general, the areas resemble an upside-down layered wedding cake. It is controlled airspace extending upward from the surface to specified altitudes within which all aircraft are subject to the operating rules and pilot requirements set forth in FAR, Part 91. These areas are listed in FLIP Planning Section AP/1 along with the pilot and equipment requirements. CLASS B AIRSPACE is depicted in detail on Sectional Aeronautical Charts (Figure 4-4) and in greater detail on VFR Terminal Area Charts. There is aVFR Terminal Area Chart for each of the CLASS B AIRSPACE areas.

Although each CLASS B area varys in structure, they all have the same operating and equipment requirements.

REQUIREMENTS:



CLASS B AIRSPACE

Figure 4-3

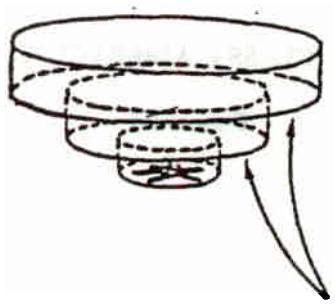
1. APPROPRIATE ATC APPROVAL - IFR OR VFR.
2. OPERABLE TWO-WAY RADIO.
3. OPERABLE VOR OR TACAN (EXCEPT VFR).
4. OPERABLE TRANSPONDER WITH MODE C.
5. (WITH EXCEPTIONS) AT LEAST A PRIVATE PILOT LICENSE.

NOTE

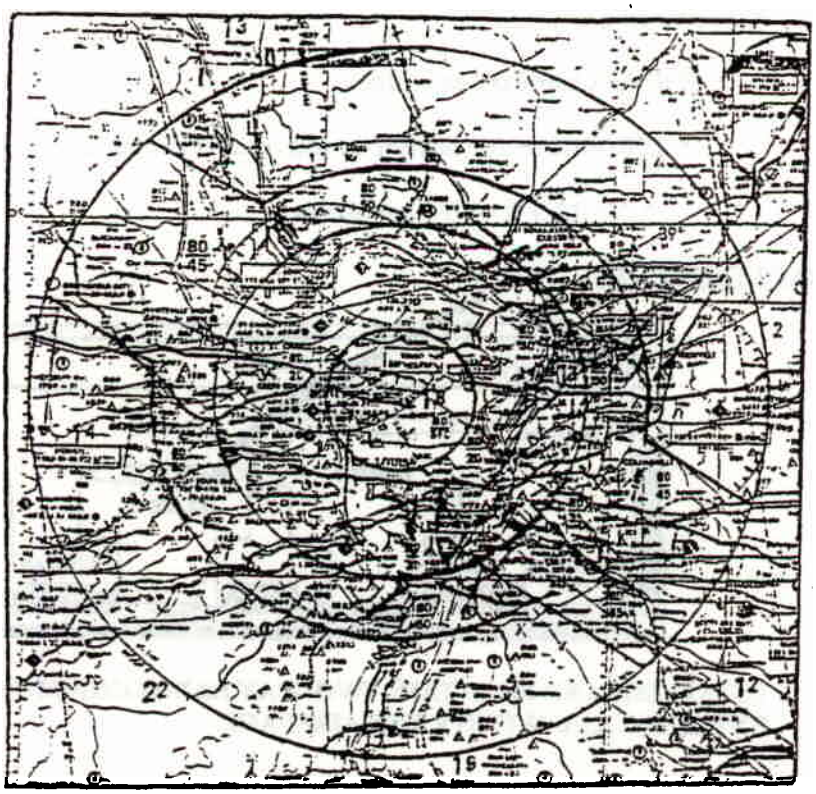
To be considered licensed, the pilot-in-command of a Naval aircraft must be a designated aviator; therefore, students cannot fly solo into CLASS B AIRSPACE areas.

CLASS B AIRSPACE
PLANVIEW FROM
SECTIONAL AERONAUTICAL CHART

Figure 4-4



LATERAL
LIMITS



CLASS C AIRSPACE (Figure 4-5)

CLASS B AIRSPACE surrounds the primary commercial hub terminal areas, whereas CLASS C AIRSPACE surrounds the secondary commercial hub terminal areas. They are not as congested, therefore, the operating rules are not as stringent. As these areas become busier and more congested, they are re-designated as CLASS B AIRSPACE. They are similar in structure to CLASS B AIRSPACE in that they resemble an upside-down layered wedding cake; however, where CLASS B AIRSPACE varied in structure, CLASS C AIRSPACE areas are identical in structure. There are a few exceptions due to location and/or terrain restrictions, but for the most part, they consist of two (2) layers (Figure 4-6).

The bottom layer of the structure is five (5) NM in radius and extends from the surface to 1200' above the highest ground level. The top layer of the structure is ten (10) NM in radius and extends from 1200' above the highest ground level to 4000' above the published airport elevation.

Although CLASS C AIRSPACE has a lesser volume of traffic than CLASS B AIRSPACE, ATC provides a full range of radar sevices in CLASS C AIRSPACE:

* Vectoring

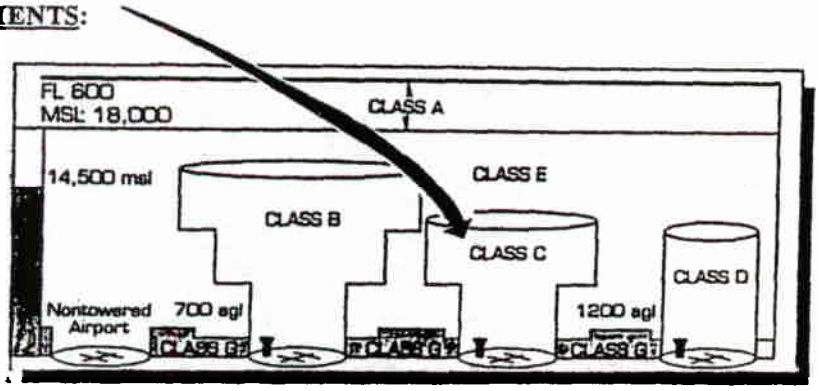
* Sequencing

* IFR/VFR standard separation

* IFR/VFR traffic advisories and conflict resolution

* VFR/VFR traffic advisories

REQUIREMENTS:



CLASS C AIRSPACE

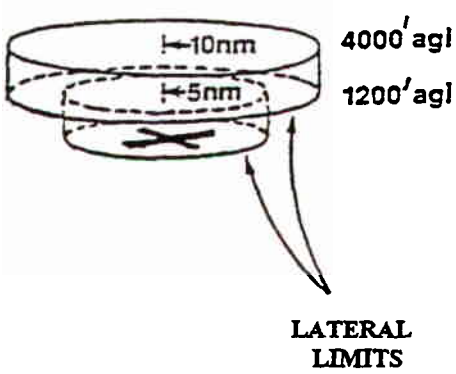
Figure 4-5

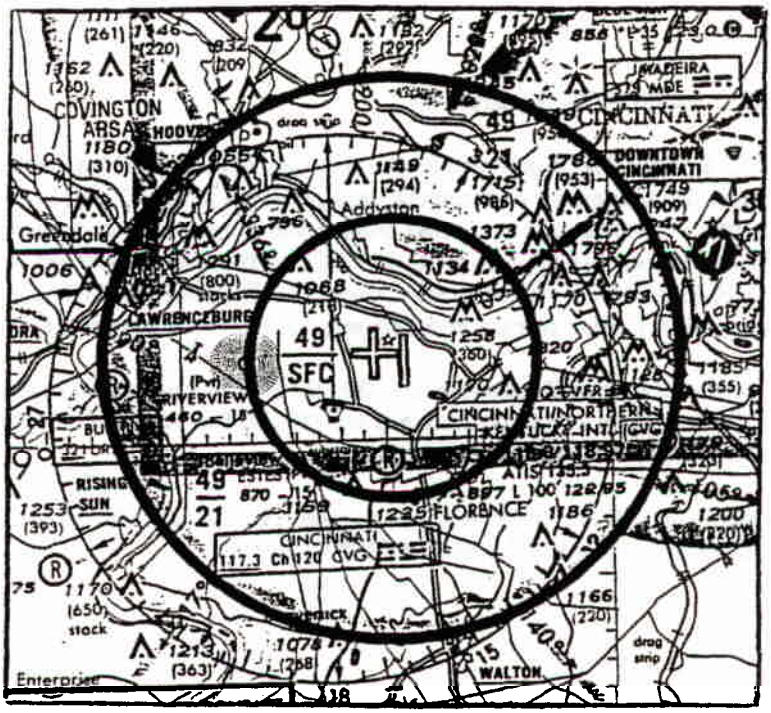
1. ESTABLISH AND MAINTAIN TWO-WAY RADIO COMMUNICATIONS WITH ATC PRIOR TO ENTERING AND WITHIN THE AIRSPACE.

2. OPERABLE TRANSPONDER WITH MODE C.

CLASS C AIRSPACE
PLANVIEW FROM
SECTIONAL AERONAUTICAL CHART

Figure 4-6





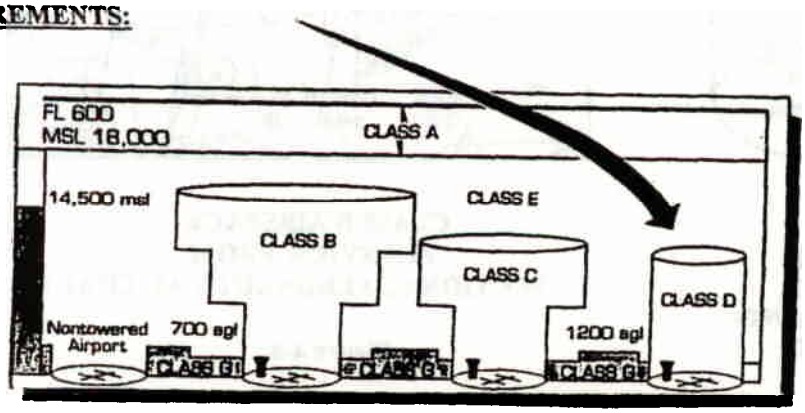
CLASS D AIRSPACE (Figure 4-7)

CLASS D AIRSPACE areas extend from the surface to specified MSL altitudes as depicted on Sectional Aeronautical Charts (Figure 4-8). Each area is based on a primary airport which has an operating Air Traffic Control Tower, but an area may contain one or more satellite airports. Depicted by blue segmented lines on charts, CLASS D AIRSPACE is normally a circular area within a radius of four (4) to five (5) miles around the primary airport. It may contain extensions for approach/departure paths where communications with ATC are required (blue segmented line extension) or extensions into general controlled airspace (CLASS E AIRSPACE) where communications with ATC are not required (magenta segmented line extension).

To be classified as CLASS D AIRSPACE, the primary airport must meet three conditions:

1. Have an operating Air Traffic Control Tower.
2. Communications capability with aircraft must exist down to the runway surface.
3. Provide weather reporting services.

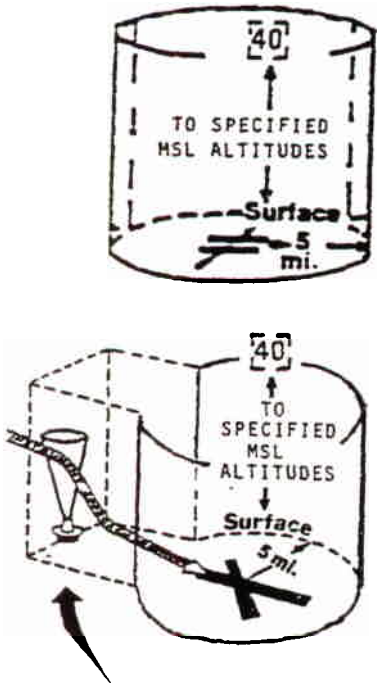
REQUIREMENTS:



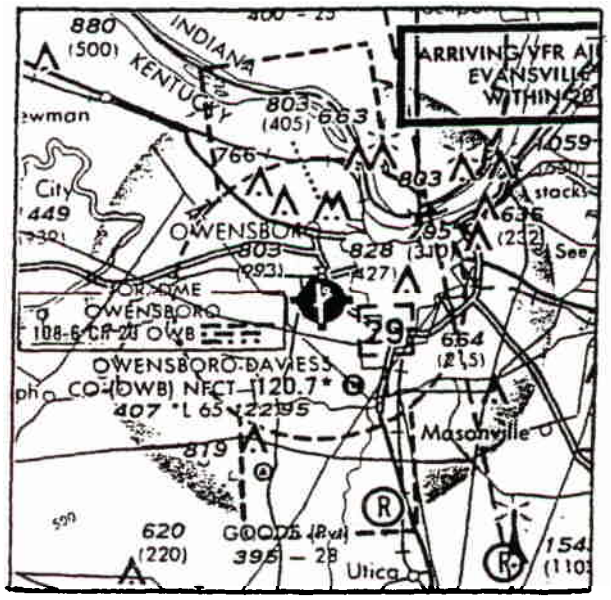
CLASS D AIRSPACE

Figure 4-7

1. ESTABLISH AND MAINTAIN TWO-WAY RADIO COMMUNICATIONS WITH ATC PRIOR TO ENTERING AND WITHIN THE AIRSPACE.
2. ENTER CIVIL PATTERNS AT LEAST 1500' AGL.
3. MAKE TURNS TO THE LEFT.
4. CLIMB TO AT LEAST 1500' AGL AS SOON AS PRACTICABLE AFTER DEPARTURE.



(EXTENSIONS IN BLUE:
CLASS D AIRSPACE
EXTENSIONS IN MAGENTA:
CLASS E AIRSPACE)

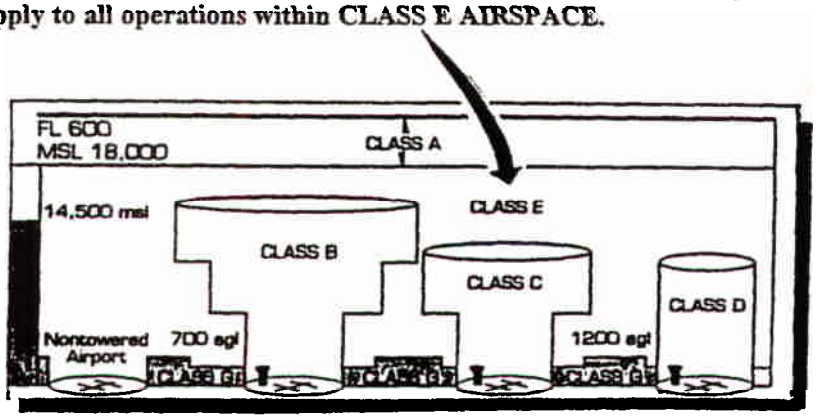


CLASS D AIRSPACE
PLANVIEW FROM
SECTIONAL AERONAUTICAL CHART

Figure 4-8

CLASS E AIRSPACE (Figure 4-9)

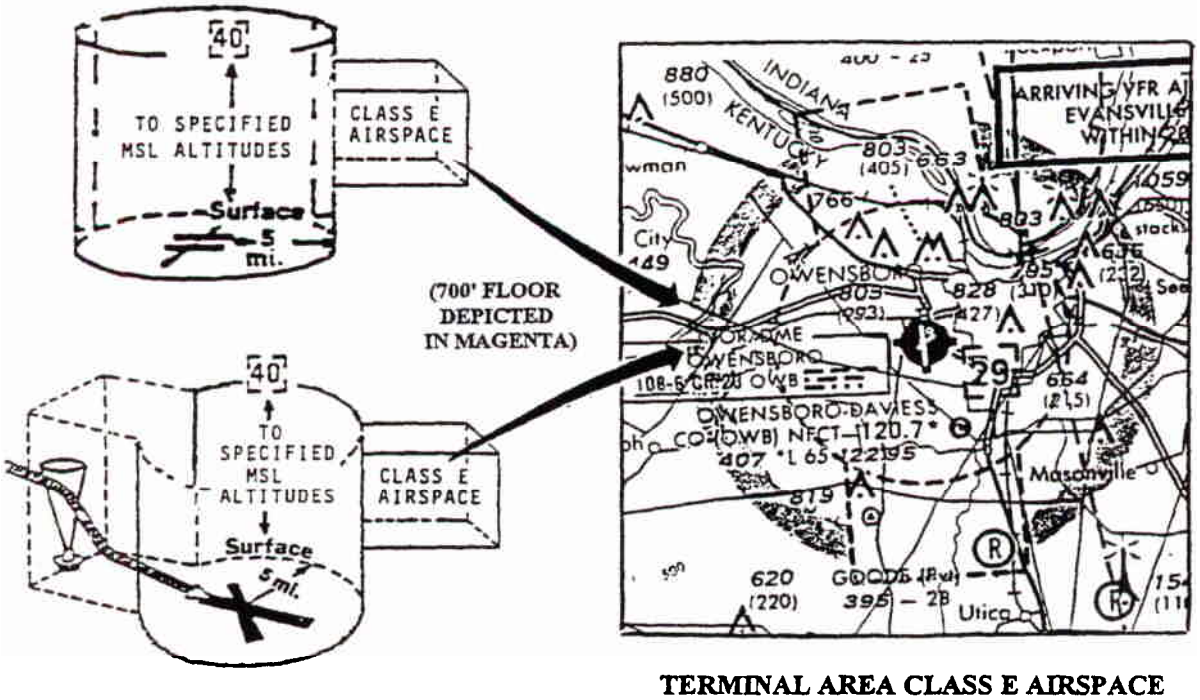
CLASS E AIRSPACE is all controlled airspace not designated as CLASS A, B, C, or D AIRSPACE. A pilot shall not operate in CLASS E AIRSPACE in instrument conditions unless he has both filed and received an IFR clearance. The Instrument Flight Rules and Procedures and Visual Flight Rules and Procedures set forth in FAR, Part 91 apply to all operations within CLASS E AIRSPACE.



CLASS E AIRSPACE

Figure 4-9

CLASS E AIRSPACE will normally extend upward from 1200' AGL above CLASS G AIRSPACE, which is uncontrolled airspace. Around CLASS B, C and D AIRSPACE terminal areas, however, it may extend upward from 700' AGL. This additional airspace is established to provide controlled airspace to arriving and departing instrument traffic, and it serves about the same purpose as CLASS D AIRSPACE extensions. It serves to keep aircraft under ATC responsibility. While not depicted on IFR Enroute Charts or Instrument Approach Procedure Charts, this airspace is depicted on Sectional Aeronautical Charts (Figure 4-10) and VFR Terminal Area Charts in MAGENTA. CLASS E AIRSPACE extends from the surface at non-towered airports and from 14,500' MSL in certain parts of mountainous areas.



TERMINAL AREA CLASS E AIRSPACE PLANVIEW FROM SECTIONAL AERONAUTICAL CHARTS

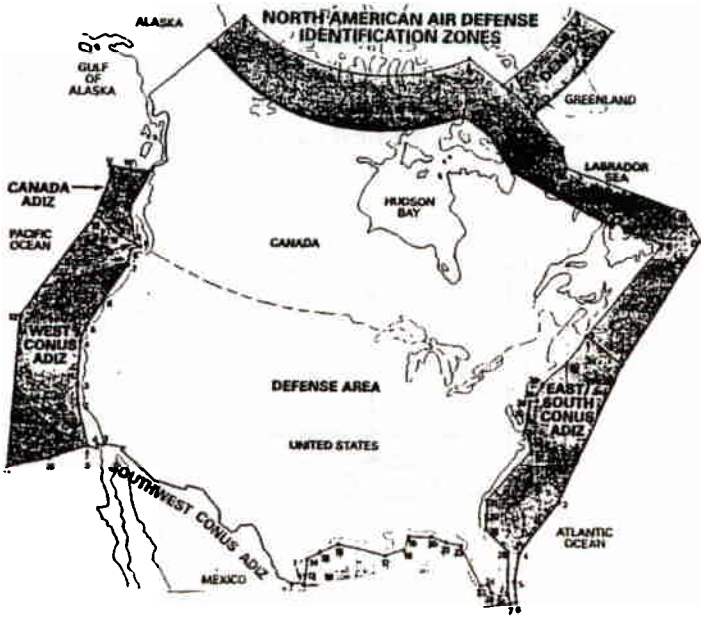
Figure 4-10

AIR DEFENSE IDENTIFICATION ZONE (ADIZ) (Figure 4-11)

An ADIZ is not a class of airspace. It is airspace of defined dimensions around the continental United States and Hawaii within which the ready location, identification, and control of aircraft is required for the national defense. With certain exceptions, all aircraft must be on an IFR or a DVFR (Defense VFR) type of flight plan and equipped with an operable transponder with Mode C to penetrate an ADIZ.

ADIZ are depicted on the FLIP Enroute Charts and in FLIP Planning Section AP/1. The procedures for penetrating an ADIZ are located in the FLIP (Enroute) IFR Supplement. There are certain estimating procedures a pilot must follow as well as certain penetration tolerances of time, distance, and altitude to which a pilot must adhere.

These Zones are established over international waters by the Administrator of the FAA after consultation with the State Department and the Department of Defense.



AIR DEFENSE IDENTIFICATION ZONES (ADIZ)

Figure 4-11

TRANSPONDER OPERATION

If equipped with a Transponder and/or Mode C, the equipment must be in the "ON" position at any time operating in controlled airspace. Squawk the appropriate Code:

* **IFR - As assigned by ATC**
* **IFR specifying "VFR-On-Top" - Discrete Code assigned by ATC, otherwise, Code 1200**
* **VFR or when cancelling IFR - Code 1200**

MODE C REQUIREMENTS

* **Within CLASS A AIRSPACE.**
* **Within CLASS B AIRSPACE and within a cylinder of radius 30 NM from the primary airport in CLASS B AIRSPACE extending from the surface to 10,000' MSL.**
* **Within CLASS C AIRSPACE and above CLASS C AIRSPACE to 10,000' MSL.**
* **Within, into, or across an ADIZ.**
* **At or above a base altitude of 10,000' MSL over the conterminous United States, excluding that airspace below 2500' AGL (a corridor in mountainous areas for VFR aircraft without Mode C equipment).**

AIRWAY AND ROUTE SYSTEMS

There are three (3) Airway and Route Systems used within the United States (Figure 4-12):

1. Federal Airway System, sometimes referred to as the Low Altitude Airways System or Victor Airways.
2. Jet Route System.
3. High Altitude Area System.

FEDERAL AIRWAY SYSTEM

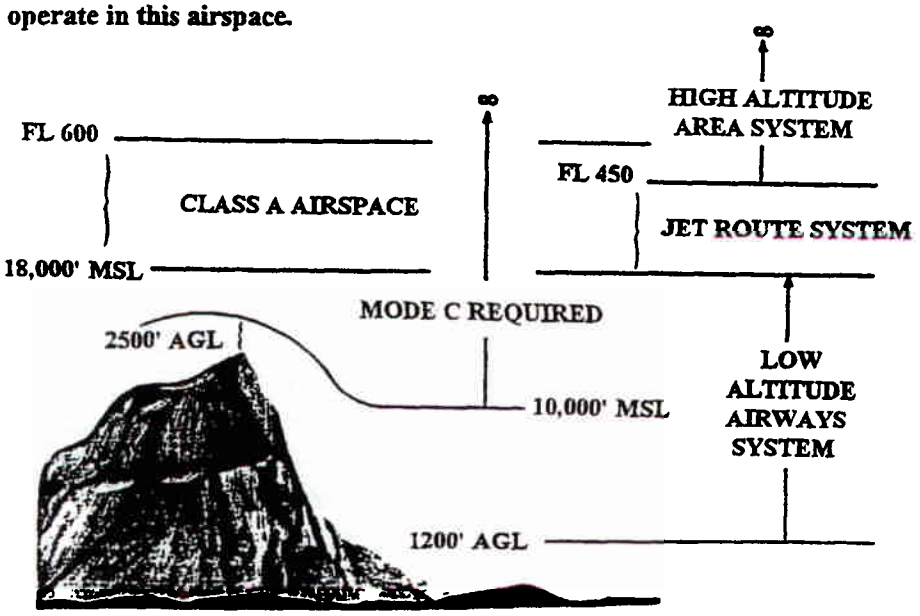
The Federal Airways, or Low Altitude Airway System, is a system of VOR and VORTAC routes eight (8) NM in width extending from 1200' AGL to 18,000' MSL. They are depicted on the FLIP Enroute (L) Charts.

JET ROUTE SYSTEM

The Jet Route System is a system of VOR and VORTAC Routes of no defined width extending from 18,000' MSL through Flight Level 450. Pilots are expected to fly centerline of designated routes using the three types of changeover points which were discussed in Chapter 3 of the course - ENROUTE CHARTS. The Jet Routes are depicted on FLIP Enroute (H) Charts. For "Direct" flight in the Jet Route System, that is, off Jet Routes, do not plan to exceed 130 NM from any one NAVAID, or 260 NM between two NAVAIDS.

HIGH ALTITUDE AREA SYSTEM

Above Flight Level 450, there are no Routes. This airspace is the High Altitude Area System and is designed to permit a free selection of routes. NAVAIDs on the (H) Charts are used for navigation, but on the IFR Flight Plan (DD Form 175), all legs are "Direct" flight. For planning purposes, do not plan to exceed 100 NM from any one NAVAID, or 200 NM between two NAVAIDs. Special flight procedures apply above Flight Level 600, for which you will be briefed if the need arises to operate in this airspace.



AIRWAY AND ROUTE SYSTEMS

Figure 4-12

VFR ROUTES

Published VFR Routes for transitioning around, under and through complex airspace such as CLASS B AIRSPACE were developed by the FAA. The terms "VFR Flyway", "VFR Corridor", "VFR Transition Route", and "Terminal Area VFR Route" have been used when referring to the same or different types of routes or airspace.

VFR FLYWAY: A VFR Flyway (Figure 4-13) is defined as a general flight path not defined as a specific course, for use by pilots in planning flights into, out of, through, or near complex terminal airspace to avoid CLASS B AIRSPACE. An ATC clearance is NOT required to fly these routes. These routes are not intended to discourage requests for VFR operations within CLASS B AIRSPACE, but are designed to assist pilots in planning for flights under and around the CLASS B AIRSPACE without actually entering it.

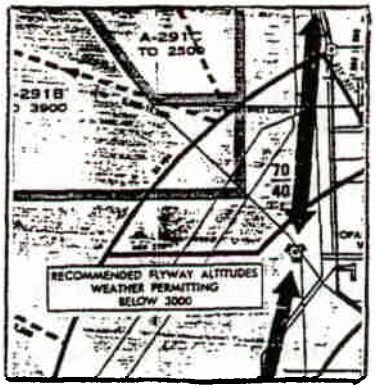


Figure 4-13

VFR CORRIDOR: A VFR Corridor (Figure 4-14) is defined as airspace through CLASS B AIRSPACE with defined vertical and lateral boundaries, in which aircraft may operate WITHOUT an ATC clearance or communications. These corridors are, in effect, a "hole" through CLASS B AIRSPACE. A corridor is surrounded on all sides by CLASS B AIRSPACE and does not extend down to the surface like a VFR Flyway.

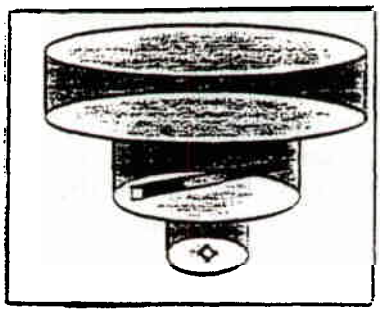


Figure 4-14

VFR TRANSITION ROUTE: VFR Transition Routes (Figure 4-15) were developed to accomodate VFR traffic through certain CLASS B AIRSPACE. A Transition Route is defined as a specific flight course for transitioning a specific Class B Airspace area. These routes include specific ATC assigned altitudes and pilots MUST obtain an ATC clearance prior to entering CLASS B Airspace on the routes. On initial contact, pilots should advise ATC of position, altitude, and route name desired. Pilots must fly the route as depicted and adhere to ATC instructions.

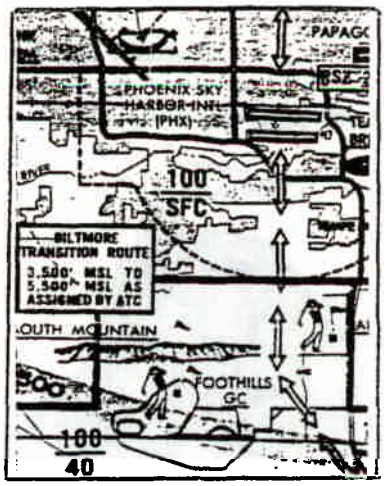


Figure 4-15

TERMINAL AREA VFR ROUTE: A Terminal Area VFR Route (Figure 4-16) is defined as a specific flight course for optional use by pilots to avoid CLASS B, C and D AIRSPACE when operating in complex terminal airspace. They may include minimum, maximum, or mandatory altitudes and are described by NAVAIDs and/or visual landmarks. An ATC clearance is NOT required to fly these routes.

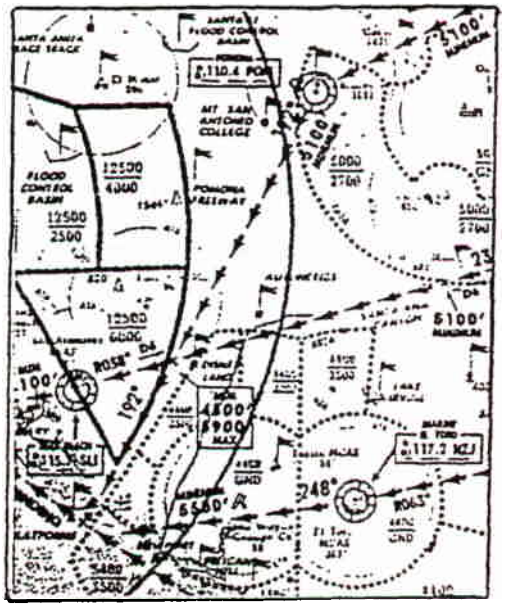
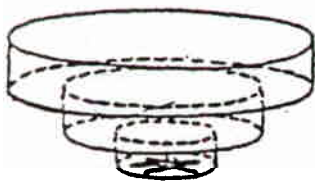


Figure 4-16

AIRSPEED LIMITATIONS

CLASS B AIRSPACE



WITHIN AIRSPACE 250K

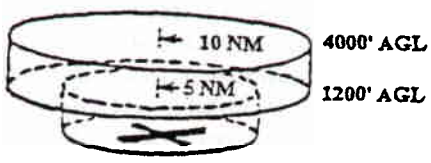
BELOW LATERAL LIMITS 200K

VFR ROUTE THROUGH AIRSPACE 200K

HOLDING

ABOVE 14,000 FT 265 K

CLASS C AIRSPACE



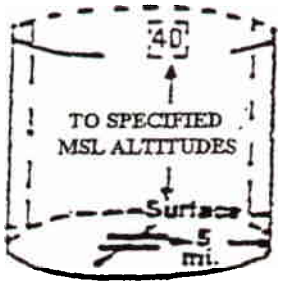
WITHIN AIRSPACE 200K

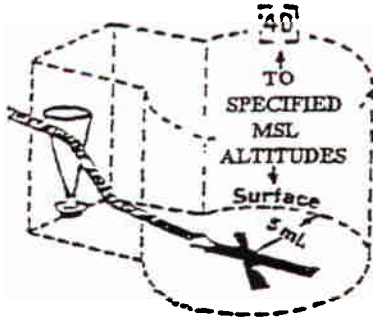
10,000' MSL

(CLASS E and CLASS G AIRSPACE)

250K

CLASS D AIRSPACE





WITHIN AIRSPACE 200K

NOTE

The military has various agreements with the FAA which allow higher airspeeds in certain CLASS D AIRSPACE, on Low Level Military Training Routes, in Military Operations Areas (MOAs), and in Restricted (R) Areas.

SPECIAL USE AIRSPACE

Special Use Airspace is airspace of defined dimensions wherein activities of aircraft must be confined because of its nature, and wherein restrictions are placed on aircraft which are not a part of those activities. Depicted on the FLIP Enroute Charts, information sufficient for operations will be located in a table on the front of the FLIP (Enroute) High Altitude Charts and a complete description in FLIP Planning Section AP/1A. Special Use Airspace is designated as:

- **PROHIBITED (P) AREAS**
- **RESTRICTED (R) AREAS**
- **WARNING (W) AREAS**
- **ALERT (A) AREAS**
- **MILITARY OPERATIONS AREAS (MOA)**

PROHIBITED (P) AREA (Figure 4-17)

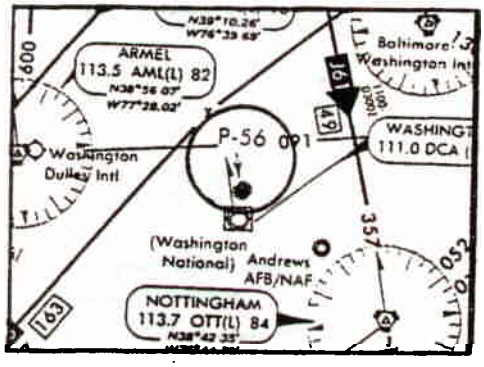


Figure 4-17

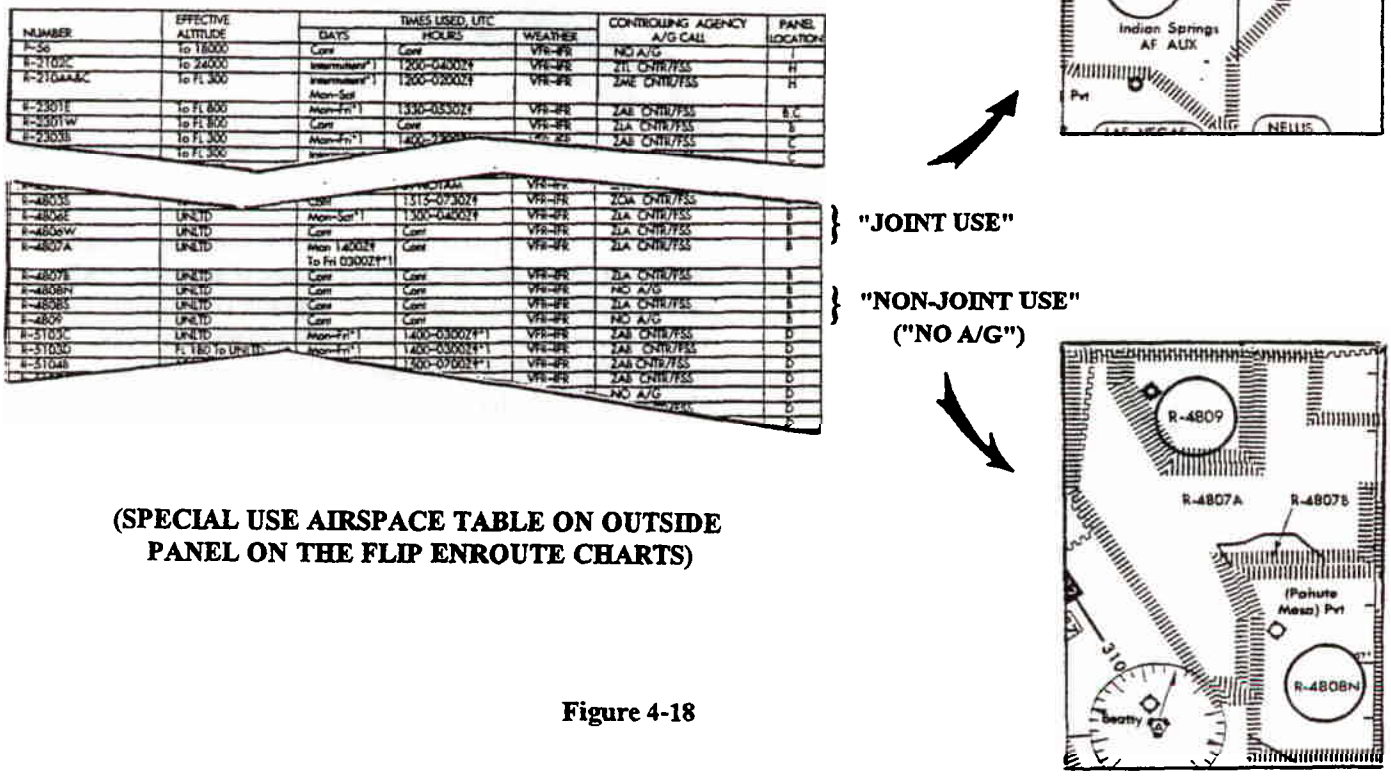
This is uncontrolled airspace, depicted in BROWN shade on Charts, in which the flight of aircraft is prohibited. ATC has no jurisdictional authority. At present, there is no requirement for prohibited airspace above 18,000' MSL; therefore, there is only one Prohibited Area depicted on Enroute High Altitude Charts. This is area P-56, which is the White House and Capitol Building. The reason for its depiction is because it includes the altitude 18,000'. There are several depicted on Low Altitude Charts and several which are not depicted since they are such small areas. However, they will be listed in FLIP Planning Section AP/1A.

RESTRICTED (R) AREA

This is airspace of defined dimensions within which the flight of aircraft is restricted in accordance with certain specified conditions due to the existence of unusual, often invisible, hazards to flight. Restricted Areas are of two types - Joint Use and Non-Joint Use.

JOINT USE RESTRICTED AREA (Figure 4-18) - Depicted in WHITE on FLIP Enroute Charts, aircraft may operate within a Joint Use Restricted Area if prior permission is obtained from the "Using Agency" or from the "Controlling Agency", which is normally the local Air Route Traffic Control Center (ARTCC). NOTAMs should be consulted prior to flight to determine if the area is being used. Permission can be obtained by filing a flight plan or by contacting ARTCC inflight.

NON-JOINT USE RESTRICTED AREA (Figure 4-18) - Aircraft may operate within a Non-Joint Use Restricted Area if prior permission is obtained from the "Using Agency" on the ground prior to flight. This is uncontrolled airspace listed on the Enroute Chart Airspace table with the letters "NO A/G" next to the area number indicating no air-to-ground communications. This is the only uncontrolled airspace not depicted in BROWN shade on the Enroute Charts. The user name and telephone number will be located in FLIP Planning Section AP/1A. When filing an IFR fllight plan which penetrates the area, you must inform ATC in the "Remarks" section of the time and altitude for which you have received permission from the user.



(SPECIAL USE AIRSPACE TABLE ON OUTSIDE PANEL ON THE FLIP ENROUTE CHARTS)

Figure 4-18

WARNING (W) AREA (Figure 4-19)

Warning Areas contain hazards to flight similar to those of a Restricted Area; however, they are over international waters and cannot be restricted. DOD directs that military pilots obtain permission from the Controlling Agency or Using Agency prior to entering these areas. NOTAMs should be consulted to determine an area status. If being used, obtain permission from the user listed in FLIP Planning Section AP/1A and advise ATC in the "Remarks" section of an IFR flight plan of the time and altitude for which you have received permission to enter the area. If not being used, the local Air Route Traffic Control Center (ARTCC) will issue an IFR clearance to cross the area. If inflight, permission can be obtained to enter a Warning Area by contacting the appropriate coordinating activity listed in the Flight Data and Procedures section of the FLIP (Enroute) IFR Supplement.

Most Warning Areas are Joint Use Areas (WHITE) with control reverting to ATC when not being used. Some Areas are uncontrolled (BROWN) in which the user retains control. ATC routes IFR traffic between active Warning Areas by the use of Control Corridors.

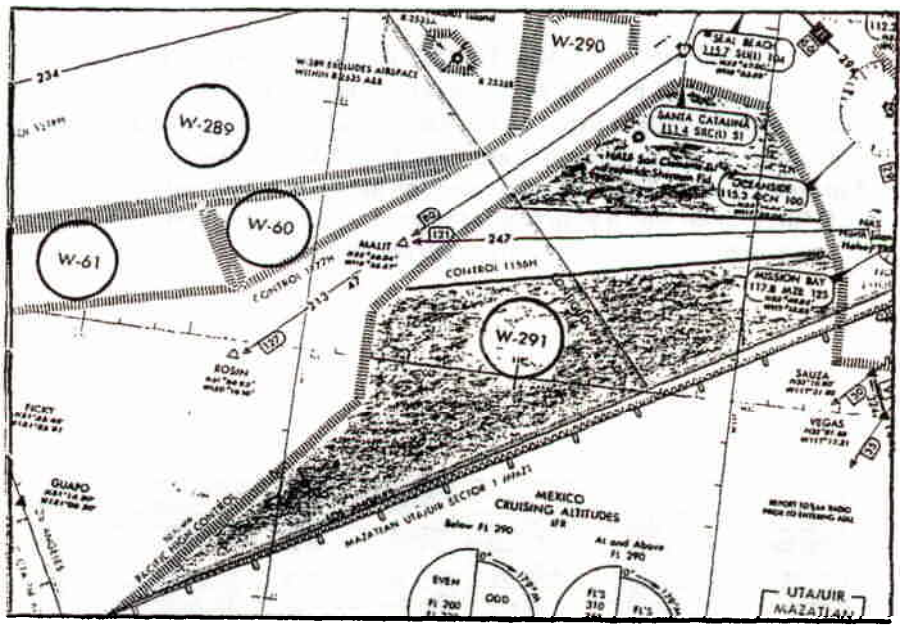
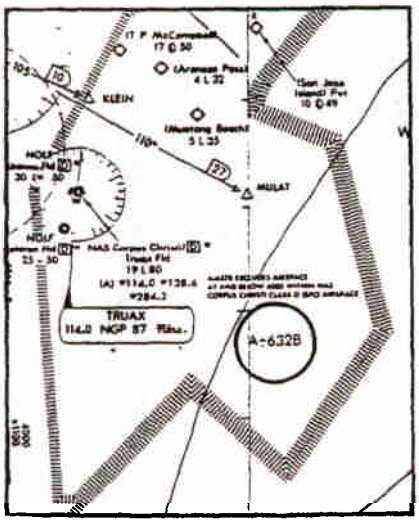


Figure 4-19

ALERT (A) AREA (Figure 4-20)



This is non-restricted airspace which contains a high volume of pilot training or other unusual activity. FAR, Part 91 applies and all pilots are equally responsible for collision avoidance. These are VFR areas; therefore, they are NOT DEPICTED on FLIP (Enroute) High Altitude Charts, since VFR operations are not allowed in the Jet Route System.

(DEPICTION FROM LOW ALTITUDE ENROUTE CHART)

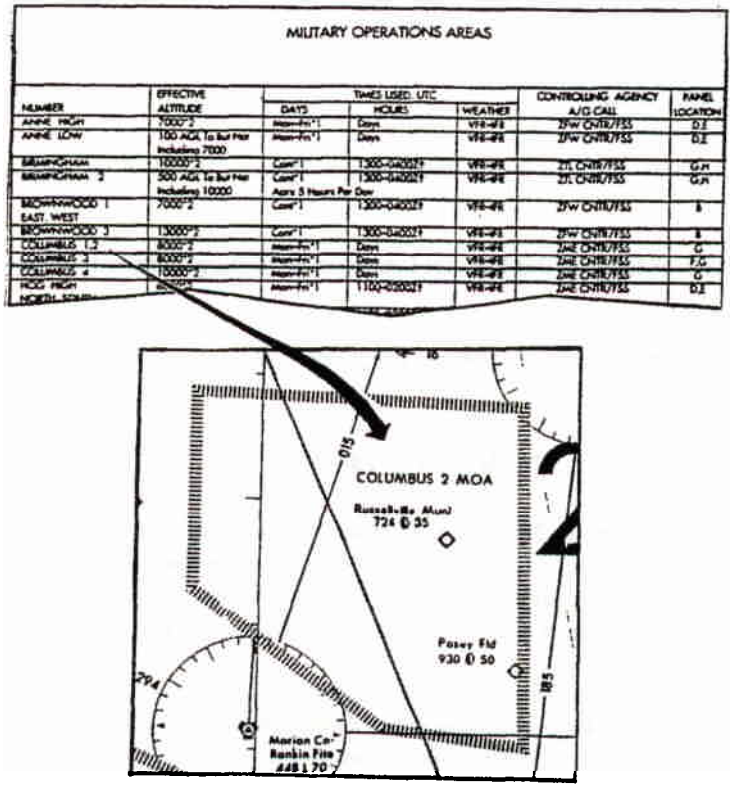
Figure 4-20

MILITARY OPERATIONS AREA (MOA) (Figure 4-21)

MOAs are also VFR operations areas and, therefore, NOT DEPICTED on FLIP (Enroute) High Altitude Charts. They are established to separate certain military training activity from IFR traffic. With operations being covered by various letters-of-agreement, non-participating IFR traffic can be routed through the MOA if ATC can provide separation.

CAUTION

Even though a participating aircraft may be on an IFR flight plan and under ATC control, complacency should be avoided since any VFR civil aircraft or non-participating military aircraft may cross the area without a flight plan and without communicating with ATC.



(DEPICTION FROM LOW ALTITUDE ENROUTE CHART)

Figure 4-21

NOTE

Training activities above the MOA in CLASS A AIRSPACE are conducted in ATC Assigned Airspace (ATCAA), in which the local ARTCC assigns a block of flight levels for training. Center controls the operating hours of the block and the number of aircraft, and allows student training without instrument ratings.

METEOROLOGY REVIEW

ENABLING OBJECTIVE: Demonstrate a knowledge of the primary uses of various Meteorological Charts and Teletype Reports particularly applicable to flight planning in tactical jet type aircraft, and the inflight advantages and disadvantages of Jet Streams.

SPECIFIC OBJECTIVES:

5.1 Recall general information relating to each major source of weather information particularly applicable to flight planning in tactical jet type aircraft.

5.2 State the seasonal migration of Jet Streams in terms of Stream position, core altitude, and associated wind strengths.

5.3 Realize the advantages and disadvantages of Jet Stream locations to flight planning in tactical jet type aircraft.

5.4 State conditions under which a Flight Weather Briefing (DD Form 175-1) must be completed.

INTRODUCTION

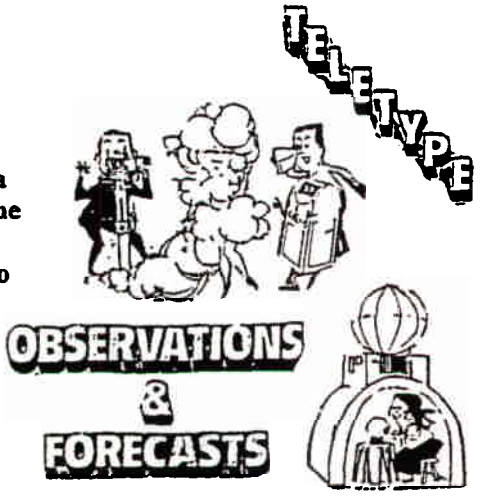
You have already received extensive training in Meteorology during previous phases of training; therefore, it is not the purpose of this topic to reteach this subject. Rather, it is to review those major sources of weather information of particular importance to flight planning in tactical jet type aircraft. Since you have not been exposed to the effects of Jet Streams on high altitude flight, this topic will introduce you to the advantages and disadvantages of Jet Streams.

As a professional Naval Aviator, you must possess a good understanding of weather phenomena and be able to make effective decisions during preflight as well as during inflight when confronted with hazardous weather conditions. The more experience you gain as an aviator, the more you will find yourself studying applicable Meteorology Charts during preflight planning so that you will be in a position to make rapid, intelligent, and effective decisions concerning your proposed flight and when encountering adverse weather conditions inflight.

OPARS

At most Naval Air Stations and on aircraft carriers, Optimum Path Aircraft Routing System (OPARS) service is available. This is a service which provides computerized flight plans for Navy pilots. OPARS provides a customized flight plan by using computers to combine the latest forecast environmental data with the most fuel efficient flight profile for a specific model aircraft. You will most likely be using this service when assigned to a fleet squadron; however, this service does not relieve you of the responsibility of familiarizing yourself with existing and forecast weather conditions pertinent to your flight and for obtaining a formal weather briefing for that flight.

In preparing for a flight, you should always make your own analysis of existing and forecast weather conditions pertinent to your proposed flight since, as a professional aviator, you are negligent in the performance of your duties if you accept a forecaster analysis or forecast which you do not completely understand.



FACSIMILE CHARTS

A preflight study of the charts posted in the weather office will give you a picture of the weather conditions and forecast developments which may affect flight along your proposed route, and enable you to intelligently discuss these conditions and developments with a forecaster. There are certain facsimile charts and teletype reports of particular importance to flight in tactical jet type aircraft.

NOTE

At some locations, these facsimile charts may only be available on a computer screen. At these locations, tell the forecaster which Charts you wish to view.

SURFACE PROGNOSTIC CHART

The Surface Prognostic Chart (Figure 5-1) provides a pictorial display of the forecast positions of pressure systems and fronts in relation to your planned route-of-flight. It is especially useful in determining where these frontal systems will be located in relation to your planned destination and alternate during the period of your ETA in those areas. Depending on the type of frontal system forecast to be in your terminal area, this Chart will aid you in determining a satisfactory departure time.

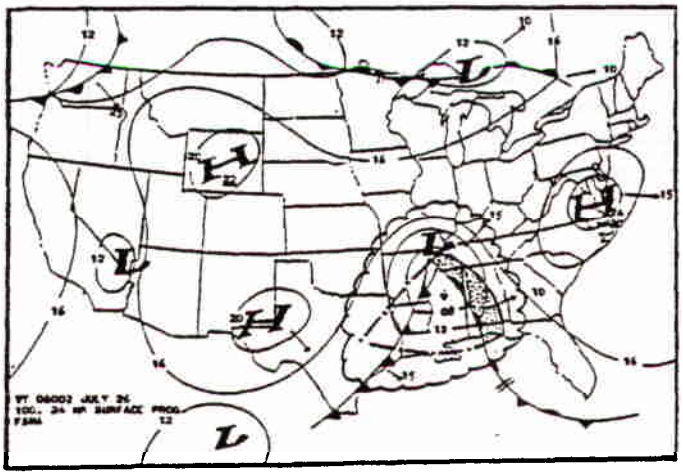


Figure 5-1

RADAR SUMMARY CHART

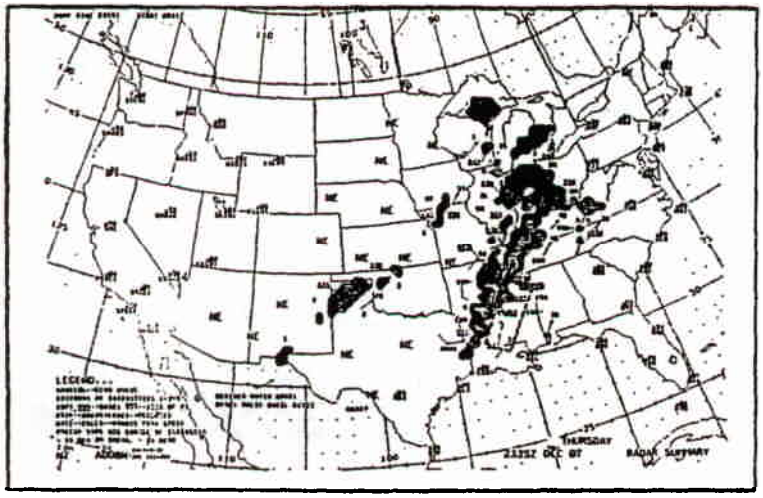


Figure 5-2

Thunderstorms are extremely dangerous to tactical jet type aircraft and should be avoided whenever possible. The Radar Summary Chart (Figure 5-2) will provide a pictorial display of the location and intensity of cells, areas of cells, and lines of cells in relation to your planned route-of-flight. Although observed information, this Chart is issued so often each day as to make the information continuously current for practical purposes.

SIGNIFICANT WEATHER PROGNOSTIC CHART

Another great danger to tactical jet type aircraft is clear air turbulence (CAT). It cannot be seen without special equipment and you would not normally detect it until encountered. It can cause severe damage to the aircraft and possibly a critical loss of altitude. The best indication that it may exist is the Significant Weather Depiction Chart (Figure 5-3). It provides a pictorial display of areas of forecast turbulence, high clouds, and areas of significant weather at cruising flight levels along your planned route-of-flight. You should plan to avoid those areas at the depicted altitudes.

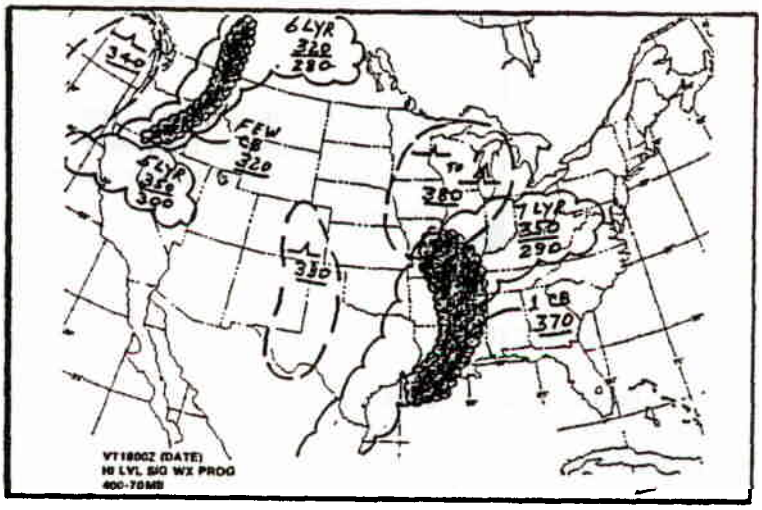
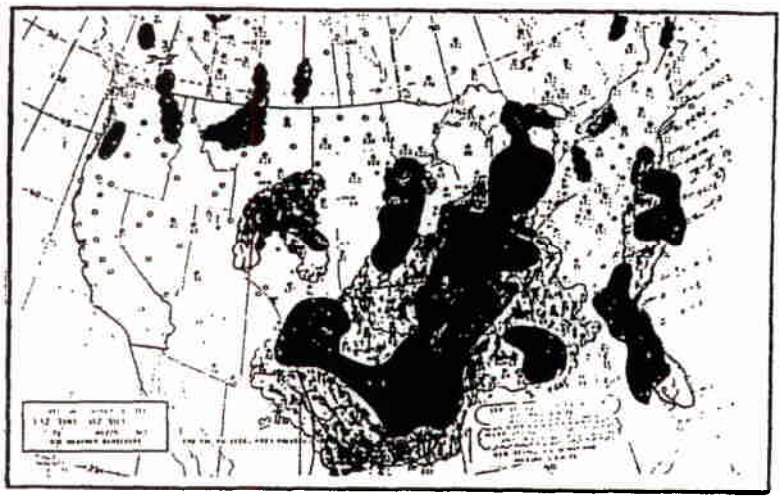


Figure 5-3

SURFACE WEATHER DEPICTION CHART



The Surface Weather Depiction Chart (Figure 5-4) provides a pictorial desplay of IFR areas (colored in RED), marginal VFR areas (colored in BLUE), and VFR areas in relation to your planned route-of-flight, that is, it displays minimum ceilings enroute. This Chart serves as an excellent source for directions to divert, especially in a situation of electrical failure.

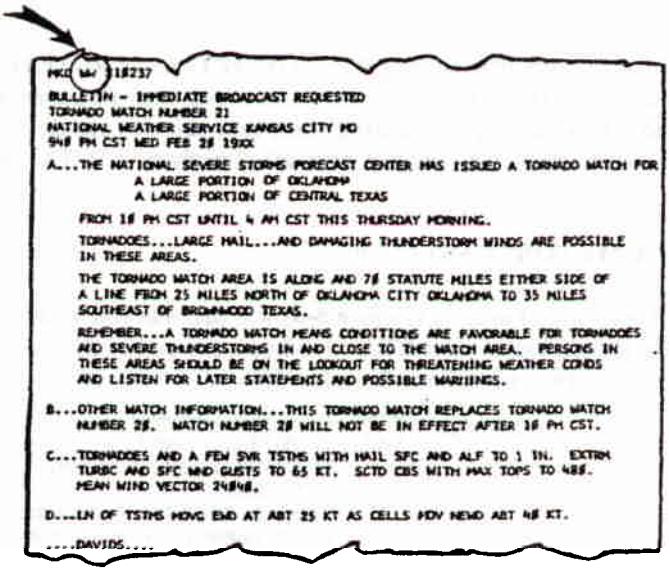
Figure 5-4

TELETYPE REPORTS

Just as with facsimile charts, there are certain teletype reports that are of particular importance to flight in tactical jet type aircraft. These are referenced by the forecaster in order to complete the Flight Weather Briefing (DD Form 175-1).

SEVERE WEATHER WATCH BULLETIN (WW)

Severe Weather Watch Bulletins (Figure 5-5) provide you with the location of areas of probable severe weather in relation to your planned route-of-flight. They may be further identified as tornado or thunderstorm watches. When planning a flight, you should always look first for WW's in effect since OPNAVINST 3710.7 limits flight in these areas and your squadron may prohibit flight in these areas. WW's will be displayed on a plotting board inside the weather office and sometimes on a plotting board near the Flight Clearance Center at Base Operations.



MKC WW 118237

BULLETIN - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 21
NATIONAL WEATHER SERVICE KANSAS CITY MO
9#8 PM CST WED FEB 2# 19XX

A...THE NATIONAL SEVERE STORMS FORECAST CENTER HAS ISSUED A TORNADO WATCH FOR
A LARGE PORTION OF OKLAHOMA
A LARGE PORTION OF CENTRAL TEXAS

FROM 1# PM CST UNTIL 4 AM CST THIS THURSDAY MORNING.

TORNADOES...LARGE HAIL...AND DAMAGING THUNDERSTORM WINDS ARE POSSIBLE IN THESE AREAS.

THE TORNADO WATCH AREA IS ALONG AND 7# STATUTE MILES EITHER SIDE OF A LINE FROM 25 MILES NORTH OF OKLAHOMA CITY OKLAHOMA TO 35 MILES SOUTHEAST OF BROWNWOOD TEXAS.

REMEMBER...A TORNADO WATCH MEANS CONDITIONS ARE FAVORABLE FOR TORNADOES AND SEVERE THUNDERSTORMS IN AND CLOSE TO THE WATCH AREA. PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR THREATENING WEATHER CONDS AND LISTEN FOR LATER STATEMENTS AND POSSIBLE WARNINGS.

B...OTHER WATCH INFORMATION...THIS TORNADO WATCH REPLACES TORNADO WATCH NUMBER 2#. WATCH NUMBER 2# WILL NOT BE IN EFFECT AFTER 1# PM CST.

C...TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND ALF TO 1 IN. EXTRM TURBC AND SFC WND GUSTS TO 65 KT. SCTD CBS WITH MAX TOPS TO 48#. MEAN WIND VECTOR 24#48.

D...LN OF TSTMS MOVG ENE AT ABT 25 KT AS CELLS MOV NEWD ABT 4# KT.

....DAVIDS....

Figure 5-5

INFLIGHT WEATHER ADVISORIES:

AIRMET (WA)

AIRMETs (Figure 5-6) are inflight weather advisories concerning weather phenomena potentially hazardous to single-engine aircraft and those aircraft with limited pilot experience or equipment capabilities.

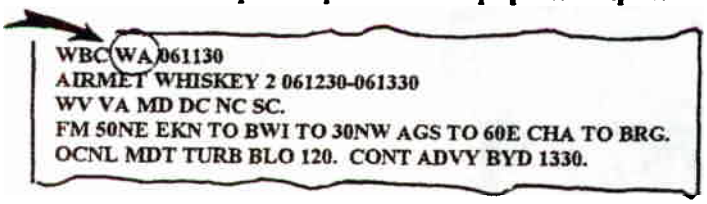


Figure 5-6

SIGMET (WS)

SIGMETs (Figure 5-7) are inflight weather advisories concerning weather phenomena potentially hazardous to all aircraft.

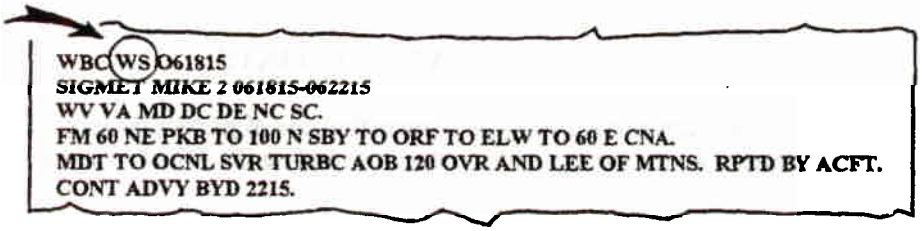


Figure 5-7

A little less in severity than a WW, AIRMETs and SIGMETs are intended primarily to provide enroute aircraft with information concerning weather conditions which may be hazardous to flight; however, any available advisories should be referenced during preflight planning since they serve to supplement and update Area Forecasts (FA). AIRMETs and SIGMETs are provided to enroute aircraft directly by ARTCC controllers through Center Weather Advisories (CWAs).

AERODROME FORECAST (TAF)

The Aerodrome Forecast (Figure 5-8) will provide you with forecast weather conditions for your planned destination airport for the period of your ETA +/- 1 hour, aid you in determining the need for an alternate airport, and provide you with the forecast weather conditions for your ETA +/- 1 hour at the selected alternate.

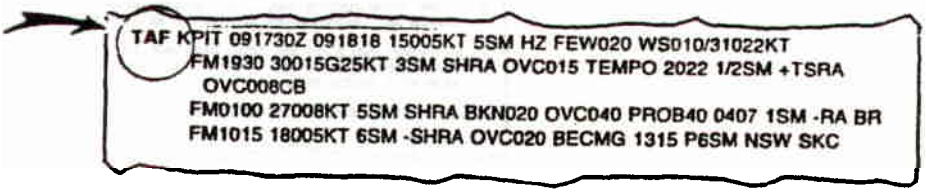
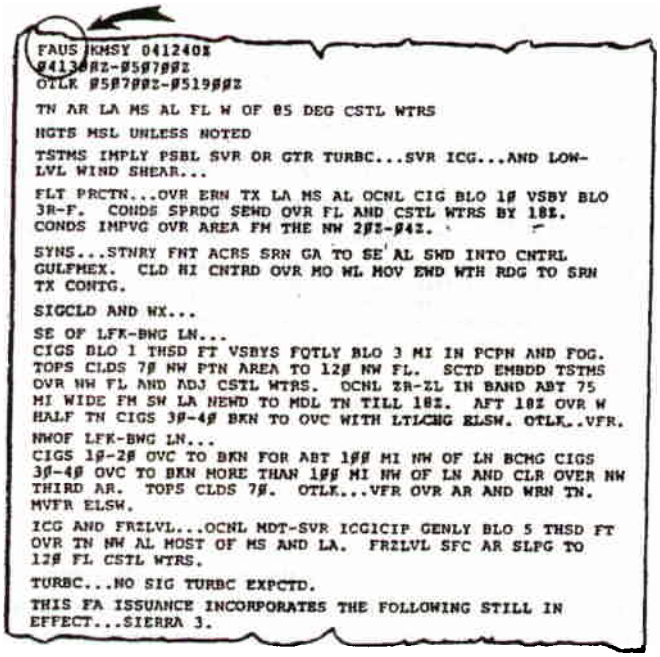


Figure 5-8

AREA FORECAST (FA)



```
FAUS KMSY 041240Z
041300Z-051700Z
OTLK 051700Z-051900Z

TN AR LA MS AL FL W OF 85 DEG CSTL WTRS

HGTS MSL UNLESS NOTED

TSTMS IMPLY PSBL SVR OR GTR TURBC...SVR ICG...AND LOW-
LVL WIND SHEAR...

FLT PRCTN...OVR ERN TX LA MS AL OCNL CIG BLO 1Z VSBY BLO
3R-F. CONDS SPRDG SEWD OVR FL AND CSTL WTRS BY 18Z.
CONDS IMPVG OVR AREA FM THE NW 2Z-4Z.

SYNS...STNRY FNT ACRS SRN GA TO SE AL SWD INTO CNTRL
GULFMEX. CLD HI CNTRD OVR MO WL MOV EWD WTH RDG TO SRN
TX CONTG.

SIGCLD AND WX...

SE OF LFK-BWG LN...
CIGS BLO 1 THSD FT VSBYS FQTLY BLO 3 MI IN PCPN AND FOG.
TOPS CLDS 7Z NW PTN AREA TO 12Z NW FL. SCTD EMBDD TSTMS
OVR NW FL AND ADJ CSTL WTRS. OCNL ZR-ZL IN BAND ABT 75
MI WIDE FM SW LA NEWD TO MDL TN TILL 18Z. AFT 18Z OVR W
HALF TN CIGS 3Z-4Z BKN TO OVC WITH LTLCHG ELSW. OTLK..VFR.

NWOF LFK-BWG LN...
CIGS 1Z-2Z OVC TO BKN FOR ABT 1ZZ MI NW OF LN BCMG CIGS
3Z-4Z OVC TO BKN MORE THAN 1ZZ MI NW OF LN AND CLR OVER NW
THIRD AR. TOPS CLDS 7Z. OTLK...VFR OVR AR AND WRN TN.
MVFR ELSW.

ICG AND FRZLVL...OCNL MDT-SVR ICGICIP GENLY BLO 5 THSD FT
OVR TN NW AL MOST OF MS AND LA. FRZLVL SFC AR SLPG TO
12Z FL CSTL WTRS.

TURBC...NO SIG TURBC EXPCTD.

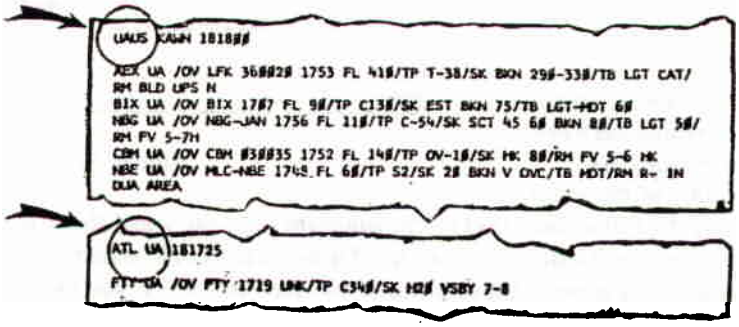
THIS FA ISSUANCE INCORPORATES THE FOLLOWING STILL IN
EFFECT...SIERRA 3.
```

Figure 5-9

In tactical jet type aircraft,you will be flying above almost all adverse weather conditions; however, somewhere in the vicinity of your planned terminal area you must descend through any existing weather conditions. While the Terminal Forecast provided forecast conditions for the planned destination and alternate airports, the Area Forecast (Figure 5-9) will provide you with a complete description of all weather conditions in the expanded general vicinity of your planned terminal areas. Of particular importance is a description of icing, turbulence, and thunderstorm activity in the general area.

PILOT REPORT (UA)

Where adverse conditions exist at an airport, it is sometimes difficult or impossible for the forecaster to determine actual conditions in the vicinity of an airport. One useful report in these situations is the Pilot Report, referred to as "PIREP" (Figure 5-10). These are reports from pilots concerning weather conditions they actually encountered or observed during departure and enroute phases of flight. After departure from an area of adverse weather conditions, you should give METRO an abbreviated description of what you encountered so as to aid pilots following you on flights from the same area.



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UAUS KJAN 181800

REK UA /OV LFK 360020 1753 FL 410/TP T-38/SK BKN 290-330/TB LGT CAT/
RM BLD UPS N
BIX UA /OV BIX 1787 FL 90/TP C130/SK EST BKN 75/TB LGT-MDT 60
NBG UA /OV NBG-JAN 1756 FL 110/TP C-54/SK SCT 45 60 BKN 80/TB LGT 50/
RM FV 5-7H
CBM UA /OV CBM 030035 1752 FL 140/TP OV-10/SK HK 80/RM FV 5-6 HK
NBE UA /OV MLC-NBE 1748 FL 60/TP S2/SK 20 BKN V OVC/TB MDT/RM R- IN
DUA AREA

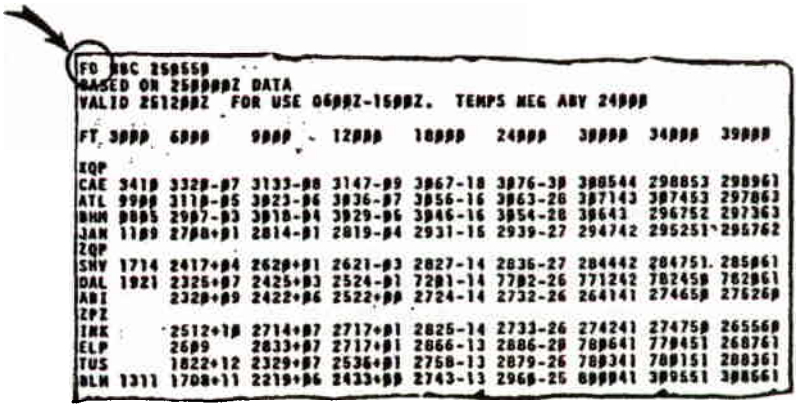
ATL UA 181725

FTY UA /OV FTY 1719 UNK/TP C340/SK H20 VSBY 7-8
```

Figure 5-10

WINDS ALOFT FORECAST (FD)

The Winds Aloft Forecast (Figure 5-11) is the primary source used to complete your Jet Flight Log. Before beginning your preflight, the forecaster will reference this report and recommend the best altitude to fly for the most advantageous winds. He will then give you the winds and temperatures over each NAVAID along your planned route and at your desired altitude so that you can complete each leg of the Jet Flight Log for groundspeed, time enroute, and fuel required.



```
FD BBC 250550
BASED ON 250000Z DATA
VALID 2512000Z  FOR USE 0600Z-1500Z.  TEMPS NEG ABV 24000

FT  3000   6000    9000    12000   18000   24000   30000   34000   39000

IQP
CAE 3410 3320-07 3133-08 3147-09 3067-18 3076-30 300544 298853 298961
ATL 9900 3110-05 3023-06 3036-07 3056-16 3063-28 307143 307453 297863
BHM 0005 2907-03 3018-04 3029-05 3046-16 3054-28 30643  296752 297363
JAN 1109 2708+01 2814-01 2819-04 2931-15 2939-27 294742 295251 295762
ZQP
SNY 1714 2417+04 2620+01 2621-03 2827-14 2836-27 284442 284751 285061
DAL 1921 2325+07 2425+03 2524-01 7201-14 7702-26 771242 702459 702961
ABI      2320+09 2422+06 2522+00 2724-14 2732-26 264141 274659 276269
ZPZ
INK      2512+10 2714+07 2717+01 2825-14 2733-26 274241 274759 265569
ELP      2609    2833+07 2717+01 2866-13 2886-28 700641 770451 268761
TUS      1822+12 2329+07 2536+01 2758-13 2879-26 700341 700151 280361
BLH 1311 1708+11 2219+06 2433+00 2743-13 2968-25 600041 300551 300661
```

Figure 5-11

JET STREAMS

The Jet Stream (Figure 5-12) is a narrow, shallow, meandering river of strong winds which usually extends around the temperate zones of the earth. There are several more or less permanent Jet Streams. The one you are primarily concerned about flows through the mid-latitudes of the United States. It follows a wavelike pattern as a part of the general wind flow from West to East, and it is locted in regions where there are large horizontal differences in temperature between warm and cold air masses.

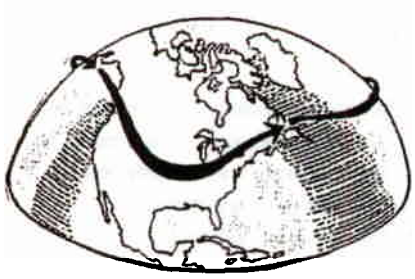


Figure 5-12

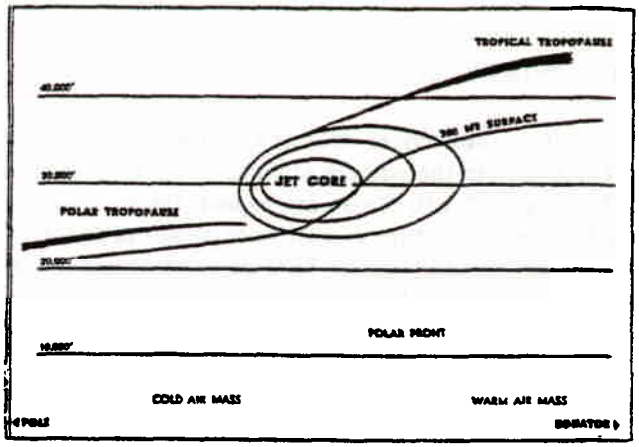


Figure 5-13

The average altitude of the Jet Stream core is about 30,000'(Figure 5-13) with the strongest winds between 25,000' and 40,000', depending on the season. As depicted in Figures 5-14 and 5-15, the rate of decrease of wind speed is considerably greater on the Polar side, that is, the magnitude of the wind sheer is greater on the Polar side. Since the Polar side is much steeper with more friction, if Clear Air Turbulence (CAT) exists, it will most likely be on the Polar side; however, the Polar side is also the shortest distance out of the Jet Stream. If you encounter adverse winds or turbulence, your best action would be to climb or descend toward the Polar side for rapid exit.

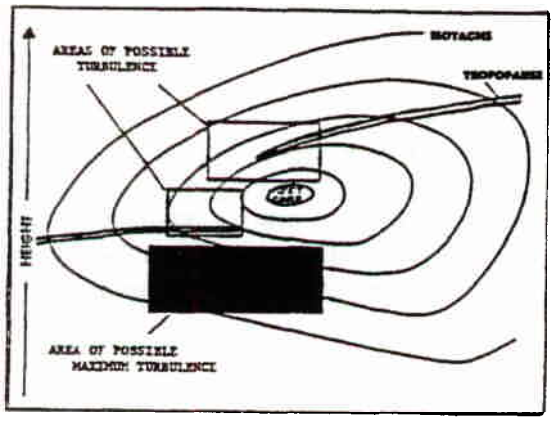


Figure 5-14

NOTE

The magnitude of the wind shear is actually greater on the Polar side than is depicted in these diagrams, that is, the Isotachs are much closer together. This results in a shorter distance toward the Polar side.

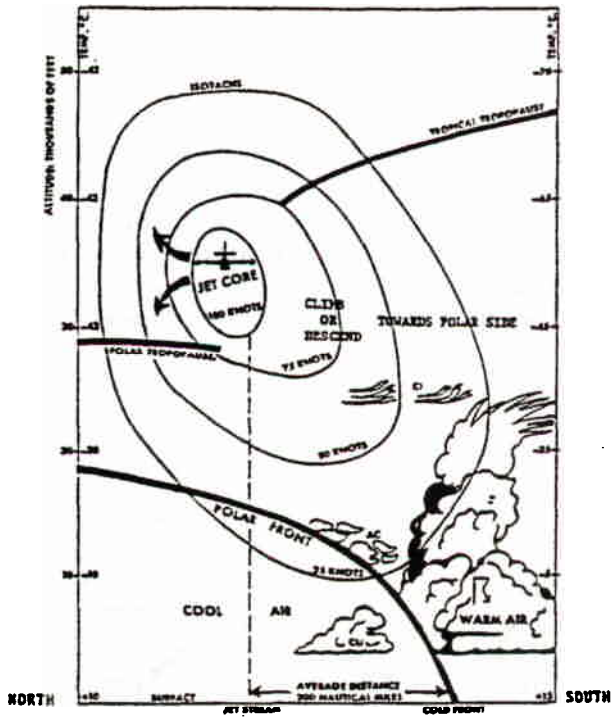


Figure 5-15

The mean positin of the Jet Stream shifts South in the Winter and North in the Summer with the seasonal migration of the Polar Front.

As the Jet Stream moves South in the Winter, the mean postion of the core increases in altitude since the cold air mass is much stronger, that is, much thicker and higher in altitude. Wind speeds increase and the wind system associated with the Jet Stream expands. In tactical jet type aircraft you are almost always fuel critical. If planning a Westerly direction flight, you will have to flight plan carefully because you will encounter very strong headwinds in the Winter at much lower altitudes; therefore, the distance you can fly will be restricted. Fuel status should be monitored closely as the flight progresses, and if winds become too adverse, a decision made to divert. If planning an Easterly direction flight in the Winter, you will be able to fly farther in distance because of the very strong tailwinds associated with the Jet Stream.

As the Jet Stream moves North in the Summer, the mean position of the core decreases in altitude since the cold air mass is not as strong and lower in altitude. Wind speeds decrease and the wind system associated with the Jet Stream is not as large. You will be able to fly farther in distance on Westerly flights because the headwinds are not as strong. Conversely, you cannot fly as far on Easterly flights since you will not have the strong tailwinds associated with the Jet Stream.

SUMMARY

Jet Streams shift South in Winter - Everything increases.
Jet Streams shift North in Summer - Everything decreases.

VOID TIME

The forecaster will complete a Flight Weather Briefing (DD Form 175-1) WHICH IS REQUIRED FOR ALL FLIGHTS TO BE CONDUCTED UNDER INSTRUMENT FLIGHT RULES, conduct a formal weather briefing from that form, and give you a copy. It will contain a weather briefing number, which you will enter on your Military Flight Plan (DD Form 175), and a "VOID TIME" for the weather briefing (Figure 5-16). The Void Time shall not exceed the "weather briefed" time by more than 2 hours, and not exceed the planned departure time by more than 30 minutes. Depending on weather conditions, this time may be extended at discretion of the forecaster.

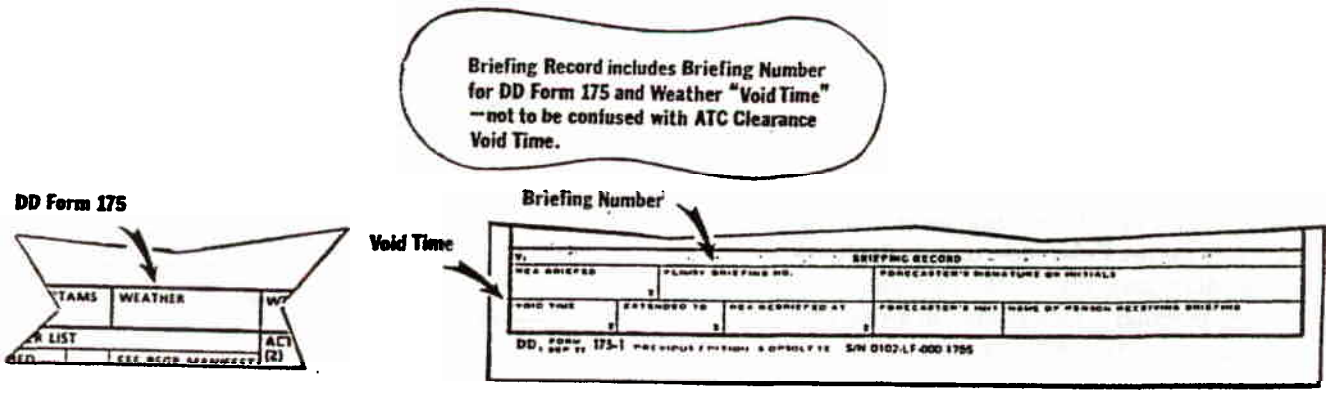


Figure 5-16

CAUTION

Do not depart with an invalid weather brief. If the "VOID TIME" expires, either return to the Weather Office for a briefing update or call "METRO" for an extension of the Void Time.

NAVIGATION COMPUTER (WIND SIDE)

ENABLING OBJECTIVE: Demonstrate a working knowledge of the Wind Side of the circluar computer by using the various scales to solve practical problems in air navigation.

SPECIFIC OBJECTIVES:

6.1 Using forecast winds aloft and appropriate information on the Enroute Charts, compute a Groundspeed for each leg of a planned flight.

6.2 Using appropriate information on the Instrument Approach Procedure Charts, compute a course and distance from the planned destination Initial Approach Fix to the planned alternate Initial Approach Fix (Point-to-Point).

INTRODUCTION

The circular computer has been designed to aid pilots in the solution to problems involving flight, and primarily to compute time enroute and fuel required for a flight. The Navy uses various types and models, but whether it be a Jeppesen, Telex, Allegheny, or one of several other makes, they are all either identical or similar in design. You have already been exposed to this type computer during the Schools Command and Primary phases of training. This chapter of the Student Guide will be confined to a review of using the "Wind Side" of the computer to complete Jet Flight Log problems:

- **Computing groundspeed to determine time enroute and fuel required for each leg of flight.**
- **Computing a course and distance from destination Initial Approach Fix to alternate Initial Approach Fix, that is, a point-to-point calculation.**

To solve these problems on any model of the circular computer consists of a simple arrangment for setting up vector triangles.

GROUNDSPEED

There are two types of winds associated with flying operations, TRUE and MAGNETIC. The surface winds you receive from Approach/Departure Control and Airport Traffic Control Towers are MAGNETIC winds, which coincide with the magnetic direction of runways. The enroute winds you receive from the forecaster are TRUE winds, and are taken from the teletype Winds Aloft Forecast (FD) and Winds Aloft Charts.

You will be primarily working with the FLIP Enroute High Altitude Charts which depict radials (courses) in degrees Magnetic. These are the radials you set in your Course Selector on the ID-249. You will fly a Magnetic Heading on your RMI to make good the course, or track-over-the-ground, you have selected. In flight planning, therefore, if you are faced with TRUE WINDS and MAGNETIC COURSES, it is obvious something has to be done to make them compatible.

The circular computer solves this by providing a Magnetic-True conversion scale on either side of the True Course (TC) Index. From the face of the FLIP Enroute Charts, you obtain your desired Magnetic Course and also the Magnetic Variation in the area. By setting the Magnetic Course on the "Degrees Scale" over the Variation (East or West), the wind scale is automatically aligned to True North to allow use of the True Winds Aloft which you received from the forecaster. You can now compute groundspeeds by applying these winds to each leg of flight.

NOTE

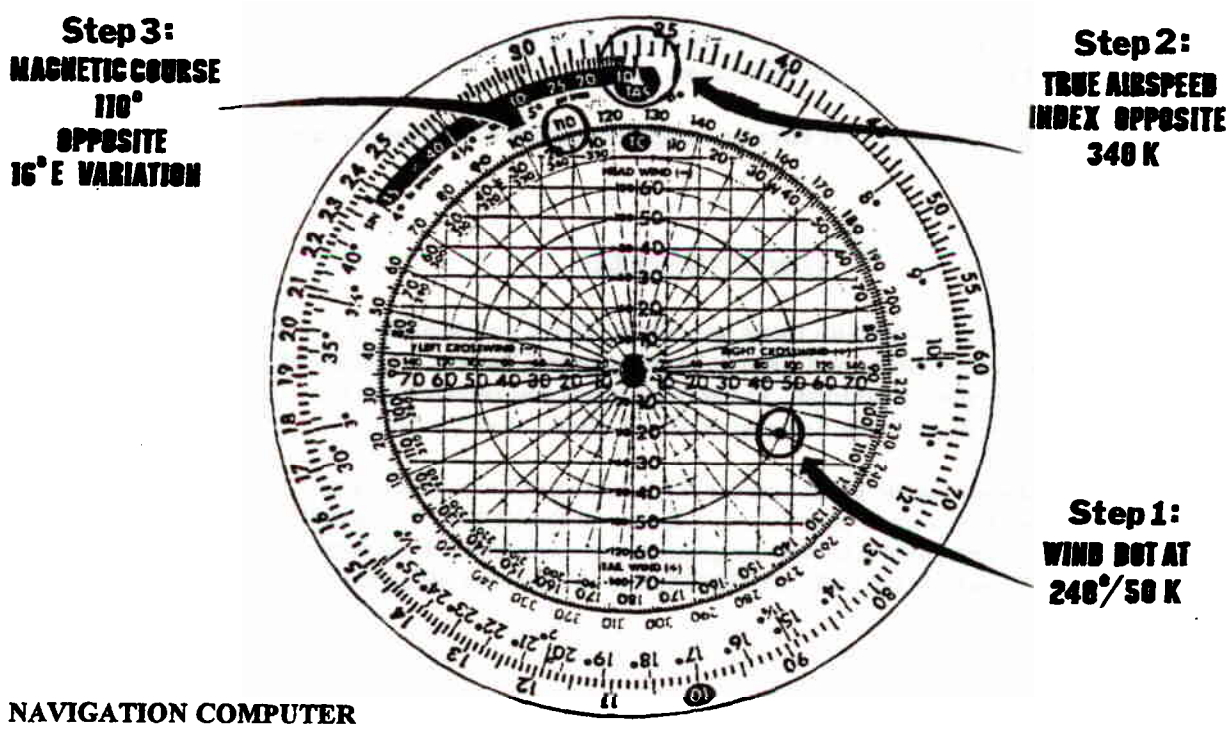
GREEN lines of Magnetic Variation are depicted at four (4) degree intervals on the Enroute Charts. You should interpolate between lines to obtain the approximate Variation in your area of flight.

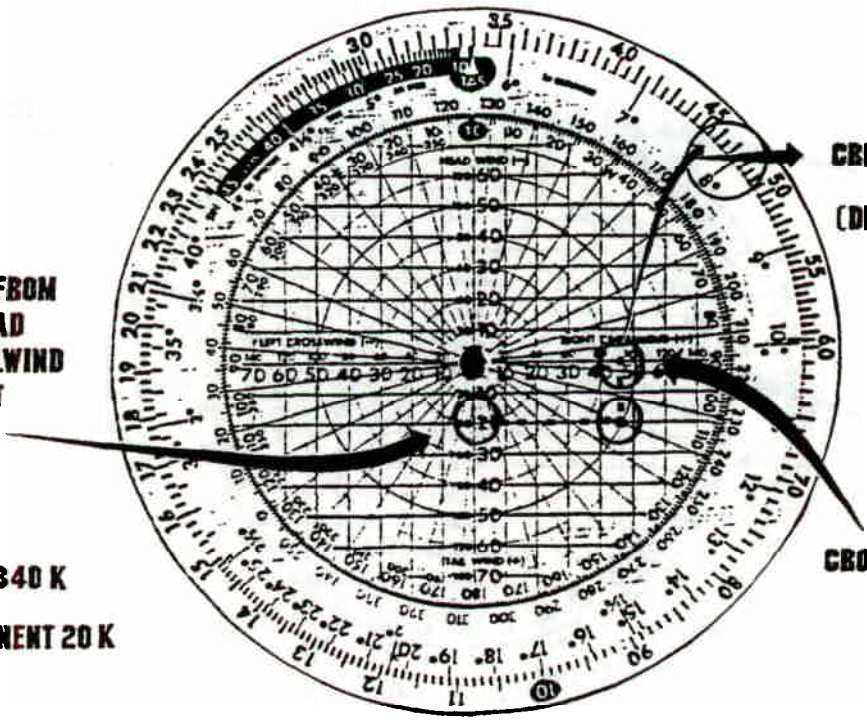
EXAMPLES

1. COMPUTING GROUNDSPEED WITH CRAB ANGLE LESS THAN 10 DEGREES.

You obtain the following information to complete one leg of flight on the Jet Flight Log:

WIND	240°/50 K
TRUE AIRSPEED	340 K
MAGNETIC COURSE	110°
VARIATION	16° E





Step 5:
READ CRAB ANGLE OPPOSITE CROSSWIND COMPONENT

(DISREGARD CRAB ANGLE IF LESS THAN 10°)

Step 6:
HORIZONTALLY FROM WIND DOT READ HEADWIND/TAILWIND COMPONENT 20 K

Step 4:
VERTICALLY FROM WIND DOT READ CROSSWIND COMPONENT 46 K

Step 7:
TRUE AIRSPEED 340 K
+
TAILWIND COMPONENT 20 K

ANSWER: GROUNDSPEED 360 K

2. COMPUTING GROUNDSPEED WITH CRAB ANGLE 10 DEGREES OR GREATER

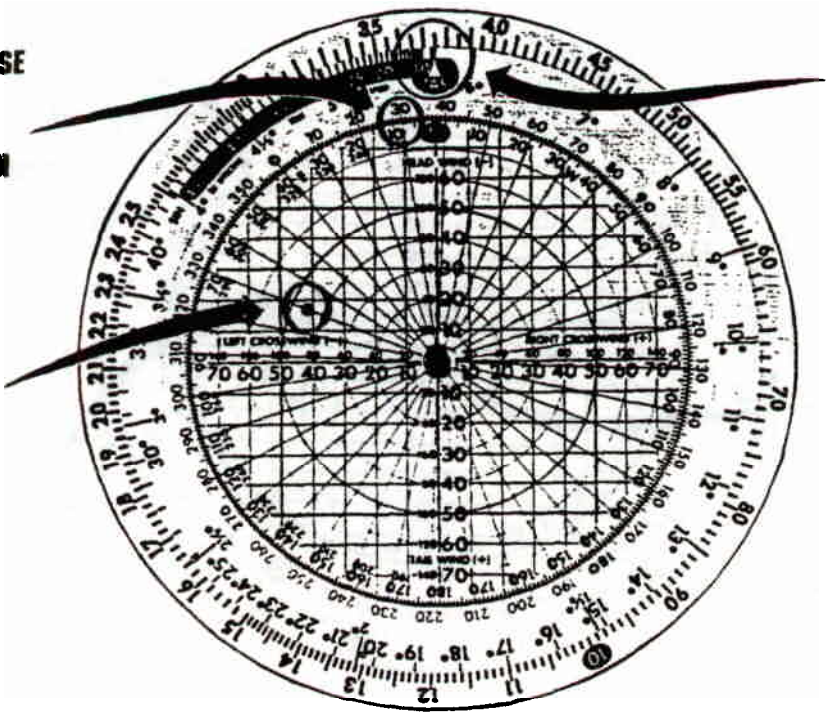
You obtain the following information to complete one leg of flight on the Jet Flight Log:

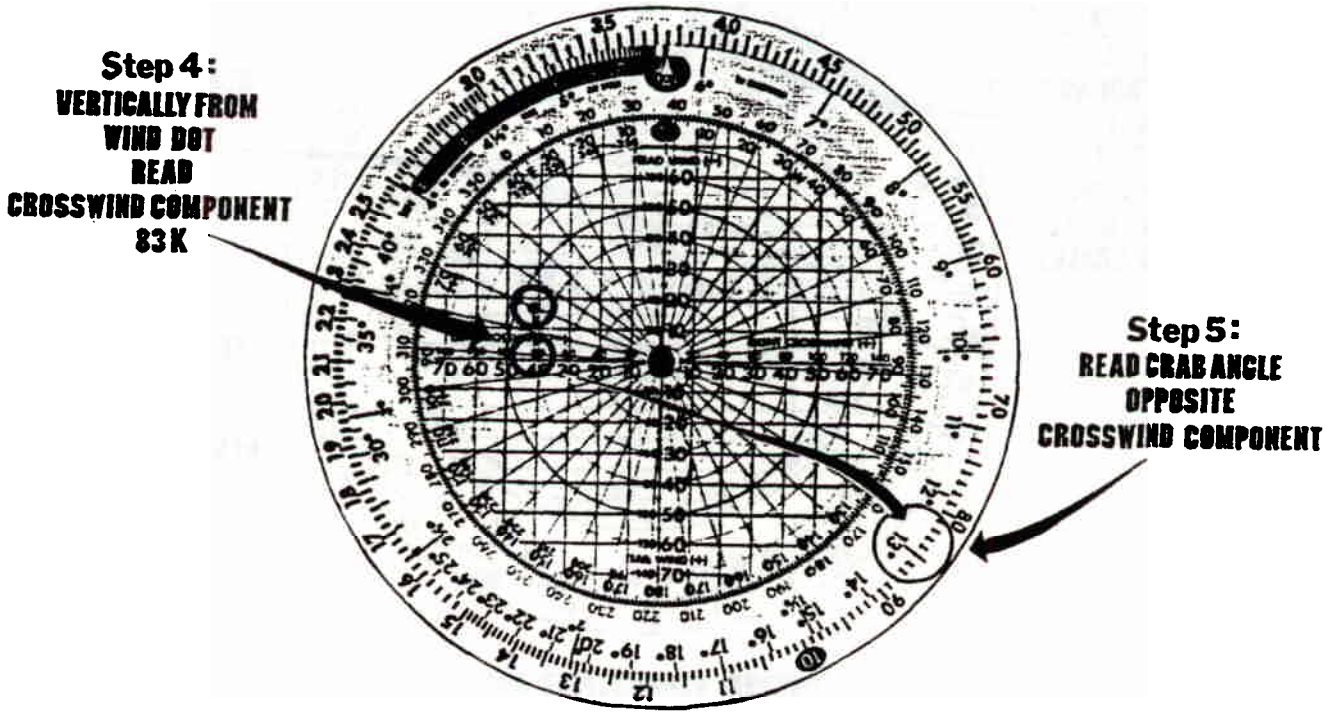
WIND	**330°/90 K**
TRUE AIRSPEED	**375 K**
MAGNETIC COURSE	**030°**
VARIATION	**8° E**

Step 3:
MAGNETIC COURSE 030° OPPOSITE 8° E VARIATION

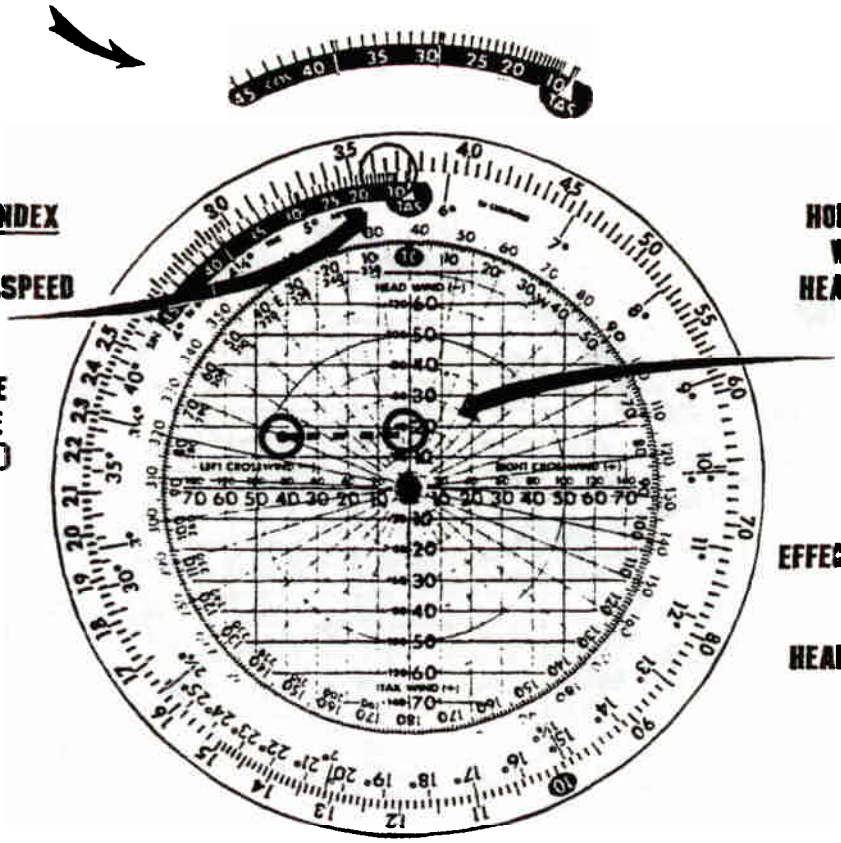
Step 2:
TRUE AIRSPEED INDEX OPPOSITE 375 K

Step 1:
WIND DOT AT 330°/90 K




Step 4:
VERTICALLY FROM
WIND DOT
READ
CROSSWIND COMPONENT
83 K
Step 5:
READ CRAB ANGLE
OPPOSITE
CROSSWIND COMPONENT

For wind problems where the crab angle is less than 10 degrees, the headwind or tailwind component is simply applied to the True Airspeed to obtain Groundspeed. With small crab angles, this is very close to being accurate, any inaccuracy being too small to be concerned about. With crab angles of 10 degrees or more, however, the error is large enough to require the use of EFFECTIVE TRUE AIRSPEED (Cosine Scale) for obtaining more precise groundspeeds.



ANSWER: GROUNDSPEED 330 K

POINT-TO-POINT

On the front side lower portion of the Jet Flight Log are spaces for cruising from destination Initial Approach Fix to alternate Initial Approach Fix. The "Wind Side" of the circular computer can be used to determine Magnetic Course and distance for this leg of flight.

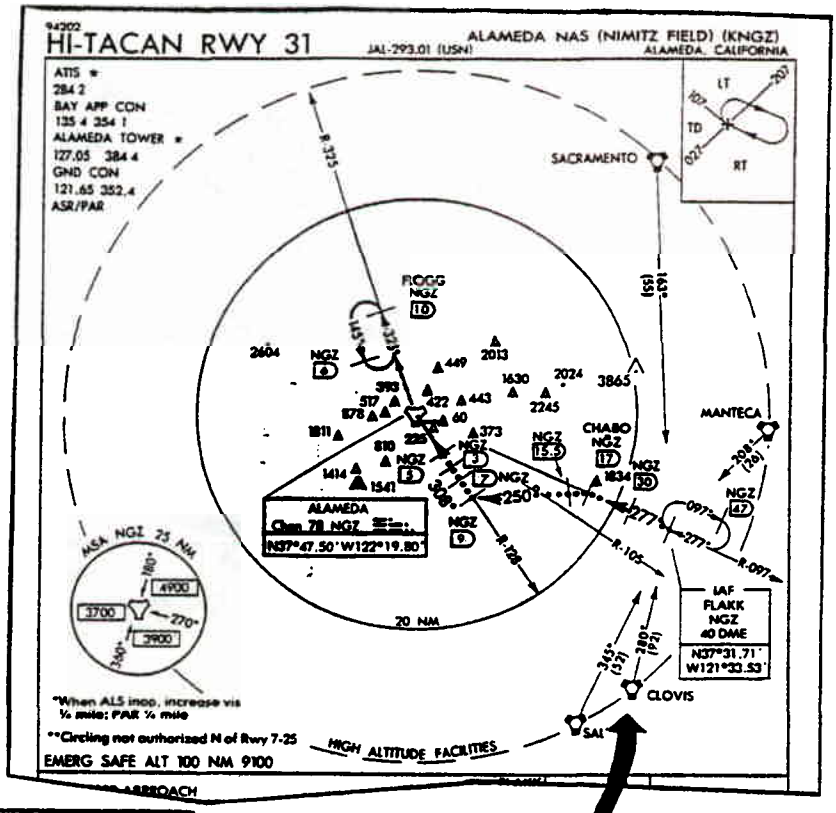
STEP 1:

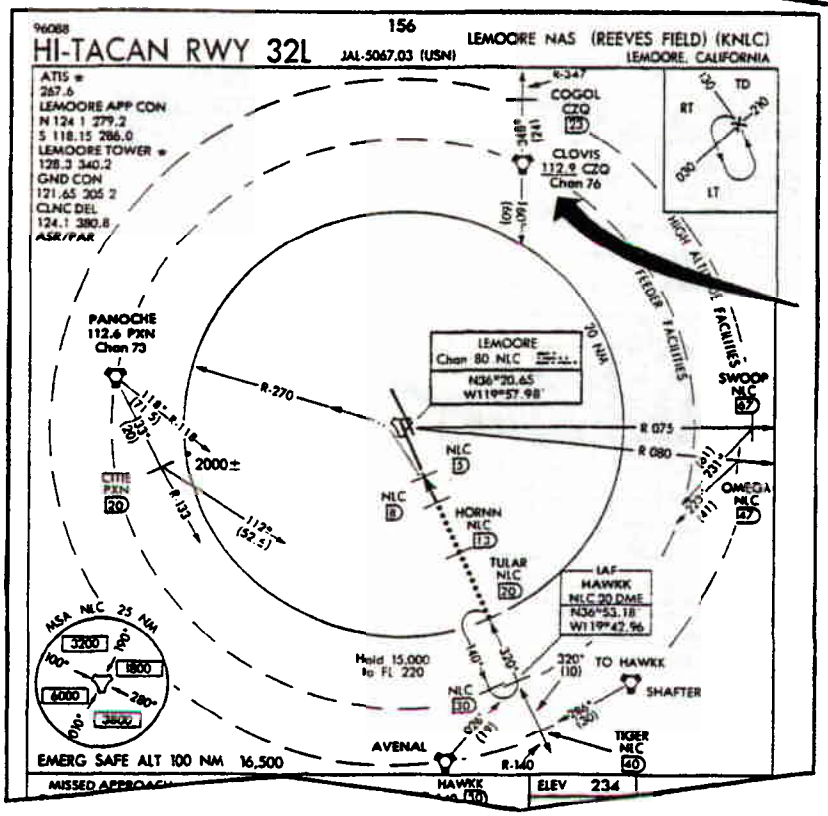
Determine appropriate Approach Procedure Charts for probable runways in use at destination and alternate based on forecast surface winds.

EXAMPLE:

Destination - ALAMEDA NAS
RUNWAY 31

Alternate - LEMOORE NAS
RUNWAY 32L





STEP 2:

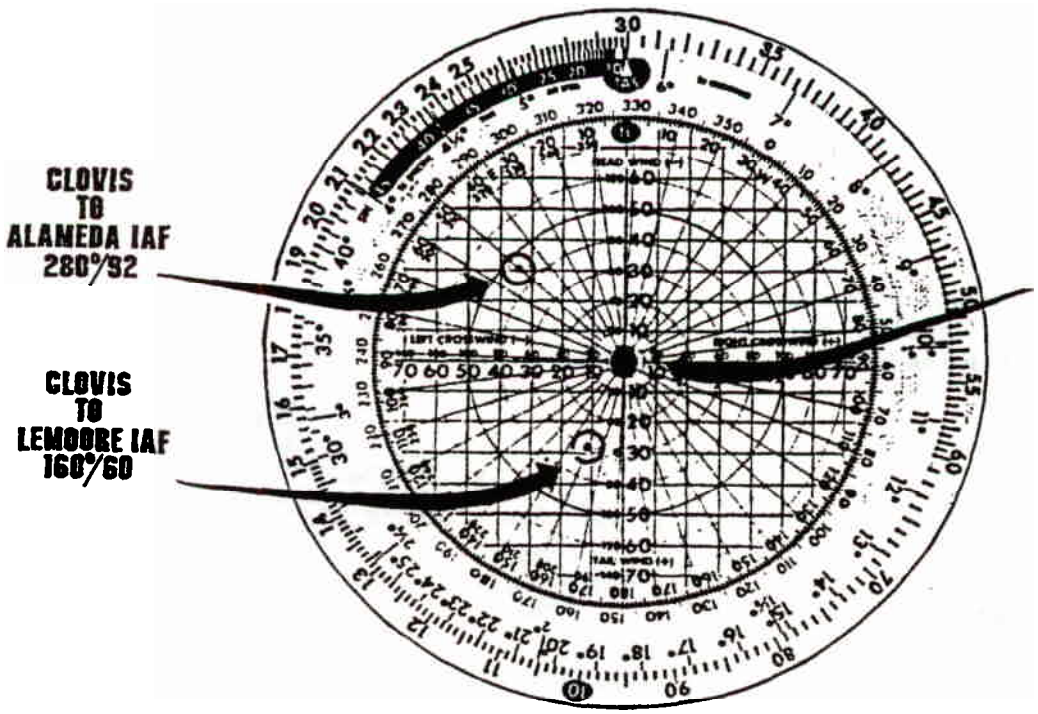
Locate a NAVAID common to both Approach Procedure Charts which have "Feeder Routes" to the Initial Approach Fix.

EXAMPLE:

CLOVIS VORTAC is depicted on both Charts with "Feeder Routes" to the Initial Approach Fix.

STEP 3:

With the center of the computer being the common NAVAID, CLOVIS VORTAC, plot the IAF for ALAMEDA NAS and the IAF for LEMOORE NAS by using the "Feeder Routes" on the two Approach Procedure Charts.



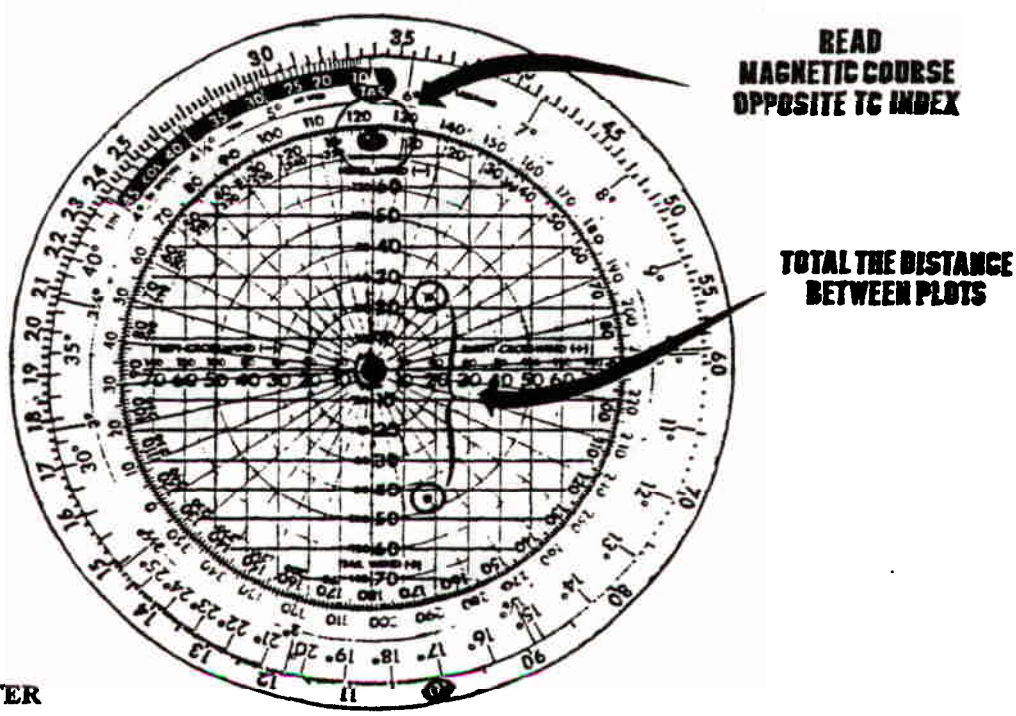
The "Feeder Routes" give two sides of a triangle from the center. Solution of the third side will be the Magnetic Course and distance from IAF to IAF. This method can be used to solve any point-to-point problem.

STEP 4:

Align the two IAF plots parallel to one of the black vertical lines and read MAGNETIC COURSE and DISTANCE.

CAUTION

Alternate plot must be at top to prevent reading reciprocal course.



ANSWER: IAF TO IAF 123°/134 NM

PREFLIGHT PLANNING

ENABLING OBJECTIVE: Demonstrate a knowledge of general preflight planning procedures, including OPNAV criteria for fuel, weather, and alternate airport planning, and demonstrate a working knowledge of common procedures for completing Jet Flight Logs and the various types of Military Flight Plans (DD Form 175).

SPECIFIC OBJECTIVES:

PART 1 - FUEL, WEATHER AND ALTERNATE AIRPORT PLANNING.

7.1 Name the publication which dictates the fuel, weather, and alternate airport planning criteria for Naval Aviators.

7.2 State the basic VFR minimums required for departure and terminal airports on a VFR flight.

7.3 State the requirements for "Special VFR".

7.4 State the enroute cloud clearance and visibility requirements for VFR flight.

7.5 State the OPNAV minimum weather criteria to plan for a suitable destination and a suitable alternate in a single-piloted aircraft and/or other aircraft with only one operable means of two-way communications on an IFR flight.

7.6 State the OPNAV requirements for filing to a "Radar Only" airport on an IFR flight.

7.7 State the OPNAV minimum fuel requirements for an IFR flight.

PART 2 - JET FLIGHT LOG.

7.8 Determine the information required to complete each section of a Jet Flight Log.

PART 3 - MILITARY FLIGHT PLAN (DD FORM 175).

7.9 Determine the information required to complete basic types of Military Flight Plans:

a. One-leg flight plan.
b. Stopover flight plan.
c. Terminal delay flight plan.
d. Enroute delay flight plan.

7.10 State the procedures for filing an IFR flight plan.

7.11 State the three documents a pilot should have for all IFR flights outside the local training area.

PART 1 - FUEL, WEATHER, AND ALTERNATE AIRPORT PLANNING

INTRODUCTION

Prior to planning any flight, whether it be VFR or IFR, you should have a plan-of-action. This plan for your flight will be finalized during preflight planning in the form of your JET FLIGHT LOG and MILITARY FLIGHT PLAN (DD FORM 175). Before beginning this, however, you must examine the forecast weather conditions for your proposed area of flight and determine if your planned destination is forecasting suitable conditions, select a suitable alternate destination, if one is required, and determine the adequate fuel requirements for developing your plan-of-action. The criteria for this process is set forth in the OPNAVINST 3710.7 series for Naval aviators.

You must keep in mind that your minimums will be different for PLANNING, TAKEOFF, and APPROACH phases of a flight. Navy pilots must have both ceiling and visibility for each phase, with the absolute minimums for single-piloted aircraft being 200 and 1/2. Always use what is published on the Approach Procedure Chart for ceiling, and what is published for visibility, and then apply your absolute minimums to each of these numbers for planning, takeoff, and approach. THIS IS THE PLANNING PHASE.

WEATHER CRITERIA FOR FILING VFR

For a VFR flight, you must have at least 1000' ceiling and 3 miles visibility to depart an airport in controlled airspace, be able to maintain the appropriate enroute cloud clearance and visibility requirements for VFR flight, and have forecast weather conditions of at least 1000' ceiling and 3 miles visibility for your planned destination.

An exception for VFR operations to, from, or within a controlled airport is "SPECIAL VFR". This is authorization to operate to, from, or within a controlled airport when the existing weather conditions are less than basic VFR minimums.

SPECIAL VFR OPERATIONS:

* 500' Ceiling (Navy requirement, not FARs).
* Clear of clouds and 1 mile visibility.
* Requested by the pilot (from an ATC facility - normally the Airport Traffic Control Tower).
* Pilot instrument rated and aircraft instrument equipped.

NOTE

FAR, Part 91 requires aircraft be instrument equipped only for night Special VFR; however, OPNAV requirements are for day and night Special VFR operations.

For the enroute phase of a VFR flight, Navy pilots are responsible for the cloud clearance and visibility requirements set forth in FAR, Part 91 (Figure 7-1).

Airspace	*Flight Visibility*	*Distance from clouds*
Class E		
Less than 10,000 feet MSL	*3 statute miles*	*500 feet below.* *1,000 feet above.* *2,000 feet horizontal.*
At or above 10,000 feet MSL	*5 statute miles*	*1,000 feet below.* *1,000 feet above.* *1 statute mile horizontal.*
Class G:		
1,200 feet or less above the surface (regardless of MSL altitude)		
Day	*1 statute mile*	*Clear of clouds.*
Night	*3 statute miles*	*500 feet below.* *1,000 feet above.* *2,000 feet horizontal.*

MINIMUM VFR VISIBILITY AND DISTANCE FROM CLOUDS

Figure 7-1

WEATHER CRITERIA FOR FILING IFR

Figure 7-2 is the filing criteria chart found in OPNAVINST 3710.7 for all IFR flights. Always apply the OPNAV filing criteria to the published minimums for the Instrument Approach Procedure to the probable runway in use based on forecast surface winds at the planned destination and planned alternate airports.

<table>
<tr><td>DESTINATION WEATHER
ETA plus and minus one (1) hour</td><td colspan="3">ALTERNATE WEATHER
ETA plus and minus one (1) hour</td></tr>
<tr><td>0–0 up to but not including published minimums</td><td colspan="3">3,000 – 3 or better</td></tr>
<tr><td rowspan="2">Published minimums up to but not including 3,000 – 3 (single piloted absolute minimums 200 – 1/2)</td><td rowspan="2">NON-PRECISION</td><td colspan="2">PRECISION</td></tr>
<tr><td>ILS</td><td>PAR</td></tr>
<tr><td></td><td>Published minimums plus 300-1</td><td>Published minimums plus 200–1/2</td><td>*Published minimums plus 200–1/2</td></tr>
<tr><td>3,000 – 3 or better</td><td colspan="3">No alternate required</td></tr>
<tr><td colspan="4">*In the case of single-piloted or other aircraft with only one operable UHF/VHF transceiver, radar approach minimums may not be used as the basis for selection of an alternate airfield.</td></tr>
</table>

Figure 7-2

For IFR operations, there are certain OPNAV guidelines pertaining to weather minimums:

* **Do not confuse PLANNING, TAKEOFF and APPROACH weather minimum requirements. Each phase of flight has different weather minumum requirements. THIS CHAPTER CONCERNS THE PLANNING PHASE.**

* **Do not confuse the OPNAV "Single Radio" restrictions with OPNAV "Single Pilot" restrictions.**

* **Always apply the OPNAV weather minimum requirements to BOTH published ceiling and published visibility values for PLANNING, TAKEOFF and APPROACH phases of flight.**

* **When applying the OPNAV weather minimum requirements for PLANNING, TAKEOFF and APPROACH, each type of published approach procedure has specified minimums - TACAN Straight-in, TACAN Circling, PAR, ASR, ADF, etc.**

EXAMPLE:

CATEGORY	C	D	E
S-TAC	520-40 287 (300-3/4)		
*CIRCLING	700-1/2 466 (500-1 1/2)	800-2 566 (600-2)	
S-PAR-32L	333/16 100 (100-1/4) GS 3.8		
* CIRCLING NORTHEAST NOT AUTHORIZED			

NOTE

When referencing the Instrument Approach Procedure Charts, use CATEGORY C minimums for the T2C.

* **For PLANNING, always use PAR minimums, if available, to evaluate the planned destination.**

NOTE

Absolute minimums for Navy single-piloted aircraft are 200 feet ceiling and 1/2 mile visibility.

* **For PLANNING, always use TACAN published minimums plus a safety factor of 300 and 1 to select a suitable alternate due to only one means of radio communications.**

NOTE

Selecting a suitable alternate for PLANNING is the absolute only time you are concerned about having one radio.

Consider three situations of forecast weather conditions and the applicable OPNAV filing criteria.

SITUATION 1: DESTINATION FORECASTING 3000 - 3 OR BETTER

DESTINATION WEATHER ETA plus and minus one (1) hour	ALTERNATE WEATHER ETA plus and minus one (1) hour		
0—0 up to but not including published minimums	3,000 — 3 or better		
Published minimums up to but not including 3,000 — 3 (single piloted absolute minimums 200 — 1/2)	NON-PRECISION	PRECISION	
		ILS	PAR
	Published minimums plus 300-1	Published minimums plus 200—1/2	*Published minimums plus 200—1/2
3,000 — 3 or better	No alternate required		

*In the case of single-piloted or other aircraft with only one operable UHF/VHF transceiver, radar approach minimums may not be used as the basis for selection of an alternate airfield.

In this situation, an ALTERNATE IS NOT REQUIRED. (For training only, a suitable alternate is required for all cross-country flights in CNATRA aircraft).

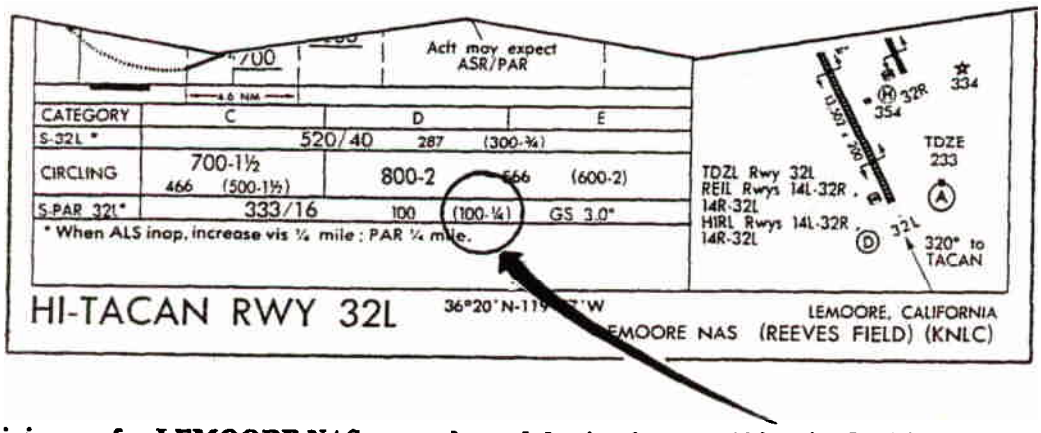
SITUATION 2: DESTINATION FORECASTING BELOW PUBLISHED MINIMUMS

DESTINATION WEATHER ETA plus and minus one (1) hour	ALTERNATE WEATHER ETA plus and minus one (1) hour		
0—0 up to but not including published minimums	3,000 — 3 or better		
Published minimums up to but not including 3,000 — 3 (single piloted absolute minimums 200 — 1/2)	NON-PRECISION	PRECISION	
		ILS	PAR
	Published minimums plus 300-1	Published minimums plus 200—1/2	*Published minimums plus 200—1/2
3,000 — 3 or better	No alternate required		

*In the case of single-piloted or other aircraft with only one operable UHF/VHF transceiver, radar approach minimums may not be used as the basis for selection of an alternate airfield.

When evaluating your planned destination, use the lowest minimums for which your aircraft is equipped; therefore, if available, ALWAYS USE PAR PUBLISHED MINIMUMS FOR YOUR DESTINATION with absolute minimums for single-piloted aircraft being 200 and 1/2.

EXAMPLE:



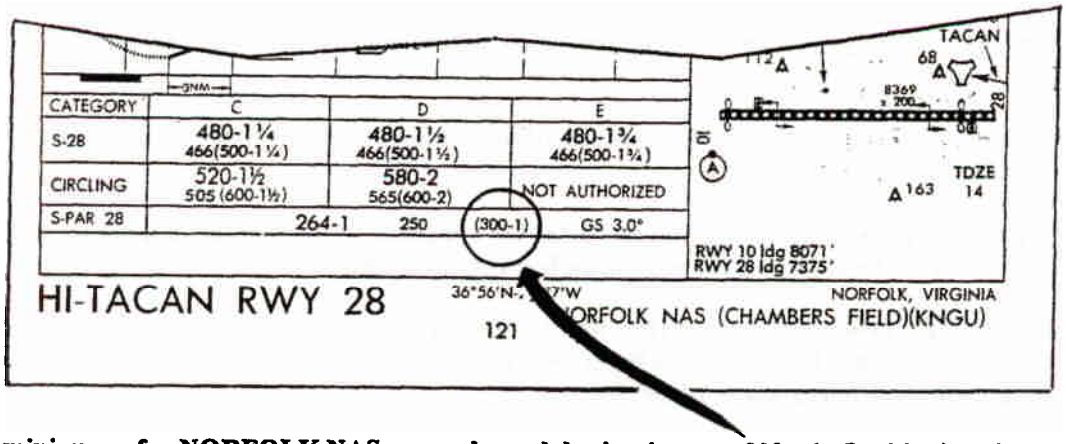
Published PAR minimums for LEMOORE NAS, your planned destination, are 100 - 1/4. In this situation, your absolute minimums in a single-piloted aircraft are 200 - 1/2; therefore, if LEMOORE NAS was forecasting less than 200 - 1/2 for your ETA +/- 1 hour, then your ALTERNATE MUST BE FORECASTING 3000 - 3 OR BETTER.

SITUATION 3: DESTINATION FORECASTING BETWEEN PUBLISHED MINIMUMS AND 3000 AND 3

DESTINATION WEATHER ETA plus and minus one (1) hour	ALTERNATE WEATHER ETA plus and minus one (1) hour		
0–0 up to but not including published minimums	3,000 – 3 or better		
Published minimums up to but not including 3,000 – 3 (single piloted absolute minimums 200 – 1/2)	NON-PRECISION	PRECISION	
		ILS	PAR
	Published minimums plus 300-1	Published minimums plus 200–1/2	*Published minimums plus 200–1/2
3,000 – 3 or better	No alternate required		

*In the case of single-piloted or other aircraft with only one operable UHF/VHF transceiver, radar approach minimums may not be used as the basis for selection of an alternate airfield.

EXAMPLE:



Published PAR minimums for NORFOLK NAS, your planned <u>destination</u>, are 300 - 1. In this situation, your absolute minimums are the higher of 200 - 1/2 or published minimums; therefore, your minimums are 300 - 1. If NORFOLK NAS was forecasting between 300 - 1 and 3000 - 3 for your ETA +/- 1 hour, then your <u>ALTERNATE MUST BE FORECASTING NON-PRECISION PUBLISHED MINIMUMS PLUS 300 AND 1</u>.

SINGLE-PILOT OR ONE RADIO RESTRICTION

DESTINATION WEATHER ETA plus and minus one (1) hour	ALTERNATE WEATHER ETA plus and minus one (1) hour		
0–0 up to but not including published minimums	3,000 – 3 or better		
Published minimums up to but not including 3,000 – 3 (single piloted absolute minimums 200 – 1/2)	NON-PRECISION	PRECISION	
		ILS	PAR
	Published minimums plus 300-1	Published minimums plus 200–1/2	*Published minimums plus 200–1/2
3,000 – 3 or better	No alternate required		

*In the case of single-piloted or other aircraft with only one operable UHF/VHF transceiver, radar approach minimums may not be used as the basis for selection of an alternate airfield.

Single-piloted aircraft <u>OR</u> aircraft with only one operable means of two-way radio communication cannot use radar as a basis for selection of an alternate airport. Only TACAN published minimums plus a safety factor of 300 and 1 can be used to select an alternate. This is the <u>ONLY TIME</u> you are concerned about one radio - PLANNING FOR AN ALTERNATE.

OPNAV FUEL REQUIREMENTS

All aircraft shall carry sufficient usable fuel, considering all meterological factors and mission requirements as computed below:

a. If an alternate is not required, fuel to fly from takeoff to destination airfield plus a reserve of 10 percent of planned fuel requirements.

b. If an alternate is required, fuel to fly from takeoff to the approach fix serving the destination and thence to an alternate airfield plus a reserve of 10 percent of planned fuel requirements.

c. In no case shall the planned fuel reserve after final landing at destination or alternate airfield, if one is required, be less than that needed for 20 minutes flight. For turbine powered fixed-wing aircraft, compute fuel consumption based on maximum endurance operation at 10,000 feet.

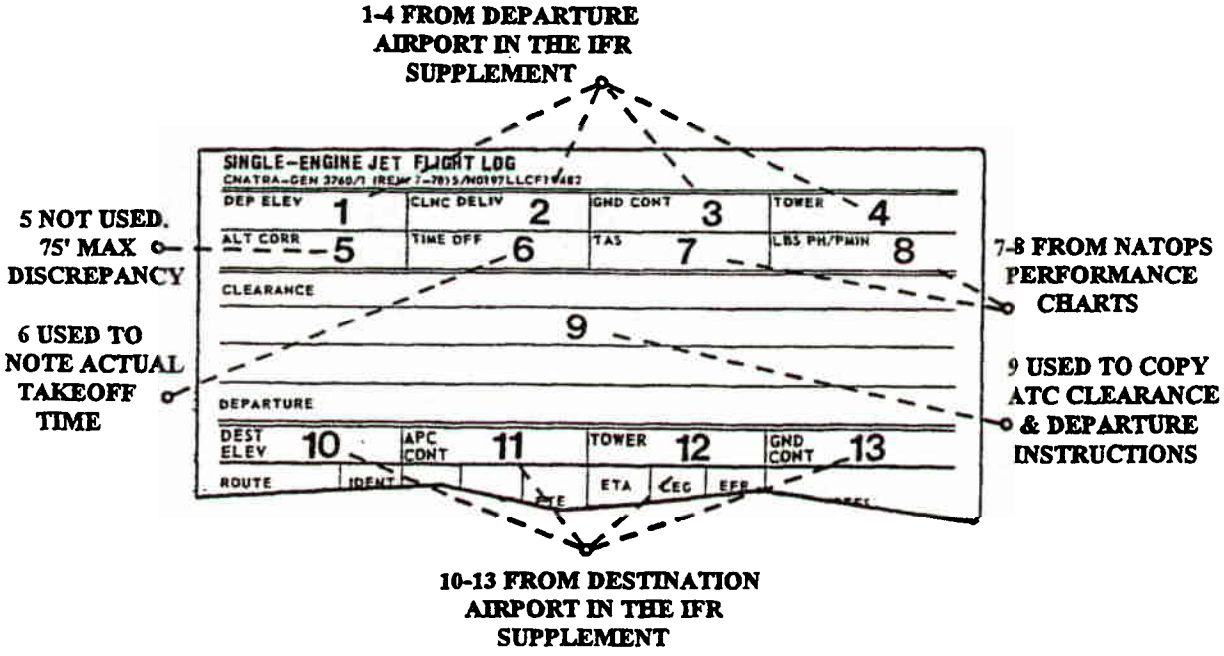
d. Minimum fuel reserve requirements for specific model aircraft shall be contained in the appropriate NATOPS Manual.

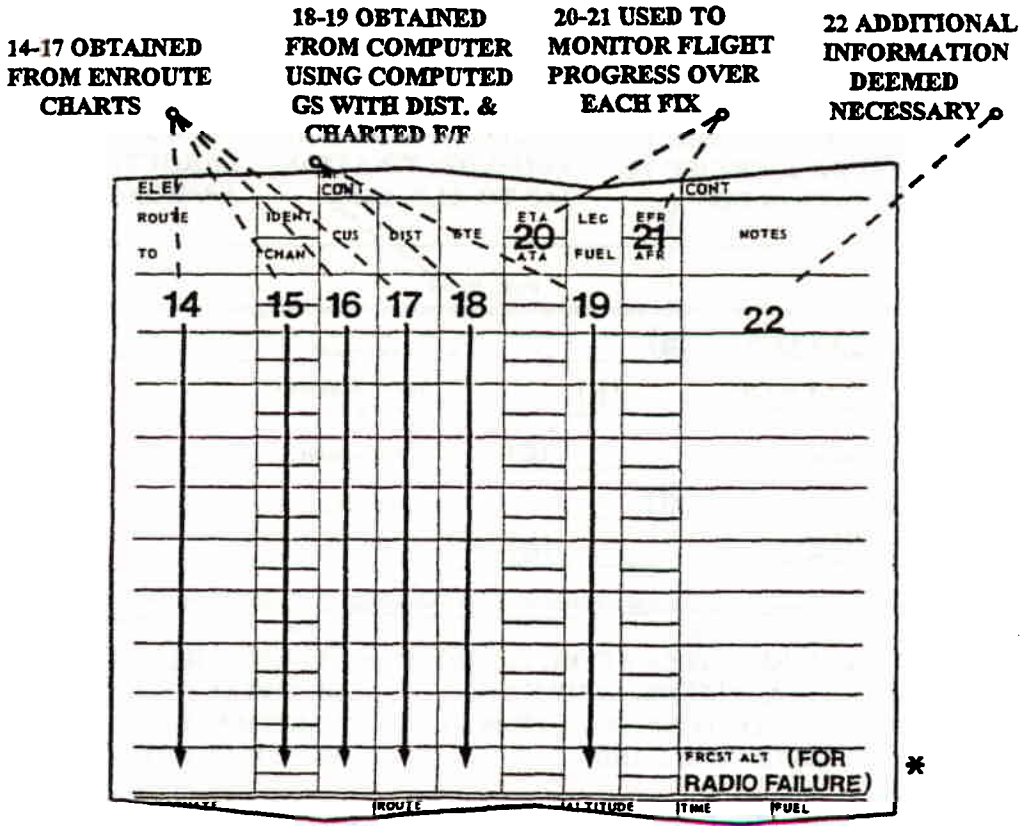
PART 2 - JET FLIGHT LOG

INTRODUCTION

The Jet Flight Log is your written plan-of-action. It is at your fingertips throughout your flight to enable you to monitor your flight progress, and to aid you in making rapid decisions in the event of excessive fuel consumption, an emergency, or changes in forecast weather conditions/winds requires you initiate alternative action. THERE IS NO ONE CORRECT METHOD OF COMPLETING A FLIGHT LOG. It is a medium for displaying, in an organized form, all information necessary for you to complete your planned flight in a safe and efficient manner.

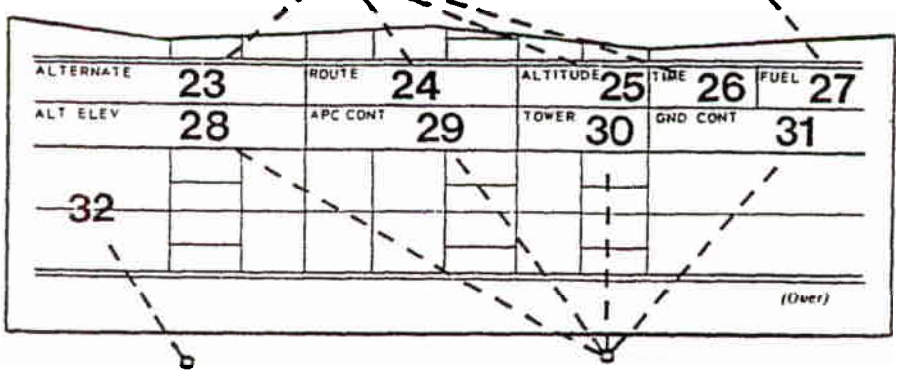
PREPARATION OF LOG - FRONT SIDE





23-26 ROUTE AND TIME FROM DESTINATION IAF TO SUITABLE ALTERNATE IAF AT PLANNED CRUISING ALTITUDE

27 COMPUTE THE FUEL REMAINING (FOR DRAFT) IN HRS + MIN AT DESTINATION USING CRUISE F/F



32 ENROUTE SECTION SAME METHOD AS TO DESTINATION

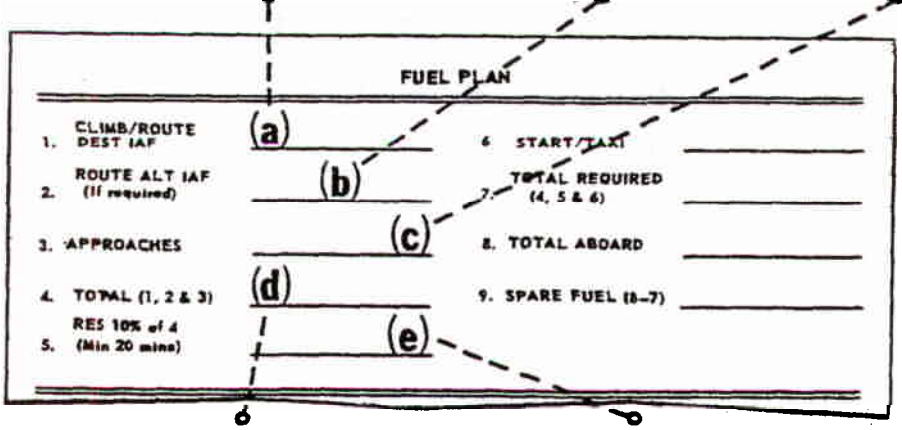
28-31 FROM ALTERNATE AIRPORT IN THE IFR SUPPLEMENT

PREPARATION OF LOG - BACK SIDE

(a) FUEL REQUIRED AFTER TAKEOFF TO CLIMB TO ALTITUDE & CRUISE TO DESTINATION IAF

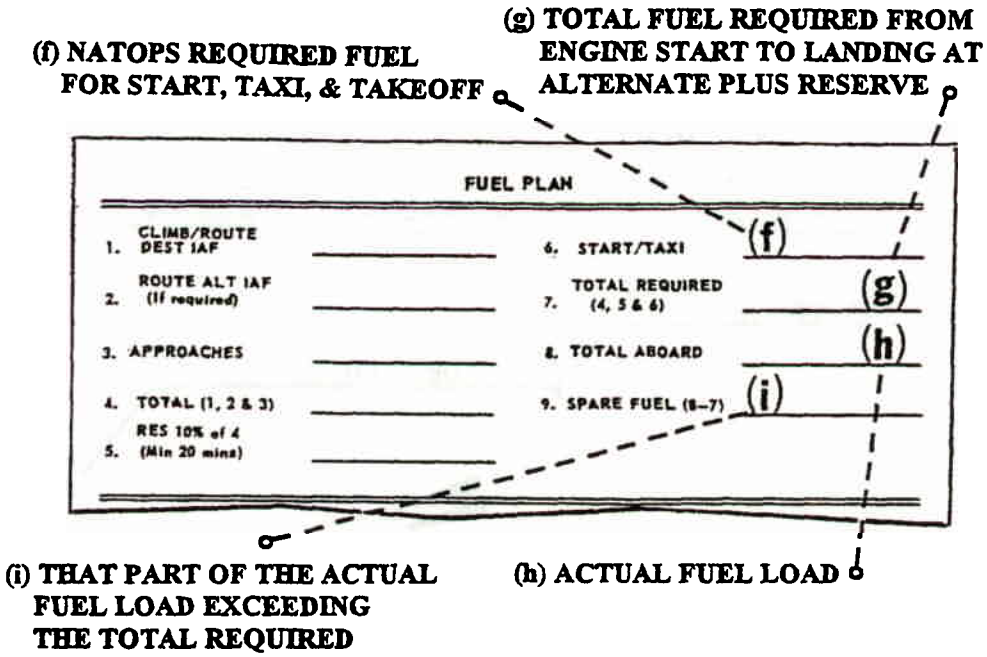
(b) FUEL REQUIRED AT CRUISING ALTITUDE FROM DESTINATION IAF TO ALT. IAF

(c) FUEL FOR 1 APPROACH AND ENROUTE PRACTICE APPROACHES

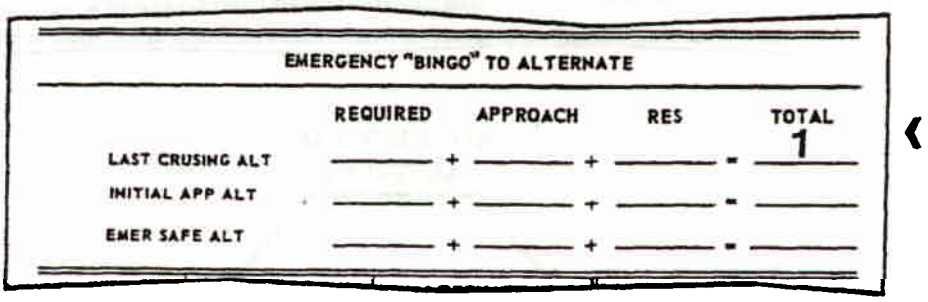


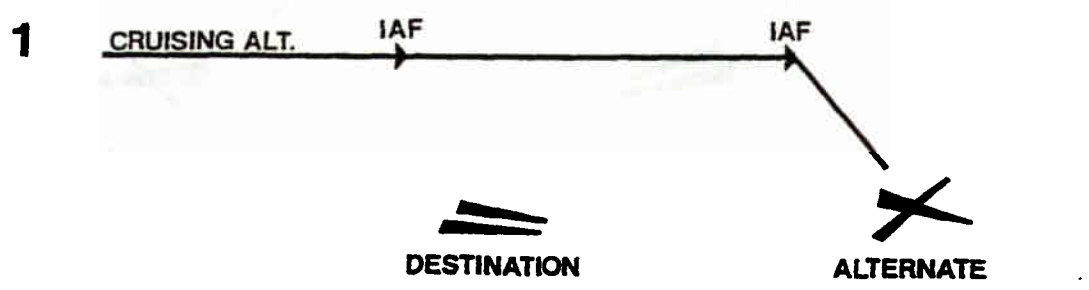
(d) TOTAL FUEL REQUIRED AFTER TAKEOFF TO CLIMB TO ALTITUDE, CRUISE TO DESTINATION IAF, THEN TO ALTERNATE IAF, PENETRATE, AND LAND

(e) PLANNED RESERVE IS 10% OF TOTAL REQUIRED AFTER TAKEOFF, NOT LESS THAN 20 MIN. (MAX END. 10,000')



"DECISION MAKING" SECTION

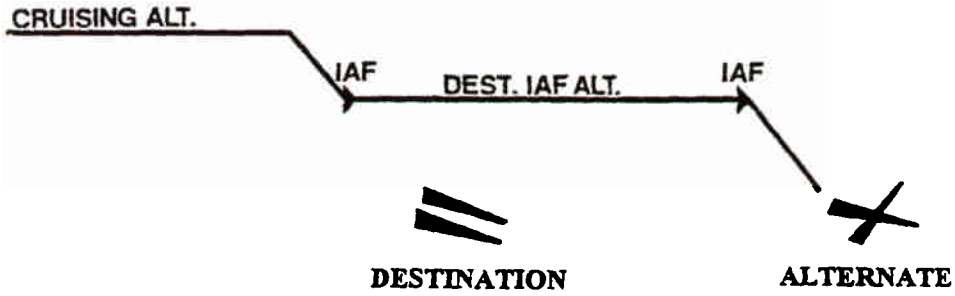




EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT	_____	+	_____	+	_____	=	_____
INITIAL APP ALT	_____	+	_____	+	_____	=	2
EMER SAFE ALT	_____	+	_____	+	_____	=	_____

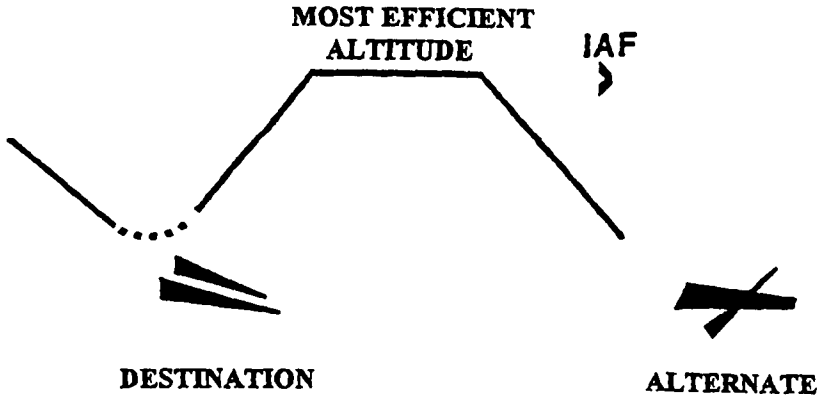
2



EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT	_____	+	_____	+	_____	=	_____
INITIAL APP ALT	_____	+	_____	+	_____	=	_____
EMER SAFE ALT	[USE SQUADRON DIRECTIVES]					=	3

3



NOTE

This part of the "Decision Making" Section is not used in Ground School; however, an example can be found in the FTIs.

PREFLIGHT REMINDER SECTION

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH			
LIGHTING			ID
FUEL/JASU/LOX			CH
UHF/ADF	(CHECK		PAGE NO.
UHF/DF	CURRENT		
RAPCON	IFR		
PAR MINS	SUPPLEMENT		
TAC MINS	FOR		
ARR GEAR	STATUS)		
PUBS			
NOTAMS			
FUEL PACKET			
FLASHLIGHT WALLET, ETC.			

CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482(BACK)

PART 3 - MILITARY FLIGHT PLAN (DD FORM 175)

INTRODUCTION

OPNAVINST 3710.7 states that a flight plan must be filed for all flights in Naval aircraft except:

a. **Flights of urgent military necessity.**
b. **Student training flights under the cognizance of the Naval Air Training Command conducted within authorized training areas. In this situation, flight schedules serve as flight plans.**

A flight plan serves two basic purposes:

1. **To relay a pilot desire to a controlling agency.**
2. **To provide search and rescue facilities the necessary information should it be required.**

A filed flight plan should be professional:

* **NEAT**

* **READABLE**

* **ACCURATE**

TYPES OF FLIGHT PLANS

There are four basic types of flight plans which you will be using, which are explained in FLIP General Planning (GP), Chapter 4:

1. **ONE LEG FLIGHT PLAN.**
2. **STOPOVER FLIGHT PLAN.**
3. **TERMINAL DELAY FLIGHT PLAN.**
4. **ENROUTE DELAY FLIGHT PLAN.**

There are variations which you will be using, such as composite flight plans, flight plans for formation flights, and flight plans for Operational Navigation (ONAV) Routes.

EXAMPLE:

ONE LEG FLIGHT PLAN

AUTHORITY: 10 USC 8012 and EO 9397
PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the filed flight
PRIVACY ACT STATEMENT
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan
DISCLOSURE: Voluntary, however failure to provide the SSN could result in denial of flight plan processing

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
6JAN97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	380	NQI	1300	370	PSX2•PSX J22LCH J2SJI		
						NPA213014	NPA	1+28

REMARKS
NPA S

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
2+40	VPS	0+07	✓	05-011	N/A	147927/VT19/NMM

SIGNATURE OF APPROVAL AUTHORITY: D.V. Jones
CREW/PASSENGER LIST: ATTACHED / SEE PSGR MANIFEST
ACTUAL DEP TIME (Z)
BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	JONES, D.V.	LT	456 75 5883	VT19/NMM
CP	MAJORS, M.C.	1LT	446 12 2507	TAW1/NMM (USMC)

DD Form 175, MAY 86 0102-LF-001-7500 Previous editions are obsolete MILITARY FLIGHT PLAN

EXAMPLE:

STOPOVER FLIGHT PLAN

PRIVACY ACT STATEMENT
AUTHORITY: 10 USC 8012 and EO 9397
PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the filed flight
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan.
DISCLOSURE: Voluntary; however, failure to provide the SSN could result in denial of flight plan processing

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
6JAN97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	380	NQI	1300	370	PSX2·PSX J22 LCH J2 SJI		
						NPA213014	NPA	1+28
	I	315	NPA	1545	160	TRADR4·SJI MEI PIGMY		
						(2+05 CBM 0+13)	NMM	0+40
	I	380	NMM	1745	350	MEI J22 CRP RVERA		
						(2+40 NGP 0+12)	NQI	1+46

REMARKS
NPA S NMM S VOID 7+00

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
2+40	VPS	0+07	✓	05-011	N/A	147927/VT19/NMM

SIGNATURE OF APPROVAL AUTHORITY	CREW/PASSENGER LIST		ACTUAL DEP TIME (Z)	BASE OPERATIONS USE
D.V. Jones	ATTACHED	SEE PSGR MANIFEST		

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	JONES, D.V.	LT	456 75 5883	VT19/NMM
CP	MAJORS, M.C.	1LT	446 12 2507	TAW1/NMM (USMC)

DD Form 175, MAY 86 0102-LF-001-7500 Previous editions are obsolete MILITARY FLIGHT PLAN

GPO: 1989-640-902/80175

NOTES

* The last entry in the "ROUTE-OF-FLIGHT" section should be the IAF which most clearly establishes the route-of-flight to destination, since this is the point at which ATC anticipates you will begin a penetration at your ETA in the event of enroute radio failure. Enter the IAF five-letter name or NAVAID three-letter identifier and a six-digit radial and DME from the Approach Procedure Chart.

* For a "Radar Only" airport, the last fix entered in the 'ROUTE-OF-FLIGHT" section will be the last NAVAID along your route-of-flight.

* Use as many lines as necessary for the route-of-flight, but ensure destination identifier in the "TO" block is entered on the last line of flight.

EXAMPLE:

TERMINAL DELAY FLIGHT PLAN

PRIVACY ACT STATEMENT
AUTHORITY: 10 USC 8012 and EO 9397
PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the listed flight.
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan voluntary; however failure to provide the SSN could result in denial of flight plan processing.
DISCLOSURE:

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
6 JAN 97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	300	NMM	1300	200	MEI J31 MSY GRETL NBG		0+40
						(R) D 0+15 NBG NMM		
	I	310	NBG	1355	250	MSY J31 MEI PIGMY	NMM	0+37

REMARKS
REQUEST RADAR DEPARTURE VOID 2+00

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
2+45	CBM	0+13	✓	05-011	N/A	156695/VT19/NMM

SIGNATURE OF APPROVAL AUTHORITY	CREW/PASSENGER LIST		ACTUAL DEP TIME (Z)	BASE OPERATIONS USE
P.D. Quick	ATTACHED	SEE PSGR MANIFEST		

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	QUICK, P.D.	LT	398 44 4588	VT19/NMM
CP	SLOW, I.M.	1LT	365 15 6677	VT19/NMM (USMC)

DD Form 175, MAY 86 0102-LF-001-7500 Previous editions are obsolete MILITARY FLIGHT PLAN

NOTE

On a Terminal Delay Flight Plan, you are not landing. ARTCC will turn you over to Approach Control to make your delay request, that is, practice approach, etc.

EXAMPLE:

ENROUTE DELAY FLIGHT PLAN

PRIVACY ACT STATEMENT										
AUTHORITY: 10 USC 8012 and EO 9397 PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the filed flight				ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan voluntary; however failure to provide the SSN could result in denial of flight plan processing DISCLOSURE:			DATE: 6 JAN 97	AIRCRAFT CALL SIGN: VV1A901	AIRCRAFT DESG AND TD CODE: T2/P	
BASE OPERATIONS USE										
	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT			TO	ETE
	I	300	NMM	1300	200	MEI J4 SIKES/D 0+10 J4 DFW BINNY			HBE	1+48

NOTE

On an Enroute Delay Flight Plan, you will remain on ARTCC frequency to make your delay request, such as practice holding.

MISCELLANEOUS EXAMPLES:

VFR FLIGHT PLAN

PRIVACY ACT STATEMENT									
10 USC 8012 and EO 9397 To aid in accurate identification of personnel participating in the filed flight			ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan. Voluntary; however, failure to provide the SSN could result in denial of flight plan processing DISCLOSURE:			DATE: 6 JAN 97	AIRCRAFT CALL SIGN: VVA901	AIRCRAFT DESG AND TD CODE: T2/P	
ATIONS USE									
TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT			TO	ETE
V	290	NPA	1300	175	CEW MCN VAN ILM			NKT	1+45

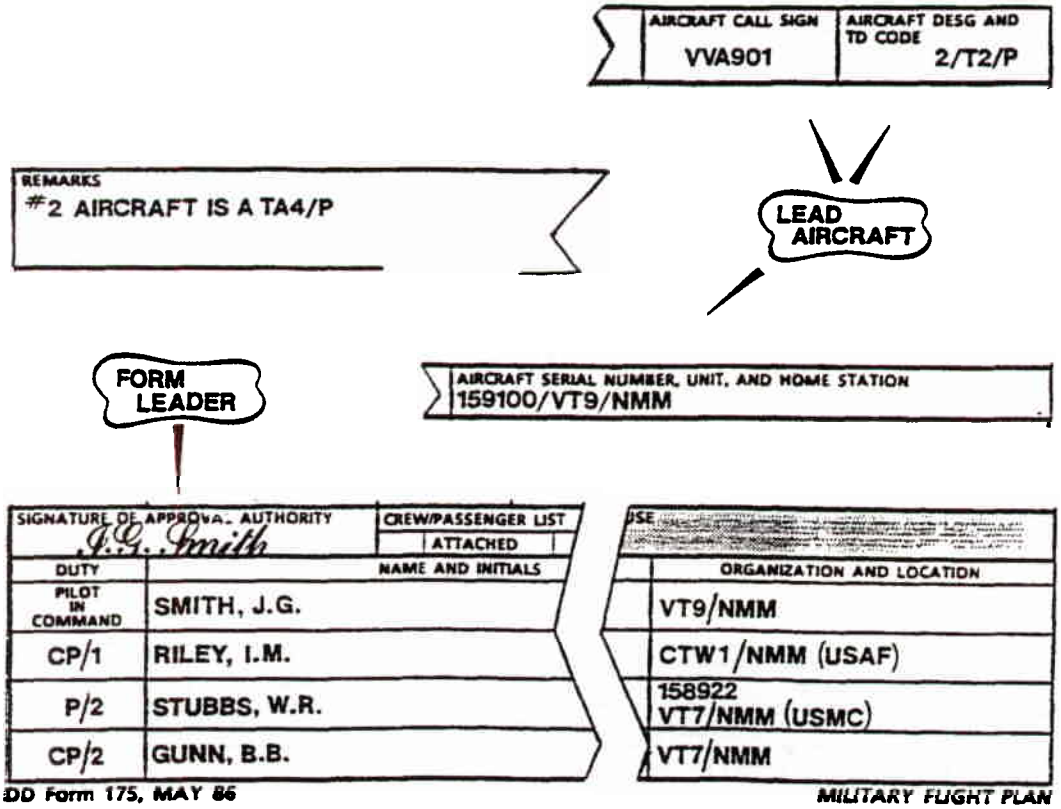
COMPOSITE FLIGHT PLAN

PRIVACY ACT STATEMENT									
10 USC 8012 and EO 9397 To aid in accurate identification of personnel participating in the filed flight			ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan. Voluntary; however failure to provide the SSN could result in denial of flight plan processing DISCLOSURE:			DATE: 6 JAN 97	AIRCRAFT CALL SIGN: VVA901	AIRCRAFT DESG AND TD CODE: T2/P	
ATIONS USE									
TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT			TO	ETE
I	332	NPA	1300	330	BREZZ-TWO CEW MCN				0+37
V	290			175	VAN ILM			NKT	1+03

NOTE

An IFR ETE EXCLUDES all planned delays.
A VFR ETE INCLUDES all planned delays.

FORMATION FLIGHT



IFR flight plans should be filed at least 30 minutes prior to planned departure time. This allows ATC ample time to process the flight plan and work your flight into the traffic system. Flight plans should be filed with the Base Operations having a communications link with ARTCC or by commercial telephone with a FSS. Flight plans can be filed inflight with a FSS provided visual flight conditions can be maintained until an IFR clearance is received.

Prior to every IFR flight outside the local training area, a pilot should have three documents in his possession:

1. A copy of the Flight Weather Briefing (DD Form 175-1).
2. A copy of the Military Flight Plan (DD Form 175).
3. A completed Jet Flight Log with essential information to complete the assigned mission.

DEPARTURE PROCEDURES

ENABLING OBJECTIVE: Demonstrate a knowledge of general and specific FAR, ATC, and OPNAV regulations, rules, and procedures applicable to the departure phase of flight, including pre-departure ground operations.

SPECIFIC OBJECTIVES:

8.1 Determine the appropriate facilities and their frequencies to contact for the various phases of pre-departure and departure operations.

8.2 Recall the items included, as appropriate, in an ATC IFR clearance.

8.3 Explain the four different forms in which ATC may issue an IFR clearance.

8.4 State the clearance readback requirements applicable to Navy pilots.

8.5 State the purpose for Automatic Terminal Information Service (ATIS).

8.6 State the groundcheck tolerances for proper operation of the barometric altimeter.

8.7 State pilot responsibilities on a taxi/"taxi to" clearance.

8.8 State the groundcheck tolerances for proper operation of TACAN navigation equipment.

8.9 Explain the three common types of IFR departures from military airports.

8.10 Name the two types of instrument ratings issued to Naval aviators.

8.11 State the takeoff weather criteria for each type of instrument rating.

8.12 State the takeoff weather criteria for a formation of Naval aircraft.

8.13 Explain the affects of ATC vectors and/or altitude assignments on clearances involving Standard Instrument Departures (SIDs).

8.14 State the Transponder Selector position for departure.

8.15 State the post-departure altimeter change (transition) procedure.

8.16 State the post-departure frequency/mode/code change rule for single-piloted aircraft.

INTRODUCTION

There are some common departure procedures applicable to all IFR flights. Specific departure procedures will vary according to the airport of departure, the type of aircraft, and existing weather conditions in the area. In general, however, ATC, FAR and OPNAV regulations, rules, and procedures are applicable to all IFR flights.

PRE-DEPARTURE FREQUENCIES

MIRAMAR NAS, (MITSCHER FLD) CA ◇ **KNKX** N 32°52.1'N 117°08.6'W 478
UTC-8(-7DT) **H-2B, L-3C**
(B) **RWY-06L** L6,11,13 ——(12,000x200 CON S116 T181 ST175 TT308)——L6,7,8,11,13 **RWY-24R**
E-28(B) (2490') ——E-28(B) (2300')
RWY-06R L6,13 ——(8000x200 ASP/CON S116 T181 ST175 TT308)——L6,13 **RWY-24L**
E-28(B) (1052') ——E-28(B) (2300')
RWY-10 L6 ——(6000x200 CON S117 T179 ST175 TT313)——L6,13 **RWY-28**
——E-28(B) (1100')
SERVICE - A-GEAR - Short fld A-GEAR Rwy 24R nml de-rigged. **JASU** - (GTC-85) (NCPP-105/RCPT) (NC-8) **FUEL** - J5 O-148-156 SP LHOX LOX **TRAN ALERT** - Opr 1600-0200Z++ Mon-Fri, clsd Sat-Sun. No AMC fleet svc avbl. ALCE team rqr for all AMC flt.
REMARKS - Opr 1530-0800Z++ Mon-Thu; 1530-0200Z++ Fri; 1600-0200Z++ Sat-Sun. Exp fld closure on National hol wkend. **RSTD** - PPR Base OPS DSN 577-4279, C619-537-4279 exc AIREVAC, prior coord or flt advsy rqr for AMC/NALO msn. 24 hr PN for acft with HAZ CARGO. For staging (LCL TRNG FLT) ctc Base OPS 24 hr PN. **CAUTION** - See FLIP AP/1, Supplementary Arpt Rmk. Hi mid-air potential, exer extreme vigilance. Rwy 06R-24L does not meet obst criteria for hvy acft. Hvy acft ldg/tkof auth Rwy 06L-24R only. **TFC PAT** - Reduced rwy separation std in eff USN/USMC acft. Opr on parl rwy 700' apart. Multi practice apch Rwy 06L/R not auth. Radar vectors to final apch, exp steep descent. Rwy 28 emerg use only. **NS ABTMT** - Strictly enforced mandatory pro and crs rules. See FLIP AP/1 Supplementary Arpt Rmk. **MISC** - Ordnance, live or inert, not perms to remain on RON tran acft. ACLS avbl Rwy 24L/R 1900-0800Z++ Mon; 1600-0800Z++ Tue-Thu; 1700-0400Z++ Fri. Data Link freq 305.1. TRN-28 CH 16 (Lcl use, Rwy 24R only).
COMMUNICATIONS - SFA ATIS - 280.4 **FSS-SAN DIEGO SAN-DL-NOTAM SAN**
SOCAL APP CON - (R) 132.2 269.1 (281.8 Acft dep W-291 for NKX arr) **TWR - (E)** 135.2 315.6 340.2x **GND CON** - 380.8 **SOCAL DEP CON - (R)** (132.2 269.1 E) (119.6 363.1 W) **CLNC DEL** - 301.3 **PMSV: METRO** - PMSV avbl 1400-0200Z++. 362.1
NAVAIDS - TACAN - (L) NKX CH 33 32°52.2'N 117°09.3'W At Fld. 430/(A)15°00'E Opr dur fld opr hr only. **NDB** - (ABMH) 280.4 NKX 32°51.8'N 117°08.0'W At Fld. 452/14°00'E Opr dur fld opr hr only.
ILS/RADAR - RADAR - SEE ... RADAR MINIMA.
MISH...

AUTOMATIC TERMINAL INFORMATION SERVICE

TOWER

GROUND CONTROL

CLEARANCE DELIVERY

AIRPORT DIRECTORY ENTRY
IFR SUPPLEMENT

Figure 8-1

CLEARANCE DELIVERY (Figure 8-1)

A special non-control branch of the Control Tower set up to relay clearances to pilots and thereby relieve frequency congestion on Ground Control and Tower frequencies. If available, it is the primary frequency for requesting your ATC clearance. If not available, call Ground Control for your clearance.

When calling for your ATC clearance, you should use the following format:

* **IDENTIFICATION**
* **POSITION ON THE AIRPORT**
* **TYPE OF OPERATION (IFR)**
* **POINT OF FIRST INTENDED LANDING**

This format ensures the appropriate person at high activity and/or joint-use airports will obtain and pass the clearance to your current position and serves to verify your destination for a "Cleared As Filed" clearance.

EXAMPLE:

"MIRAMAR CLEARANCE DELIVERY, NAVY ONE ALFA NINER ZERO ONE, TRANSIENT LINE, IFR DAVIS-MONTHAN AIR FORCE BASE."

ATC CLEARANCE FORMAT

Whether on the ground or inflight, ATC clearances will be issued in the same basic format so that you can anticipate the information.

EXAMPLE:

"ATC CLEARS NAVY (IDENTIFICATION) TO THE NAVY (CLEARANCE LIMIT) AIRPORT VIA (ROUTE), MAINTAIN FLIGHT LEVEL (ALTITUDE). DEPARTURE CONTROL FREQUENCY (FREQUENCY), SQUAWK MODE 3 CODE (BEACON INFO) PRIOR TO DEPARTURE."

Departure instructions are separate from your ATC cleaarance and can be issued by any facility, and at any time, depending on the size/location of the airport and on local procedures. They may be issued by Clearance Delivery when your ATC clearance is delivered, by Ground Control, Tower, Departure Control prior to takeoff, or passed by a FSS; however, it is your responsibility to ensure adequate departure instructions are received prior to takeoff. If assigned a SID and Departure Control frequency is printed on the SID, then the frequency may be omitted from your departure instructions.

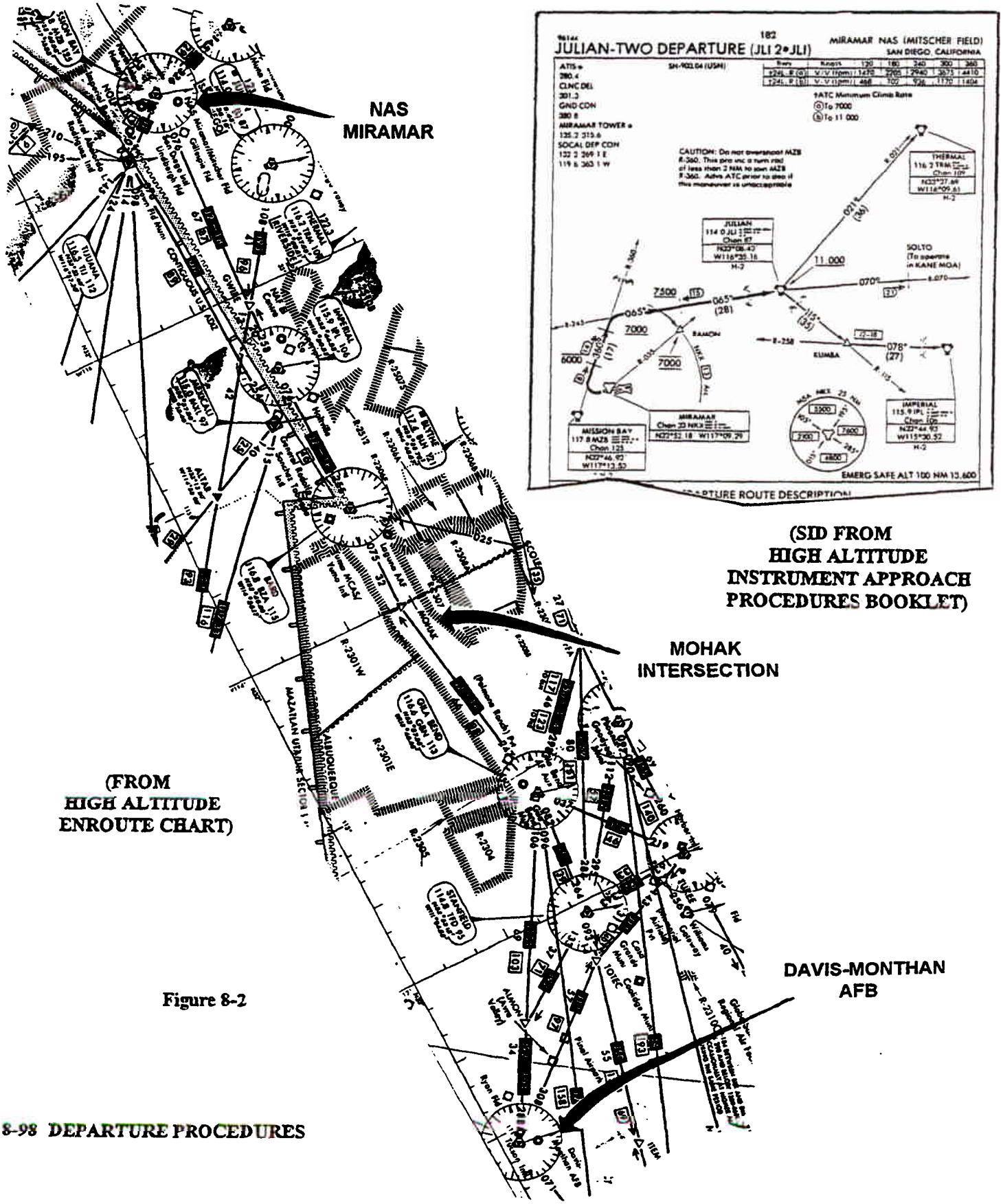

NAS MIRAMAR
JULIAN-TWO DEPARTURE (JLI 2•JLI)
MIRAMAR NAS (MITSCHER FIELD)
SAN DIEGO, CALIFORNIA
(SID FROM HIGH ALTITUDE INSTRUMENT APPROACH PROCEDURES BOOKLET)
MOHAK INTERSECTION
(FROM HIGH ALTITUDE ENROUTE CHART)
DAVIS-MONTHAN AFB

Figure 8-2

FORM OF ATC CLEARANCE

Depending on the traffic status, weather conditions, and status of NAVAIDs, an ATC clearance may be issued in one of several forms:

* **A DETAILED CLEARANCE FOR THE ENTIRE ROUTE.**
* **AN ABBREVIATED CLEARANCE FOR THE ENTIRE ROUTE.**
* **AN ABBREVIATED CLEARANCE FOR A PORTION OF THE ROUTE.**
* **A SHORT RANGE CLEARANCE LIMIT.**

EXAMPLE:

Using the High Altitude Enroute Chart and Standard Instrument Departure depicted in Figure 8-2, you file an IFR flight plan from NAS MIRAMAR to DAVIS-MONTHAN AFB.

AUTHORITY: / PRINCIPAL PURPOSE:	PRIVACY ACT STATEMENT — ROUTINE USE(S): / DISCLOSURE:	DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
		4 JAN 97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	305	NKX	1600	230	JL12-IPL J2 GBN J104 TUS FIVEL	DMA	1+00

DETAILED CLEARANCE FOR ENTIRE ROUTE

A detailed clearance must be issued:

* **When requested by the pilot.**
* **When the pilot has requested a change to the filed route.**
* **When ATC changes the majority of a filed route.**

> **"NAVY ONE ALFA NINER ZERO ONE CLEARED TO DAVIS-MONTHAN AIRPORT VIA THE JULIAN-TWO DEPARTURE, IMPERIAL TRANSITION, J-TWO GILA BEND, J-ONE O FOUR TUCSON, DIRECT DAVIS-MONTHAN. MAINTAIN FLIGHT LEVEL TWO THREE ZERO....."**

You will copy your clearance before starting engines. If the detailed cleaarance is the result of ATC changing the majority of your filed route, it is your option to accept this clearance or inform ATC you will delay the flight until clearance can be issued for the filed route.

ABBREVIATED CLEARANCE FOR ENTIRE ROUTE

* **"CLEARED AS FILED" is only for the route-of-flight.**

* **SID, SID Transition, and altitude to maintain must be specifically stated separately.**

"NAVY ONE ALFA NINER ZERO ONE CLEARED TO THE DAVIS-MONTHAN AIRPORT VIA JULIAN TWO DEPARTURE, IMPERIAL TRANSITION, THEN AS FILED, MAINTAIN FLIGHT LEVEL TWO THREE ZERO....."

This is the clearance form you will receive the vast majority of times in tactical jet type aircraft due to the simplicity of your filed routes.

ABBREVIATED CLEARANCE FOR PORTION OF ROUTE

"NAVY ONE ALFA NINER ZERO ONE CLEARED TO THE DAVIS-MONTHAN AIRPORT VIA JULIAN TWO DEPARTURE, THEN AS FILED, EXCEPT CHANGE ROUTE TO READ SOLTO TRANSITION, DIRECT IMPERIAL. MAINTAIN FLIGHT LEVEL TWO THREE ZERO....."

This form is sometimes necessary when exiting high density terminal areas due to a high volume of traffic during certain hours of the day. The probability of receiving this form may be reduced by filing the Preferred Routing in FLIP Planning AP/1 during the specified hours.

SHORT-RANGE CLEARANCE LIMIT

"NAVY ONE ALFA NINER ZERO ONE CLEARED TO MOHAK INTERSECTION, VIA JULIAN TWO DEPARTURE, IMPERIAL TRANSITION, MAINTAIN FLIGHT LEVEL TWO THREE ZERO....."

This form may be necessary sometimes due to communications or traffic saturation problems in the next ARTCC area. The clearance limit is usually at or very close to the ARTCC area dividing lines on the Enroute Charts.

CAUTION

If the Clearance Limit point is NOT ON THE FILED ROUTE, do not accept the clearance without receiving EXPECTED FURTHER ROUTING beyond the clearance limit.

A common misconception is EFC times. An EFC time is given when your flight is delayed, that is, put in holding. On a short-range clearance, ATC is not delaying your flight. You will receive further clearance at least 5 minutes prior to reaching the clearance limit; therefore, an EFC time is not needed for any reason. You must, however, know how to proceed to your destination in event of radio failure if the point is not on the filed route.

CLEARANCE READBACK REQUIREMENTS

ON GROUND REQUIREMENTS

1. ATC requirements:

   a. There is no requirement by ATC for the spontaneous readback of any clearance except "HOLD SHORT" instructions.

TRAINING ONLY NOTE

For radio proficiency purposes, a Training Squadron may require readbacks of any or all instructions and clearances.

2. OPNAV requirements:

   a. When the clearance received differs from that originally filed.

   b. All "HOLD SHORT" and "POSITION AND HOLD" instructions.

INFLIGHT REQUIREMENTS

1. ATC requirements:

   a. Altitude assignments.

   b. Vector headings.

   c. Altimeter settings below 18,000' MSL.

2. OPNAV requirements:

   a. (None in addition to the ATC inflight requirements).

AUTOMATIC TERMINAL INFORMATION SERVICE - ATIS (Figure 8-1)

This is the continuous broadcast of routine, but essential, non-control information such as weather conditions, altimeter, active runway, etc. It is established to relieve frequency congestion on Ground Control and Approach Control frequencies. When requesting taxi clearance, or contacting Approach Control on arrival, inform the facility that you have the latest ATIS information, that is, "HAVE INFORMATION BRAVO", etc. Do not say you "HAVE NUMBERS", which only indicates you have the wind, altimeter and runway information.

GROUND CONTROL (Figure 8-1)

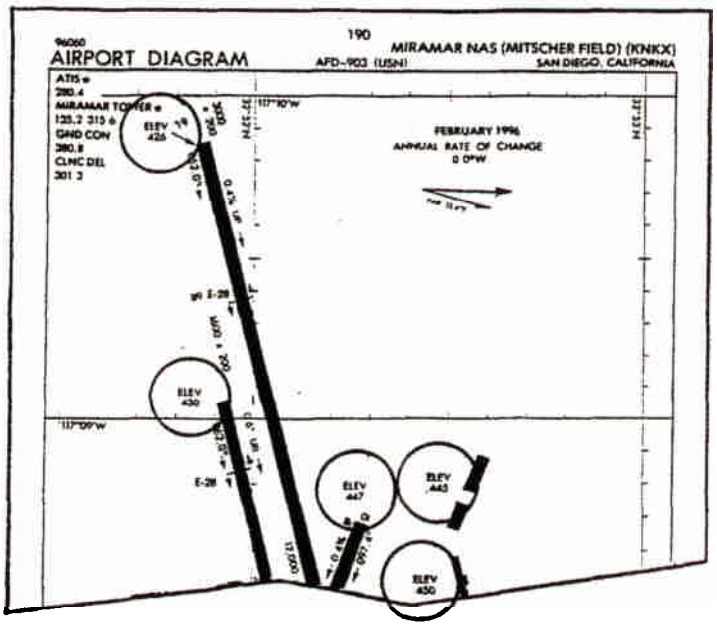
A control branch of the Airport Traffic Control Tower responsible for the control of all traffic on the ground at the airport except on the active runway. When calling for taxi clearance, give your position on the airport and type of operation, that is, IFR. This ensures they will not unduly delay your taxi and they can assign the appropriate taxiway for use or issue progressive instructions to get you to the assigned runway in use.

EXAMPLE:

"MIRAMAR GROUND CONTROL, NAVY ONE ALFA
NINER ZERO ONE, TRANSIENT LINE, TAXI IFR,
HAVE INFORMATION BRAVO."

ALTIMETER GROUNDCHECK

To be satisfactory for flight under IFR, the altimeter must read within +/- 75' of the spot elevation where the aircraft is located on the airport. Ramp and other spot elevations are depicted on the full-page airport diagrams located in the Instrument Approach Procedures Booklets (Figure 8-3).



SPOT ELEVATIONS

Figure 8-3

TAXI PROCEDURES

* Remain on Ground Control frequency.
* Do not overtake or pass another taxiing aircraft without Ground Control approval.
* Taxi on centerline.
* Taxi at a safe rate of speed.
* Follow right-of-way rules at intersections.
* Watch for Control Tower light signals.

CAUTION

A "TAXI TO" clearance is a clearance to cross all intersecting runways and taxiways enroute to the assigned runway, but is not a clearance to taxi onto or across the assigned runway without specific approval.

AIRCRAFT LIGHTING

POSITION LIGHTS

* **Anytime the engines are turning at night.**
* **When an aircraft is parked at night so as to create a collision hazard.**
* **Inflight during daylight - anytime the inflight visibility is less than basic VMC of 3 miles.**
* **Inflight at night - 30 minutes prior to sunset to 30 minutes after sunrise.**

ANTI-COLLISION LIGHTS

* **Anytime the engines are turning (may be turned off if pilot visibility is restricted).**

TAXI LIGHT

* **For all taxi operations during night hours.**

NOTE

Be considerate of Taxi Director, other taxiing pilots, and pilots awaiting takeoff or on final approach.

SAFETY RECOMMENDATION

To enhance safety of flight during daylight hours, the FAA recommends and encourages pilots to display all lights when operating in a high density terminal area which has smog or other low visibility causing conditions.

TACAN EQUIPMENT

GROUNDCHECK TOLERANCES

Signs will be posted in the vicinity of the end of the runway/warm-up area depicting a TACAN Channel, radial, and DME for TACAN groundcheck. TACAN equipment should be within operational limits of +/- 4 degrees and within1/2 mile, or 3% of the distance whichever is greater, of what is depicted on the sign.

LIMITS OF USE

a. DEPARTURE: To comply with departure instructions, always select a TACAN facility located within 40 NM of the departure point for a "Direct" flight leg. If using a SID, then select the facility on which the SID is established.

b. JET ROUTE SYSTEM: For "Direct" flight within the Jet Route System, do not plan to exceed 130 NM from any one TACAN facility. For "Direct" flight between two NAVAIDs, do not plan to exceed 260 NM.

NOTE

There are no distance restrictions when operating on published Jet Routes and published "Feeder Routes" on Instrument Approach Procedure Charts (FAA flight checked), and once inflight, ATC can vector your aircraft to exceed any distance if continuing radar service is provided.

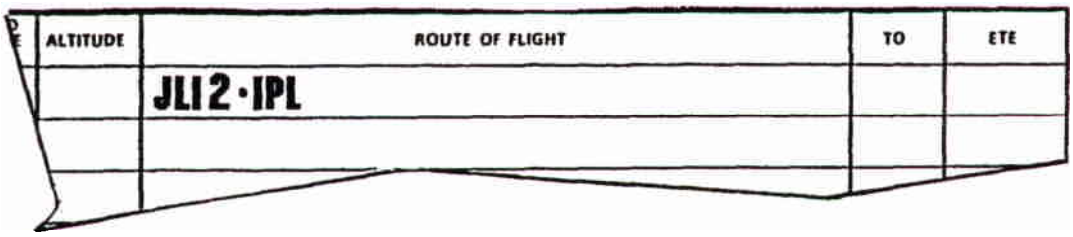
TYPES OF IFR DEPARTURES

There are three basic types of IFR departures from military airports:

1. STANDARD INSTRUMENT DEPARTURE (SID).
2. RADAR DEPARTURE.
3. VFR CLIMB-ON-COURSE.

STANDARD INSTRUMENT DEPARTURE (SID)

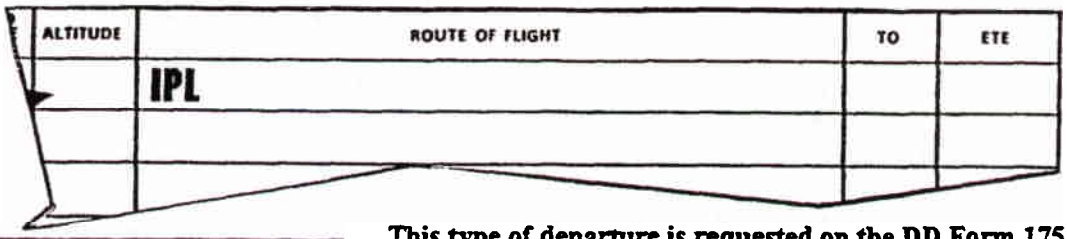
EXAMPLE:



Enter the name or the coded identifier of the SID as the first entry in the ROUTE-OF-FLIGHT Section of the DD Form 175 followed by a dot and then the identifier of the SID Transition Point which will establish you on your route.

RADAR DEPARTURE

EXAMPLE:



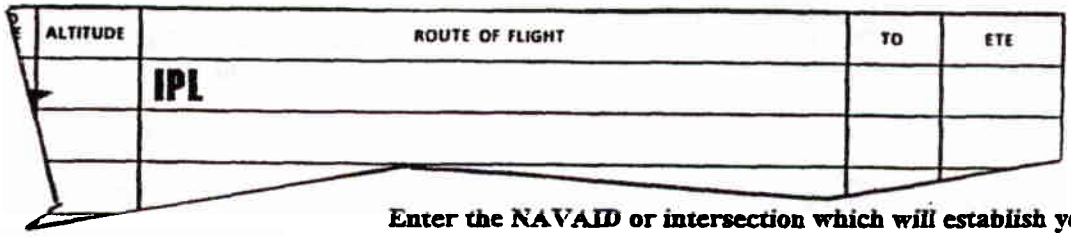
This type of departure is requested on the DD Form 175 only for the first point of departure. Enter the NAVAID or intersection which will establish you on your route as the first entry in the ROUTE-OF-FLIGHT Section and your departure request in the REMARKS Section.

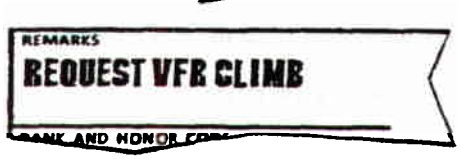
NOTE

This is a type of direct flight departure on which you only desire radar advisory service from ATC. You do not request radar vectors.

VFR CLIMB-ON-COURSE

EXAMPLE:





Enter the NAVAID or intersection which will establish you on your route as the first entry in the ROUTE-OF-FLIGHT Section. ATC will issue instructions and frequency to contact ARTCC for your IFR clearance. Fly VFR altitudes and remain below 18,000' MSL until an IFR clearance is received.

STANDARD INSTRUMENT DEPARTURES

* **SIDs (Figure 8-4) are Located in the DOD FLIP (Terminal) Instrument Approach Procedures Booklets.**

* **Use is not mandatory by OPNAV, but use is encouraged.**

* **Use can be made mandatory by a local airport, but pilot can reject SID if safety of flight dictates.**

* **Pilot responsibility to ensure all climb and crossing restrictions can be met.**

* **Once accepted, a SID must be followed regardless of weather conditions unless a deviation is approved by ATC.**

* **If vectored to an endpoint off a SID, then the SID is cancelled. To reinstate, ATC must specify which portions apply and all applicable altitude restrictions.**

* **If an altitude to maintain is changed or restated, either prior to or after departure, a pilot can climb immediately to that altitude unless ATC states that altitude restrictions remain in effect or still apply. In this event, ATC would only be changing the ultimate altitude. The SID path-over-the-ground must still be followed even though a climb is commenced.**

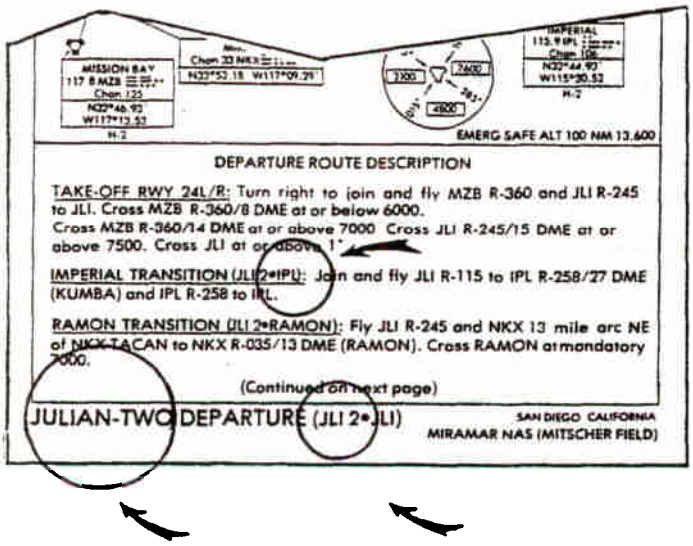


Figure 8-5

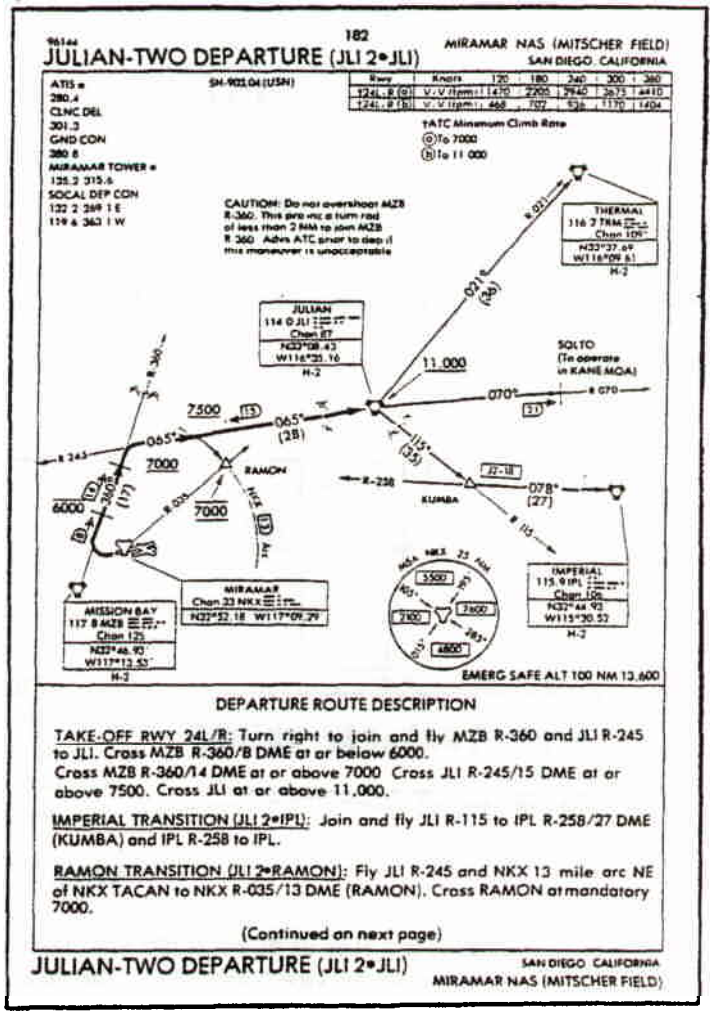


Figure 8-4

On the Military Flight Plan (DD Form 175), use either the

"NAME"
or
"CODED IDENTIFIER"

followed by a dot and then the appropriate

"TRANSITION POINT"

as depicted in Figure 8-5.

PRE-DEPARTURE

DEPARTURE INSTRUCTIONS

Departure instructions may be issued by any ATC/FSS facility at any time depending on local procedures; however, it is pilot responsibility to ensure adequate departure instructions have been received prior to takeoff.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, AFTER TAKEOFF TURN RIGHT, EXECUTE JULIAN-TWO DEPARTURE. CONTACT SOCAL DEPARTURE CONTROL TWO SIX NINER POINT ONE PASSING TWO THOUSAND FIVE HUNDRED FEET, REPORT PASSING ONE ONE THOUSAND."

AIRPORT TRAFFIC CONTROL TOWER (Figure 8-1)

At controlled airports, the Tower has control responsibility for traffic in its area and coordinates with Departure Control for IFR release times. Never taxi onto or across an assigned runway without Tower approval. When requesting takeoff clearance, watch for footnotes in the IFR Supplement as to the appropriate frequency, such as for arrivals or departures, parallel runways, etc.

EXAMPLE:

"MIRAMAR TOWER, NAVY ONE ALFA NINER ZERO ONE, READY FOR IFR DEPARTURE."

The format of takeoff clearance is at discretion of the Tower after coordination with Departure Control.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, MIRAMAR TOWER, WIND TWO FOUR ZERO AT ONE ZERO, CHANGE TO DEPARTURE CONTROL FREQUENCY, MONITOR GUARD, CLEARED FOR TAKEOFF."

PRE-TAKEOFF

* **Set Transponder to "NORMAL"**

NOTE

If at anytime ATC directs "Stop Squawk", it is recommended Transponder be set to "STANDBY" to ensure an emergency signal is transmitted in event ejection is necessary.

* **Note takeoff time on Jet Flight Log:**

  a. **To compute position reports if required.**

  b. **To compute an ETA for penetration/approach in event of enroute radio failure.**

TAKEOFF MINIMUMS

Instrument ratings issued to Naval aviators are either Standard or Special, and the instrument rating criteria is set forth in the OPNAVINST 3710.7 series. Minimum weather conditions for takeoff depends on the instrument rating of the Pilot-in-Command.

STANDARD INSTRUMENT RATING

The non-precision (TACAN) published minimums for the runway in use, but in no case less than 300 feet ceiling AND 1 mile visibility.

EXCEPTION

If available and operating for the landing runway in use, PAR published minimums may be used for takeoff, but in no case less than 200 feet ceiling and 1/2 mile visibility. This is based on absolute minimums for a single-piloted aircraft to request a PAR approach back into the departure airport.

SPECIAL INSTRUMENT RATING

No specific minimums apply. Weather conditions for takeoff are dependent on PILOT JUDGMENT and urgency of flight; however, good judgment dictates an adequate departure alternate be available.

FORMATION

Formations are completely independent of instrument ratings. Formation departures are restricted to two aircraft of similar performance with the lead aircraft on the downwind side of the runway, and weather conditions must be at least equal to the published CIRCLING MINIMUMS for the runway in use. If a circling approach is not authorized for the runway in use, formation takeoff minimums revert to basic VFR of 1000 and 3.

NOTE

It is not an optional use of one weather condition or the other. The basic VFR condition applies only if a circling approach is not authorized.

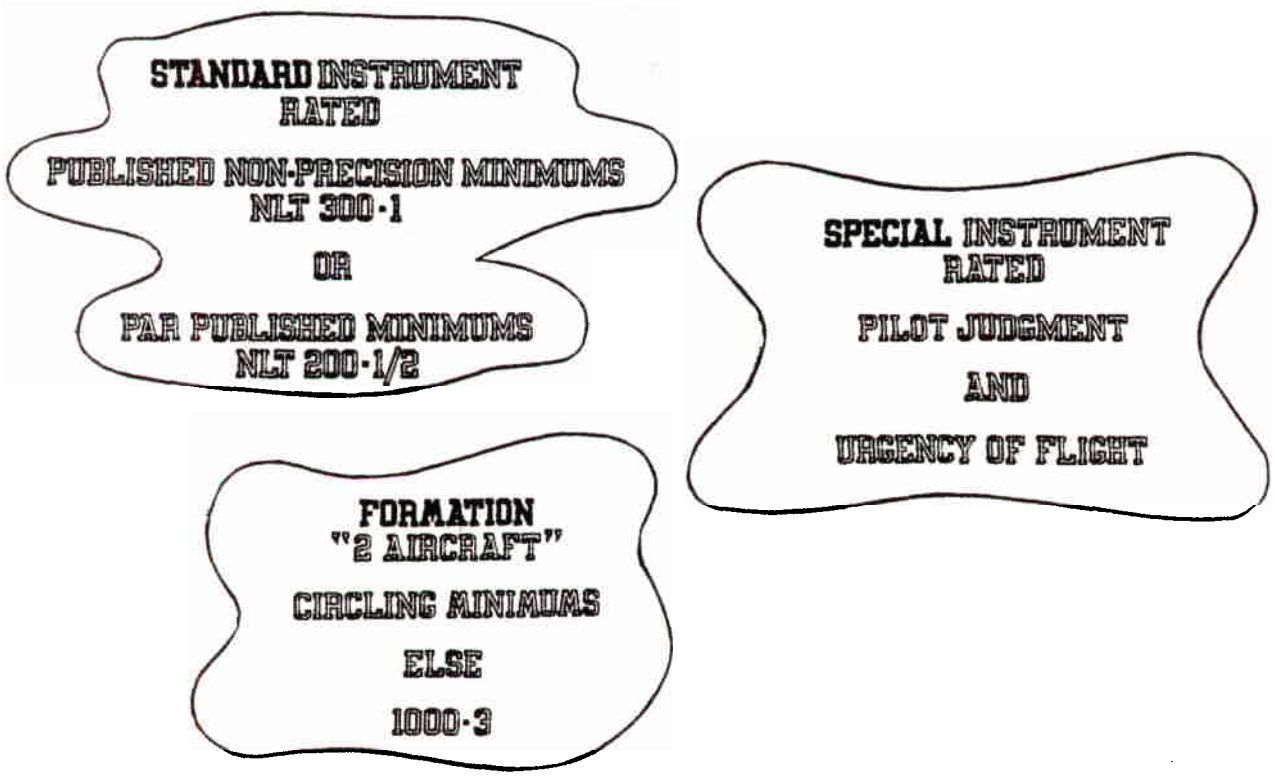
EXAMPLE:

CATEGORY	C	D	E
S-29*	460/40 434 (500-¾)	460/50 434 (500-1)	
CIRCLING	NOT AUTHORIZED		
S-PAR 29	226/24 200 (200-½) GS 3.0°		
*When ALS inop, increase vis ½ mile.			

HI-TACAN RWY 29

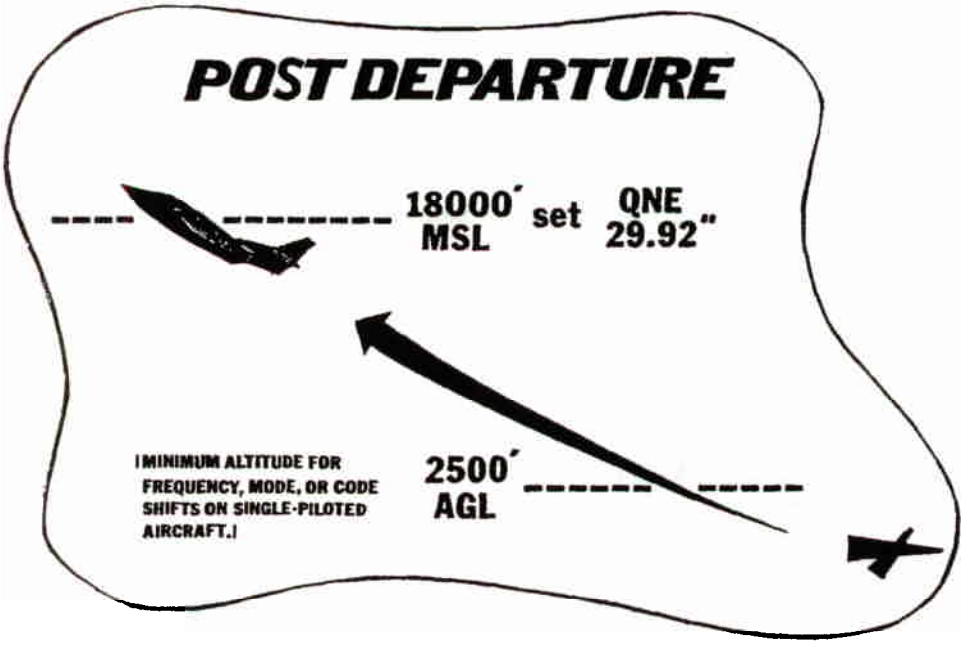
CATEGORY C minimums apply to the T2C aircraft for both straight-in and circling approaches.

SUMMARY



POST DEPARTURE

After departure, ATC will not change frequencies, Mode or Code settings on single-piloted aircraft below 2500'AGL unless level-off is below that altitude. Passing 18,000' MSL, set in 29.92" on the altimeter. At some predetermined point and/or altitude, Departure Control will turn control of your aircraft over to an Air RouteTraffic Control Center (ARTCC) for the enroute portion of flight.



ENROUTE PROCEDURES

ENABLING OBJECTIVE: Demonstrate a knowledge of the normal flight operations procedures, emergency procedures, and voice reports which may be required to complete the enroute phase of an IFR flight.

SPECIFIC OBJECTIVES:

9.1 State the appropriate NORDO procedures applicable to the various stages of enroute IFR flight:

- **a. NORDO on departure.**
- **b. NORDO while cruising enroute:**
  1. **In VMC.**
  2. **In IMC.**
- **c. NORDO during enroute holding.**

9.2 State the appropriate actions for Transponder and UHF Auxiliary Receiver (AN/ARR-40) equipment operation in event of a NORDO situation.

9.3 Recall the pilot responsibilities for an IFR flight specifying "VFR-On-Top".

9.4 Explain the significance of the term "MINIMUM FUEL".

9.5 State the conditions for a "SPECIAL USE FREQUENCY".

9.6 State the pilot responsibilities:

- **a. At a short range clearance limit.**
- **b. On a military composite flight plan.**

9.7 State the typical ATC control sequence for enroute IFR traffic.

9.8 State the three general types of enroute voice reports.

9.9 State the format for an Initial Contact Report:

- **a. In a radar environment (In radar contact by ATC).**
- **b. When not in a radar environment (Not in radar contact by ATC).**

9.10 State the format for an enroute position report.

9.11 State the procedures for regaining communications with a Air Route Traffic Control Center (ARTCC).

9.12 Recall the voice reports which are always mandatory regardless of radar status.

9.13 Recall the additional voice reports required when not in a radar environment (Not in radar contact by ATC).

9.14 Recall the location of PIREP formats/METRO facility location maps.

9.15 State the use and significance of:

a. The term "LOW ALTITUDE ALERT".
b. Center Weather Advisories (CWAs).

INTRODUCTION

During the enroute phase of an IFR flight, you will be under the control of Air Route Traffic Control Centers (ARTCC). Center will normally advise you of VFR traffic if their workload permits or if it is on their radar scopes. Outside CLASS B and C AIRSPACE, however, ATC only has a statutory responsibility to advise and separate IFR traffic. Therefore, your IFR clearance will only provide separation from other IFR flights. When in VMC, it is your responsibility to see and avoid other aircraft.

Specific pilot procedures for the enroute phase of flight under both normal and emergency operating conditions will be found in the FLIP (Enroute) Flight Information Handbook.

RADIO FAILURE (NORDO) PROCEDURES

NOTE

The FAA definition of the term "NORDO" is an aircraft which is not equipped with a radio. However, this term will be used throughout the Instrument Ground Training Course to indicate radio failure because of its common usage among Naval aviators.

A. NORDO ON DEPARTURE

NORDO ON VECTORS.

Proceed from the point of radio failure direct to the ATC stated vector endpoint.

NORDO ON RADAR DEPARTURE.

Proceed direct to the transition point filed in the Route-of-Flight Section of the Military Flight Plan (DD Form 175).

ALTITUDE TO MAINTAIN.

Until established on the Jet Route structure, maintain the highest of:

* The MINIMUM SAFE (SECTOR) ALTITUDE depicted on the Instrument Approach Procedure Chart if within 25 NM; or,

* The EMERGENCY SAFE ALTITUDE depicted on the Instrument Approach Procedure Chart if more than 25 NM; or,

* The last assigned altitude.

The highest of these altitudes will guarantee you obstruction clearance until established on the Jet Route structure. Once established, you will fly the last assigned altitude or exact MEA, whichever is highest, for each route segment.

NOTE

An "EXPECTED HIGHER ALTITUDE" at a time or place constitutes a clearance to climb to that expected altitude at that time or place if radio failure occurs prior to reaching that time or place. That altitude then becomes your last assigned altitude. If communications exist at that expected time or place, the altitude clearance is not valid.

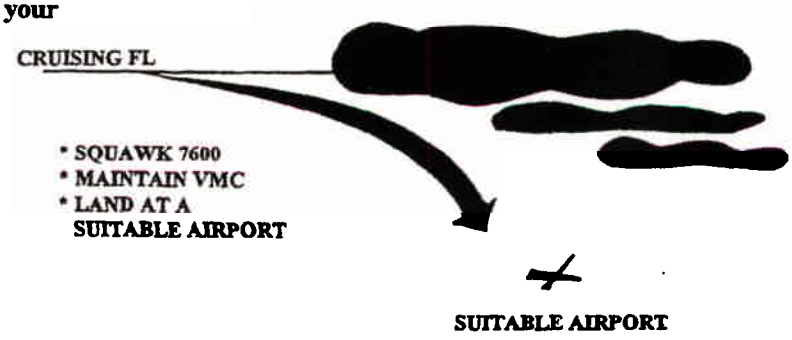
B. NORDO WHILE CRUISING ENROUTE

NORDO IN VMC

If unable to return to your departure airport in VMC, ATC expects you to leave the Jet Route System and land at a suitable airport as soon as practicable. Do not leave assigned altitude, however, unless certain of VMC to the deck. With NORDO, you are tying up the System, will tie up the terminal area, and you could get into adverse weather conditions and pose a safety of flight threat to yourself and other aircraft. Use good headwork, however, and do not land at an airport which is unsuitable for your type aircraft or just short of your filed destination.

EXAMPLE:

"NORDO"
IFR FLIGHT PLAN IN VMC



NORDO IN IMC

Continue flight to the destination IAF.

ROUTE TO FLY

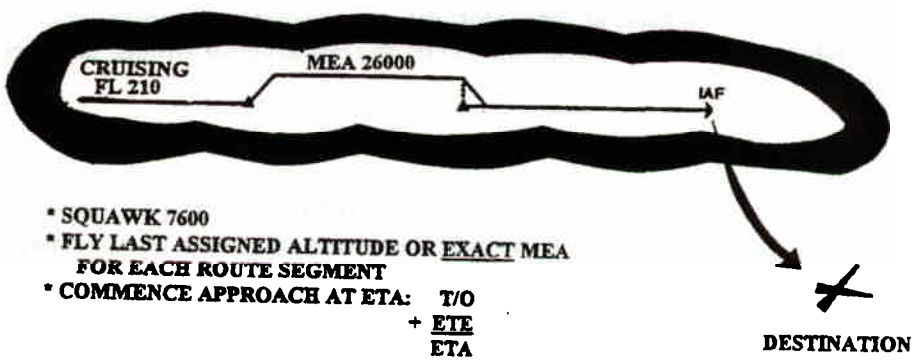
* **Last cleared route; or,**
* **Expected further routing; or,**
* **In absence of a cleared route or expected further routing, by the route filed in the flight plan.**

ALTITUDE TO MAINTAIN

* **Last assigned altitude; or,**
* **Expected altitude at a time or place (which becomes your last assigned altitude); or**
* **The exact MEA, whichever is higher for each route segment.**

EXAMPLE:

"NORDO"
IFR FLIGHT PLAN IN IMC



APPROACH TIME

Commence a penetration and approach at the Estimated Time Of Arrival (ETA).

* **Later than ETA: Commence penetration and approach on arrival at the IAF.**
* **Earlier than ETA: Hold in the published holding pattern until the ETA.**

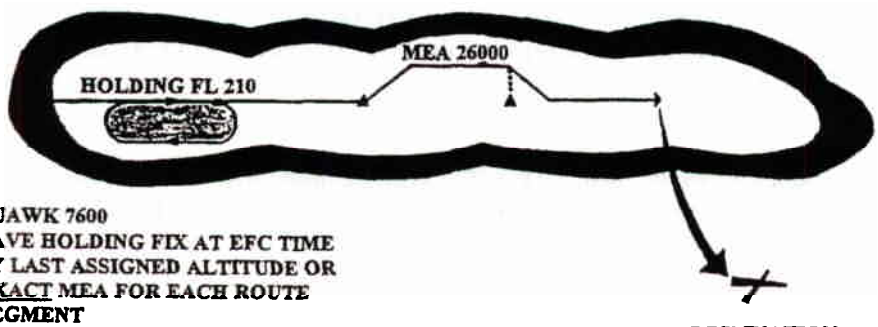
If no published pattern, hold in a standard (right-hand) pattern on the course you approach the IAF until the ETA.

C. NORDO DURING ENROUTE HOLDING

* Leave the holding fix at or after the Expected Further Clearance (EFC)Time.
* Fly the last assigned altitude or exact MEA, whichever is higher, for each route segment.
* Commence penetration and approach at your ETA, from the IAF, and from the last assigned altitude.

EXAMPLE:

"NORDO"
DURING ENROUTE HOLDING IN IMC



* SQUAWK 7600
* LEAVE HOLDING FIX AT EFC TIME
* FLY LAST ASSIGNED ALTITUDE OR EXACT MEA FOR EACH ROUTE SEGMENT
* COMMENCE APPROACH AT ETA:

T/O
+ ETE
+ HOLDING DELAY
ETA

NOTE

When filing an IFR flight plan, do not include any delays in the ETE. Once cleared for a delay, however, this becomes an amended clearance. For an accurate ETA, that is, time on the clock to commence an approach, you must include any cleared delay.

"NORDO" OPERATION OF TRANSPONDER/UHF AUXILIARY RECEIVER EQUIPMENT

TRANSPONDER

VFR FLIGHT PLAN

* Continue to squawk 1200; or
* Continue to squawk any assigned discreet frequency if on an IFR flight plan specifying "VFR-on-Top".

IFR FLIGHT PLAN

* Squawk Mode 3 Code 7600.

NOTE

Regardless of weather conditions, there is no provision for squawking 1200 (VFR Code) or any other Code other than 7600 on an IFR flight plan, unless by some means, ATC assigns another Code.

UHF AUXILIARY RECEIVER AN/ARR-40

The AN/ARR-40 Auxiliary UHF Receiver in the T2C provides direction finding and communication reception (no transmit capability) on twenty (20) preset channels between frequencies 265.0 and 284.9 plus GUARD. If you should experience UHF radio failure enroute, you can monitor certain Airport Traffic Control Tower and Approach Control frequencies and receive ATIS information when you arrive in your terminal area on the Auxiliary UHF Receiver. Subtracting sixty-four (64) from the second and third digits of the UHF frequency will indicate the preset reception channel to select on the AN/ARR-40. The ATIS frequency and UHF Radio Beacon (if one is available) will normally be the same frequency.

In the event of radio failure and a squawk of 7600, ATC will attempt contact with instructions on GUARD. Activating the "IDENT" switch on the Transponder will serve as acknowledgment of ATC instructions, and you can be given an actual Precision Radar Approach (PAR) on the Auxiliary Receiver.

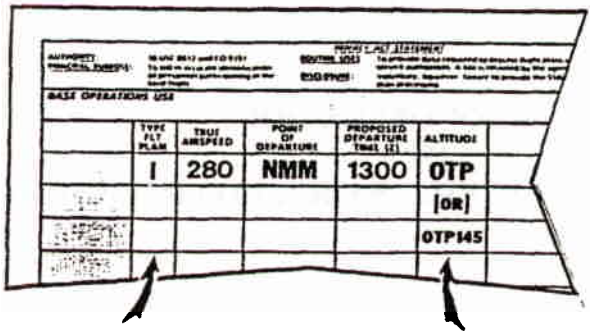
IFR "VFR-ON-TOP" CLEARANCE

This is an available option which allows a pilot to pick his own altitudes and remain clear of clouds while flying the enroute phase of an IFR flight. This option must be specifically requested by the pilot.

FILING

VFR and VFR-On-Top operations are not allowed in CLASS A AIRSPACE; therefore, 17,500' MSL would be the highest allowable VFR-On-Top filing altitude within the United States. VFR-On-Top is filed as an IFR flight plan (Figure 9-1).

Figure 9-1



Designate IFR in the "TYPE OF FLIGHT PLAN" block

Insert "OTP" or "OTP" with proposed VFR cruising altitude in the "ALTITUDE" block

DEPARTURE

ATC provides standard IFR separation on departure and furnishes the pilot with the reported cloud tops. ATC may or may not assign a discreet Code to squawk. In absence of an assigned Code, the pilot will squawk Mode 3 Code 1200, report "On Top", and report the initial VFR cruising altitude.

ENROUTE PILOT RESPONSIBILITY

* Pilot provides own aircraft separation by see-and-avoid.
* Adhere to FAR Part 91 VFR cloud clearance and visibility requirements.
* Monitor any assigned ARTCC frequency. In absence of an assigned frequency, monitor FSS on 255.4.
* Fly VFR cruising altitudes and remain below 18,000' MSL.
* Report all altitude changes if assigned an ARTCC frequency (ATC approval not required).
* Remain on the basic filed route.
* Request an ATC altitude assignment when ready for terminal area descent (ATC will assume responsibility for standard IFR separation).

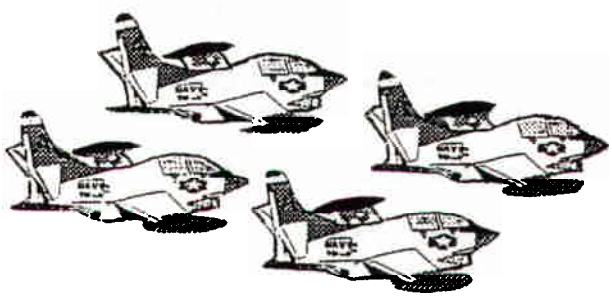
MINIMUM FUEL

You may encounter adverse winds or excessive fuel consumption problems of some type and determine you have the minimum fuel in tanks to proceed as filed and execute a safe landing. If your fuel state reaches this point, each time you change ARTCC frequencies you should inform the new controller - "BE ADVISED I HAVE MINIMUM FUEL". This is not an emergency, you are not requesting priority handling, and you will not be given special handling. You are informing the controller that any undue delays could create an emergency fuel situation.

If your fuel state reaches the point where priority handling is required, DECLARE AN EMERGENCY and give the controller your fuel state in minutes. You will then be furnished priority handling.

SPECIAL USE FREQUENCY

Two UHF frequencies are loaned by the Navy to the FAA for use by formations of single-piloted jet aircraft at night or in instrument conditions which allows remaining on one frequency throughout the flight duration. A Special Use Frequency can be requested on the flight plan or from the controller when inflight and is not to be used in Special Use Airspace or when going between ARTCC areas of responsibility.

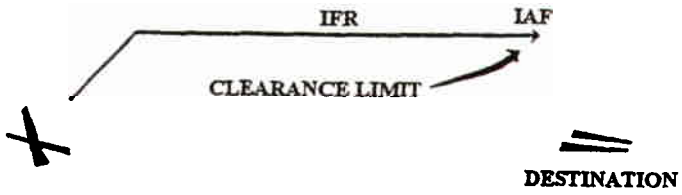


CLEARANCE LIMIT

DESTINATION

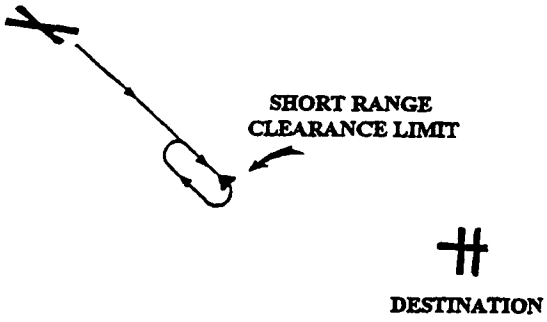
On an IFR flight, you will normally be cleared to the destination airport. This is a clearance to the Initial Approach Fix serving that airport.

EXAMPLE:



SHORT RANGE LIMIT

EXAMPLE:

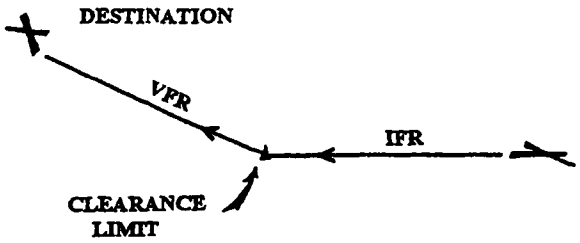


Due to communications difficulty or temporary traffic saturation problems in the next ARTCC area, you may sometimes be issued a short range clearance. ATC should issue further clearance at least 5 minutes prior to your reaching this clearance limit. If further clearance has not been received, you are expected to hold at the clearance limit and contact ATC.

COMPOSITE FLIGHT

On a military composite flight plan, you plan to fly one leg; however, part is IFR and part is VFR. Your clearance limit will be the point where the IFR portion terminates. At this point, you have certain pilot responsibilities:

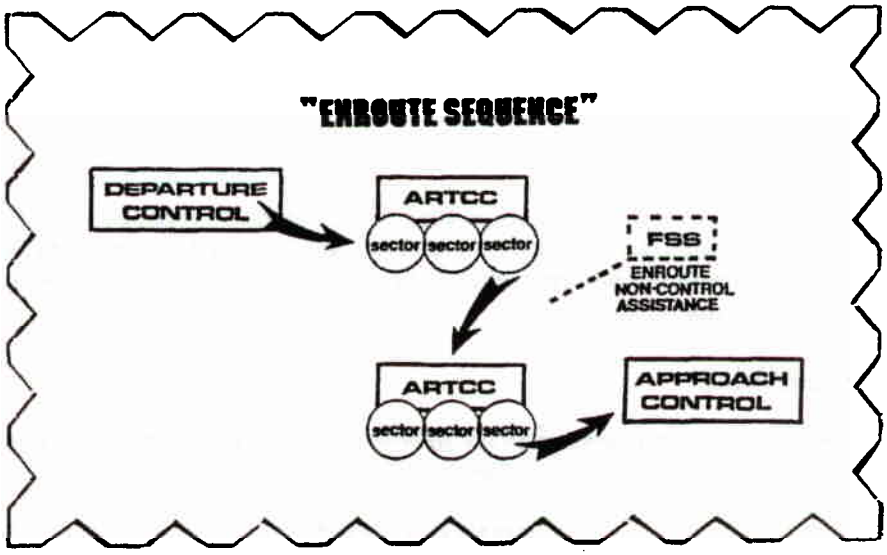
EXAMPLE:



* **Cancel instruments (If in CLASS A AIRSPACE, request a descent in order to cancel).**
* **Squawk Mode 3 Code 1200.**
* **Maintain FAR Part 91 VFR cloud clearance and visibility requirements.**
* **Verbally close military flight plan on the ground (Normally with Ground Control to ensure arrival report is transmitted to departure point and accountability of aircraft).**

ENROUTE COMMUNICATIONS

The normal sequence for control of IFR aircraft is depicted in figure 9-2. At some pre-coordinated time and/or altitude after departure, Departure Control will transfer control of your aircraft to an Air Route Traffic Control Center (ARTCC) for the enroute phase of your IFR flight. As you arrive in the vicinity of your terminal area, control of your aircraft will be transferred to the appropriate Approach Control facility for termination of your IFR flight.



ATC CONTROL SEQUENCE

Figure 9-2

The approximate locations of the 20 ARTCCs within the continental United States are depicted in Figure 9-3. As you proceed enroute on an IFR flight plan, you will be constantly directed to change frequencies as you transit from sector to sector within a Center area and from one Center to another Center area of responsibility. Services of a non-control nature can be requested from any of more than 200 Flight Service Stations (FSS) on UHF frequency 255.4.

ARTCC LOCATIONS

Figure 9-3

ENROUTE VOICE REPORTS

Communications will occupy the majority of your time during the enroute portion of an IFR flight; therefore, you should be thoroughly familiar with good radio procedure and the types of reports which may be required in various situations. The types of voice reports which may be required on an IFR flight are many and varied, but can be classified as being of three general types:

* INITIAL CONTACT REPORTS
* POSITION REPORTS
* ADDITIONAL REPORTS

INITIAL CONTACT REPORTS

You will be directed to change frequencies as your flight progresses from Departure Control to ARTCC, from sector to sector within an ARTCC area, from ARTCC to ARTCC, and from ARTCC to Approach Control. Each situation requires an initial contact report with the new controller. The report format depends on whether or not your aircraft is in a radar environment, that is, "Radar Contact".

IN RADAR CONTACT

If you have been in radar contact with the previous controller, you assume continued radar contact until advised otherwise. Your initial contact report will consist of two items:

* IDENTIFICATION
* ALTITUDE

EXAMPLES:

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, 11,000 FEET, CLIMBING TO FLIGHT LEVEL 230."

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, LEVEL FLIGHT LEVEL 230."

NOT IN RADAR CONTACT

With the Air Traffic Control System existing in the United States, an IFR aircraft is very seldom out of a radar environment. It is, however, very common in other parts of the world and you should be familiar with the proper voice report format for communications with worldwide Air Traffic Control facilities.

Whenever ATC advises "RADAR CONTACT LOST" or "RADAR SERVICE TERMINATED", you assume the next controller will not have you in radar contact. Your initial contact report will consist of three items:

* IDENTIFICATION
* ESTIMATE TO NEXT REPORTING POINT
  (Time on the clock in minutes past the hour)
* ALTITUDE

EXAMPLES:

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, ESTIMATING IMPERIAL 20, 11,000 FEET, CLIMBING TO MAINTAIN FLIGHT LEVEL 230."

"ALBUQUERQUE CENTER, NAVY ONE ALFA NINER ZERO ONE, ESTIMATING GILA BEND 42, FLIGHT LEVEL 230."

OFF-ROUTE INITIAL CONTACT REPORTS

EXAMPLE 1: A controller takes you off your cleared route, clears you "Direct" to a point, and subsequently issues a frequency change. On initial contact with the new controller, you should verify your clearance point.

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, LEVEL FLIGHT LEVEL 230, DIRECT GWIRE INTERSECTION."

EXAMPLE 2: A controller takes you off your cleared route, assigns you a vector heading to fly, and subsequently issues a frequency change. On initial contact with the new controller, you should verify your vector heading.

"ALBUQUERQUE CENTER, NAVY ONE ALFA NINER ZERO ONE, LEVEL FLIGHT LEVEL 230, HEADING 120."

(PROCEDURE NOTE)

There may be times when you will be unable to contact a new ARTCC controller on assigned frequency. This may occur for various reasons, such as, weather conditions, being out of sector frequency transmission range, or the controller not being on frequency. This latter situation may occur when you are directed to contact a new controller at a certain fix or time on the clock. If you experience temporary loss of communications with ARTCC, there are certain steps you should follow to re-gain communications.

TO RE-ESTABLISH
ENROUTE COMMUNICATIONS

1. RE-CONTACT TRANSFERRING CONTROLLER.

(if unable, then either)

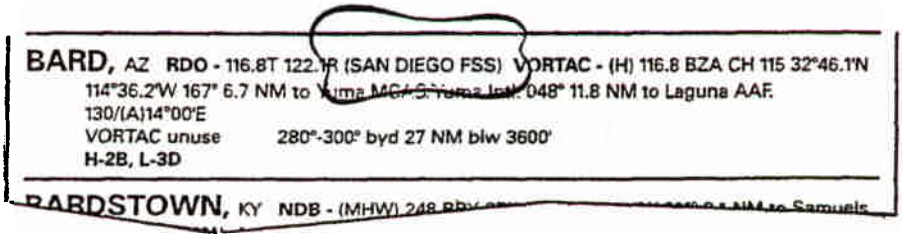
2. CONTACT A FSS, GIVE POSITION AND ALTITUDE, REQUEST AN ARTCC FREQUENCY;

or (as tactical jet types normally do)

CONTACT ARTCC ON SECTOR FREQUENCY PUBLISHED IN THE IFR SUPPLEMENT

PROCEDURE STEPS:

If unable to recontact your transferring controller, you could obtain an ARTCC frequency from the FSS serving the area. Reference the Enroute Chart for location and the IFR Supplement (Figure 9-4) for the FSS name (Unless the Charted NAVAID box has a shadowed outline).


BARD, AZ RDO - 116.8T 122.1R (SAN DIEGO FSS) VORTAC - (H) 116.8 BZA CH 115 32°46.1'N 114°36.2'W 167° 6.7 NM to Yuma MCAS/Yuma Intl. 048° 11.8 NM to Laguna AAF.
130/(A)14°00'E
VORTAC unuse 280°-300° byd 27 NM blw 3600'
H-2B, L-3D

BARDSTOWN, KY NDB - (MHW) 248 RBY 0... ...NM to Samuels

Figure 9-4

OR

You could go directly to the appropriate ARTCC sector frequency by referencing the Center name in the IFR Supplement (Figure 9-5). From the Enroute Chart, determine the nearest city, airport, or NAVAID that is listed under the Center name and use the first listed BOLD PRINT frequency for initial contact. If a bold print (high altitude) frequency is not listed, use a light print frequency.

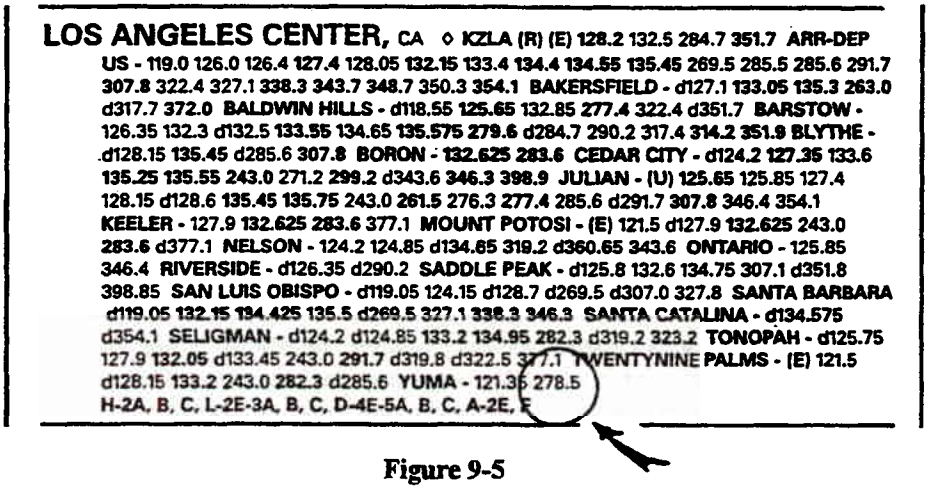

LOS ANGELES CENTER, CA ◇ KZLA (R) (E) 128.2 132.5 284.7 351.7 ARR-DEP US - 119.0 126.0 126.4 127.4 128.05 132.15 133.4 134.4 134.55 135.45 269.5 285.5 285.6 291.7 307.8 322.4 327.1 338.3 343.7 348.7 350.3 354.1 BAKERSFIELD - d127.1 133.05 135.3 263.0 d317.7 372.0 BALDWIN HILLS - d118.55 125.65 132.85 277.4 322.4 d351.7 BARSTOW - 126.35 132.3 d132.5 133.55 134.65 135.575 279.6 d284.7 290.2 317.4 314.2 351.9 BLYTHE - d128.15 135.45 d285.6 307.8 BORON - 132.625 283.6 CEDAR CITY - d124.2 127.35 133.6 135.25 135.55 243.0 271.2 299.2 d343.6 346.3 398.9 JULIAN - (U) 125.65 125.85 127.4 128.15 d128.6 135.45 135.75 243.0 261.5 276.3 277.4 285.6 d291.7 307.8 346.4 354.1 KEELER - 127.9 132.625 283.6 377.1 MOUNT POTOSI - (E) 121.5 d127.9 132.625 243.0 283.6 d377.1 NELSON - 124.2 124.85 d134.65 319.2 d360.65 343.6 ONTARIO - 125.85 346.4 RIVERSIDE - d126.35 d290.2 SADDLE PEAK - d125.8 132.6 134.75 307.1 d351.8 398.85 SAN LUIS OBISPO - d119.05 124.15 d128.7 d269.5 d307.0 327.8 SANTA BARBARA d119.05 132.15 194.425 135.5 d269.5 327.1 338.3 346.3 SANTA CATALINA - d134.575 d354.1 SELIGMAN - d124.2 d124.85 133.2 134.95 282.3 d319.2 323.2 TONOPAH - d125.75 127.9 132.05 d133.45 243.0 291.7 d319.8 d322.5 377.1 TWENTYNINE PALMS - (E) 121.5 d128.15 133.2 243.0 282.3 d285.6 YUMA - 121.35 278.5
H-2A, B, C, L-2E-3A, B, C, D-4E-5A, B, C, A-2E, F

Figure 9-5

EXAMPLES:

TRANSFERRING CONTROLLER	"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, NO CONTACT WITH LOS ANGELES ON 307.8."
	(If unable, then)
FSS WITH POSITION AND ALTITUDE	"SAN DIEGO RADIO, NAVY ONE ALFA NINER ZERO ONE, TWENTY DME WEST OF BARD EASTBOUND ON J TWO, FLIGHT LEVEL 230. UNABLE TO CONTACT LOS ANGELES CENTER ON 307.8, REQUEST A FREQUENCY."
	(Or)
CENTER SECTOR FREQUENCY	"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE ON 278.5, LEVEL FLIGHT LEVEL 230."

POSITION REPORTS

You will normally be in "Radar Contact" on IFR flights anywhere in the United States. There may be times, however, when radar contact cannot be maintained, such as in an area of severe weather, at very low levels over mountainous terrain, or during periods of major maintenance and/or radar equipment replacements. During these periods, the controller must rely on your position reports to monitor your flight and provide for traffic separation.

As stated in Figure 9-6. a position report is required when passing over any fix that is depicted on the Enroute Charts by a solid triangle, or any fix used in the Route-Of-Flight Section of the Military flight plan (DD Form 175) to define a "Direct" route. Except at ATC control boundaries over international waters, all solid triangles have been eliminated from the High Altitude Enroute Charts within the United States. They are still quite common in other parts of the world.

(EXCERPT FROM THE FAA AERONAUTICAL INFORMATION MANUAL AND FLIP (ENROUTE) FLIGHT INFORMATION HANDBOOK)

Figure 9-6

POSITION REPORTING REQUIREMENTS

The designated compulsory reporting point symbol is the solid triangle (▲); the "on request" reporting point symbol is the open triangle (△). Reports passing an "on request" reporting point are only necessary when requested by ATC.

(1) Flights along airways or routes — A position report is required by all flights regardless of altitude, including those operating in accordance with an ATC clearance specifying "VFR ON TOP," over each designated compulsory reporting point along the route being flown.

(2) Flight Along a Direct Route — Regardless of the altitude or flight level being flown, including flights operating in accordance with an ATC clearance specifying "VFR ON TOP", pilots shall report over each reporting point used in the flight plan to define the route of flight.

ATC RADAR ADVISORY:

"RADAR CONTACT" - **Discontinue making position reports.**

"RADAR CONTACT LOST" OR "RADAR SERVICE TERMINATED" - **Resume making position reports.**

(NOTE: INTERNATIONAL REPORTING PROCEDURES ARE THE SAME AS THOSE FOR THE UNITED STATES. TO PREPARE YOU FOR IFR FLIGHTS UNDER ICAO RULES AND PROCEDURES, ASSUME THE NAVAIDS ON YOUR ENROUTE CHART HAVE SOLID TRIANGLES FOR THE FOLLOWING EXAMPLES.)

EXAMPLES - Not in "Radar Contact":

(BETWEEN POINTS)

- **IDENTIFICATION**
- **ESTIMATE TO NEXT POINT**
- **ALTITUDE**

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, ESTIMATING BARD 27, LEVEL FLIGHT LEVEL 230."

(ARRIVAL AT NEXT POINT)

* IDENTIFICATION
* POSITION

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, BARD."

(POSITION REPORT - WHEN DIRECTED "GO AHEAD")

* IDENTIFICATION
* POSITION
* TIME
* ALTITDE
* POSITION (NEXT)
* TIME (ESTIMATE)
* POSITION (FOLLOWING)

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, BARD 27, FLIGHT LEVEL 230, GILA BEND 42, TUCSON."

Considering the current Air Traffic Control System, in all probability, you may never give this type report in the United States when flying in the Jet Route System.

ADDITIONAL REPORTS

As you proceed on the enroute phase of an IFR flilght, you will be required to make certain voice reports in addition to initial contact and position reports. The FLIP (Enroute) Flight Information Handbook lists additional reports which are to be given to ATC. Some of these reports are to be given at all times, whether in radar contact or not, while others are to be given only when not in radar contact.

NOTE

Some of these reports apply specifically to the arrival phase of flight.

These reports are necessary in order for ATC to move traffic in a safe and efficient manner. ATC will move aircraft from point to point in the horizontal plane using airspeed and altitude assignments to maintain aircraft separation. Notice that most of these reports affect aircraft separation, both horizontally and vertically; therefore, it is essential that you know the situations requiring reports so as to keep controllers advised of your actions.

AT ALL TIMES:

* VACATING AN ASSIGNED ALTITUDE FOR A NEWLY ASSIGNED ALTITUDE
  (Reaching new altitude report not required unless specifically directed to report).
* VACATING ASSIGNED ALTITUDE WHEN COMMENCING PENETRATION/APPROACH.
* CHANGING FILED TAS BY GREATER OF 10 KNOTS OR 5%.
* ANY MALFUNCTION OF COMMUNICATIONS, NAVIGATION, OR TRANSPONDER EQUIPMENT.
* LEAVING AN ASSIGNED FREQUENCY (Unless directed to change frequencies).
* ATIS INFORMATION RECEIVED (When contacting Ground Control and Approach Control).
* WHEELS DOWN REPORT (OPNAV requirement, not an ATC requirement unless directed to report).
* EXECUTING A MISSED APPROACH AND INTENTIONS.
* ENTERING AND LEAVING AN ASSIGNED HOLDING PATTERN (Except in a training area where radar service is provided).
* WHEN ENCOUNTERING ANY UNFORECAST AND/OR HAZARDOUS WEATHER CONDITIONS.

WHEN NOT IN "RADAR CONTACT":

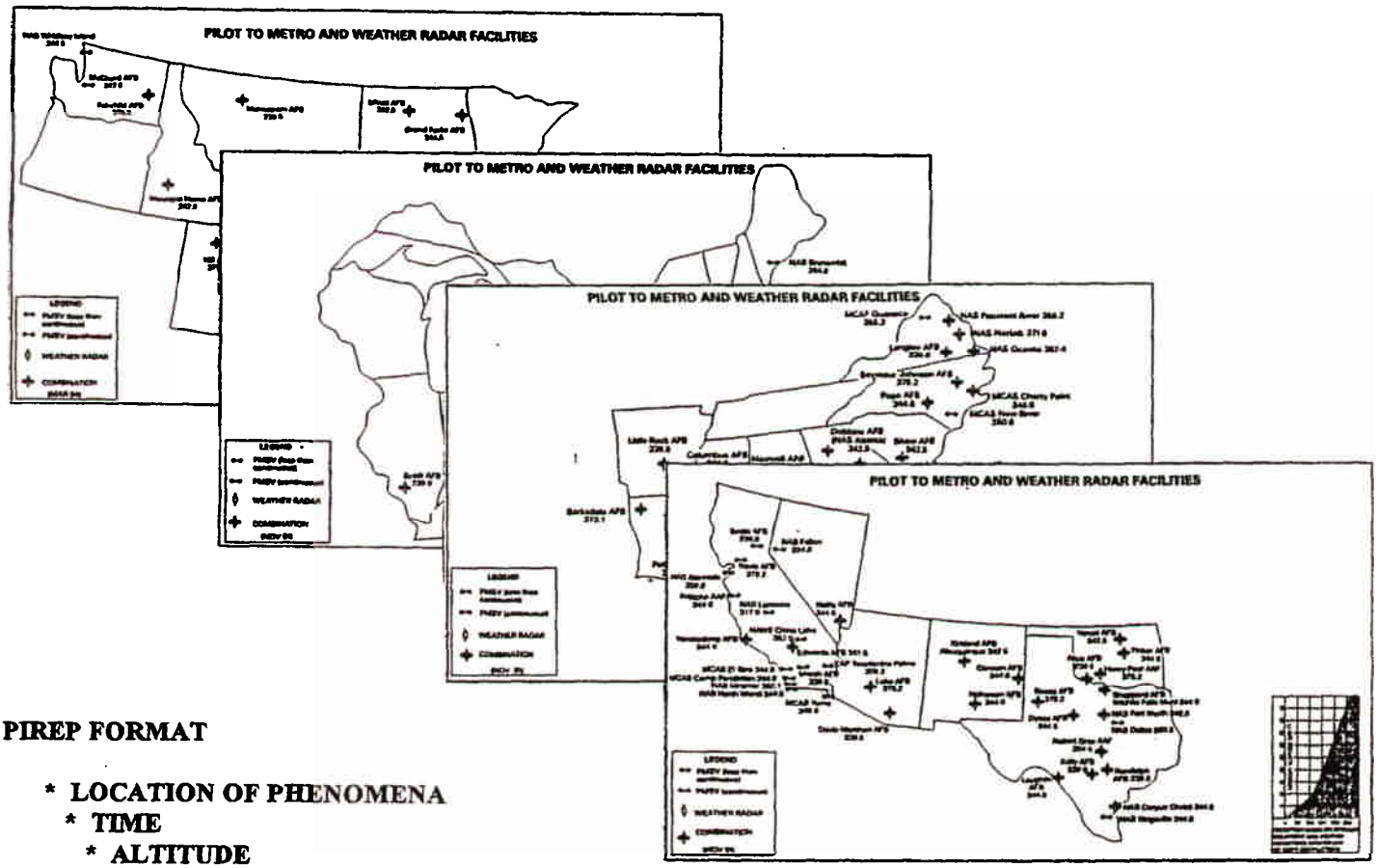
* FINAL APPROACH FIX.
* POSITION REPORTS.
* CHANGE IN POSITION ESTIMATE BY +/- 3 MINUTES.
* WHEN ENCOUNTERING ANY UNFORECAST AND /OR HAZARDOUS WEATHER CONDITIONS.

PILOT REPORTS (PIREPs)

You are encouraged to cooperate with the National Weather Service and give Pilot Reports (PIREPs) whenever practicable. The PIREP is designed to aid forecasters in providing more accurate weather briefings to other pilots preparing for flights, and to aid controllers in keeping other enroute aircraft out of hazardous weather conditions. PIREPs can be given to ATC, a FSS, or to the nearest military METRO facility since the information is distributed by each type facility.

Although the PIREP is a requirement of the FARs when encountering adverse or unforecast weather conditions, safety of flight should always be your first consideration, especially in a single-piloted aircraft with only one radio and no one to assist you. You must use good judgment in determining if, when, and to what facility a PIREP should be given.

The form and content of the PIREP is located in the FLIP (Enroute) Flight Information Handbook along with four (4) convenient reference maps (Figure 9-7) for locating the nearest METRO facililty.



PIREP FORMAT

* **LOCATION OF PHENOMENA**
* **TIME**
* **ALTITUDE**
* **TYPE AIRCRAFT**

Figure 9-7

EXAMPLE:

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, REQUEST TO LEAVE YOUR FREQUENCY TO CONTACT METRO."

"NAVY ONE ALFA NINER ZERO ONE, LOS ANGELES CENTER, REQUEST APPROVED, REPORT BACK ON THIS FREQUENCY."

"YUMA METRO, NAVY ONE ALFA NINER ZERO ONE, PIREP."

"YUMA METRO, NAVY ONE ALFA NINER ZERO ONE, 20 DME EAST OF BARD 1630Z, INTERMITTENT MODERATE CLEAR AIR TURBULENCE AT FLIGHT LEVEL 230, T2 AIRCRAFT."

"LOS ANGELES CENTER, NAVY ONE ALFA NINER ZERO ONE, BACK ON YOUR FREQUENCY."

At some time during enroute flight, you may find it necessary to deviate from your clearance due to weather conditions, impairment of aircraft capabilities, loss of navigational equipment, or by exercising your own emergency authority. Deviation requests are normally for weather avoidance, but for whatever reason, a deviation must be approved by ATC unless by your own emergency authority.

For tactical jet type aircraft, controllers require simple and abbreviated requests, that is, who you are, what you want to do, and the reason.

EXAMPLE:

"ALBUQUERQUE CENTER, NAVY ONE ALFA NINER ZERO ONE, REQUEST DEVIATION TEN MILES NORTH FOR FIVE MINUTES TO AVOID THUNDERSTORMS, VISUAL CONDITIONS."

SAFETY ADVISORIES

MODE C READOUT

Anytime you are below 18,000' MSL and contacting a new controller, give your exact altitude in hundreds of feet. The controller determines whether or not to use the Mode C readout on his radar scope for traffic separation purposes. If more than 300' difference, he will not use it. For a major discrepancy, the controller may direct "STOP MODE C SQUAWK".

LOW ALTITUDE ALERT

When a controller observes from his Mode C readout that your aircraft is in unsafe proximity to the terrain, he will state "LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY". The controller will not issue instructions, but is simply advising you of an unsafe situation. You can always request controller assistance.

TRAFFIC ADVISORIES

Since the controller cannot read crab angle on his radar scope, any advisories will be relative to your actual track-over-the-ground.

CENTER WEATHER ADVISORY (CWA)

By means of a CWA, the controller will keep you advised directly of any reported or observed severe weather in your area of flight, including any AIRMETs or SIGMETs which may become effective.

HOLDING PROCEDURES

ENABLING OBJECTIVE: Demonstrate a knowledge of enroute and terminal area TACAN and ADF holding patterns and procedures.

SPECIFIC OBJECTIVES:

10.1 State the difference between a standard and a non-standard holding pattern.

10.2 Explain the term "Direction to Hold" as it applies to TACAN holding.

10.3 List the five items in a holding clearance necessary to describe a non-published holding pattern.

10.4 State the situations requiring use of the "Non-DME Rules" for determining lengths of holding pattern legs.

10.5 Explain why the ADF holding fix is located at the Radio Beacon.

10.6 Explain the three basic methods for entering a holding pattern.

10.7 State the maximum holding airspeed for the T2C aircraft.

10.8 State the normal holding airspeed for the T2C aircraft in a situation of anticipated delay.

10.9 Explain the difference between the published holding pattern for an Approach Procedure and the missed approach holding pattern for an Approach Procedure.

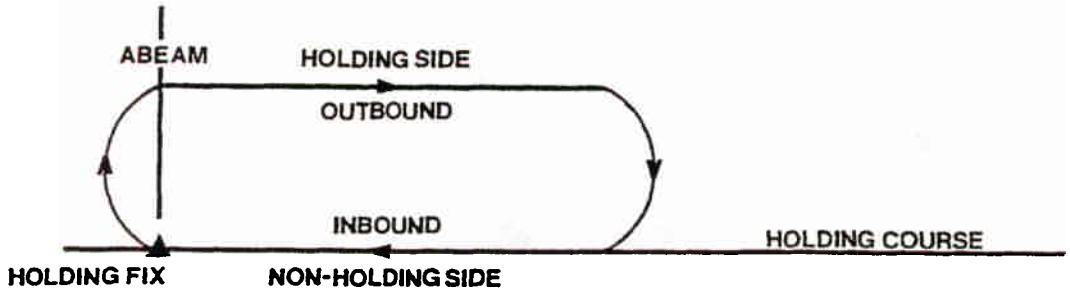
10.10 Explain the difference between the holding fix for an Approach Procedure and the Initial Approach Fix for an Approach Procedure.

INTRODUCTION

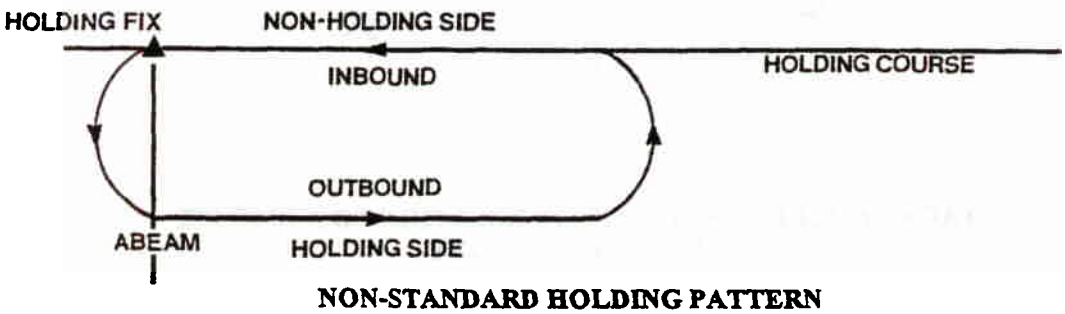
Control over aircraft traffic on IFR flight plans is continuous from taxi prior to takeoff to parking at destination. Because of various circumstances, such as traffic density, weather conditions, communications difficulties, and emergencies in progress, it sometimes becomes necessary to readjust traffic flow. This is usually accomplished by directing pilots to hold at specified locations until further clearance to proceed can be issued. Holding is a predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance. An aircraft holds at a navigatinal "FIX". This fix can be an OMNI station, Radio Beacon, published intersection, or a TACAN radial/DME fix.

TYPES OF HOLDING PATTERNS

Holding patterns are designated as either STANDARD or NON-STANDARD (Figure 10-1) with the only difference being direction to turn as you cross the fix. It is always assumed that a pattern is STANDARD unless ATC specifies NON-STANDARD or "Left-Hand" in a clearance.



STANDARD HOLDING PATTERN

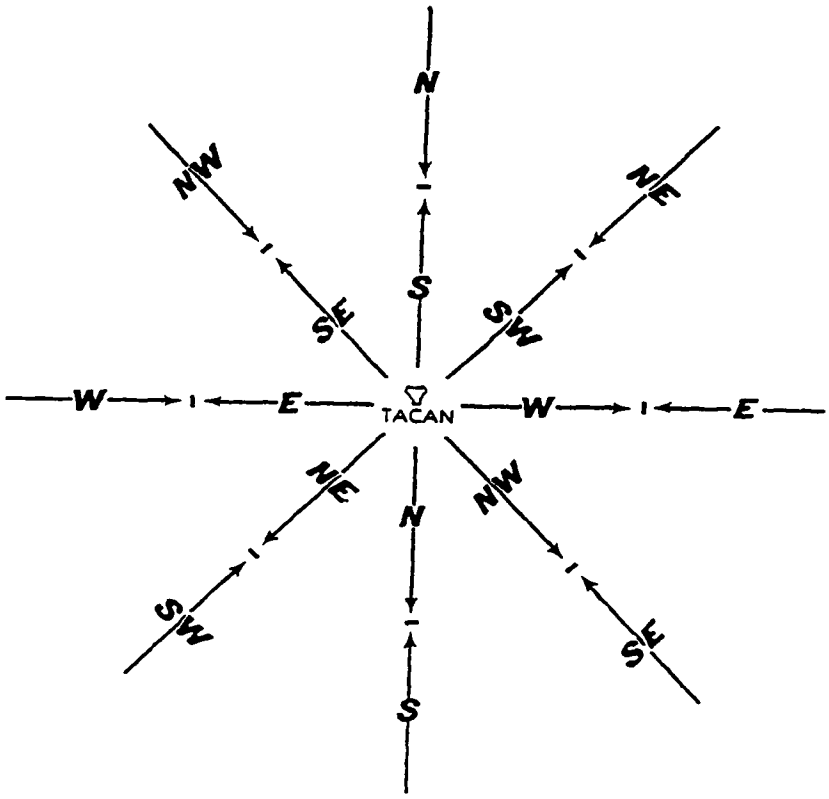


NON-STANDARD HOLDING PATTERN

Figure 10-1

HOLDING DIRECTION

TACAN holding is always inbound to the fix, a point in space, along a specified radial or Jet Route. The direction to hold (Figure 10-2) is in relation to that fix and not in relation to the TACAN facility. There are only two directions to hold in relation to a fix, and one of these directions will be specified in a holding clearance.



TACAN HOLDING DIRECTION IN RELATION TO A DME FIX
- NOT THE TACAN FACILITY

Figure 10-2

HOLDING CLEARANCE ITEMS

A holding clearance will contain the following general instructions, of which the first five are necessary to describe a non-published holding pattern:

To describe the pattern

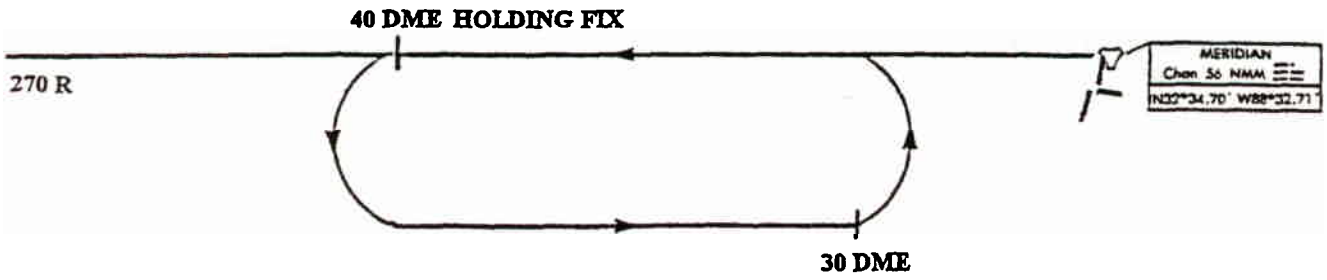
1. The holding fix (point in space).
2. Direction to hold from the fix (one side or the other).
3. The radial, course, or Jet Route on which to hold.
4. The length of legs if TACAN holding.
5. The direction of turns if non-standard.

And as part of your clearance

6. Altitude instructions if applicable.
7. An Expected Further Clearance (EFC) time.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, HOLD EAST OF THE FORTY NAUTICAL MILE DME FIX, NAVY MERIDIAN TACAN TWO SEVEN ZERO DEGREE RADIAL, LEFT TURNS, TEN MILE LEGS. MAINTAIN FLIGHT LEVEL TWO ZERO ZERO. EXPECT FURTHER CLEARANCE AT 0950Z."



NON-DME RULES

The Non-DME Rules state that the inbound leg of a holding pattern will be:

a. **1 minute at or below 14,000' MSL; and,**

b. **1 1/2 minutes above 14,000' MSL.**

These rules will be applied in several situations of holding:

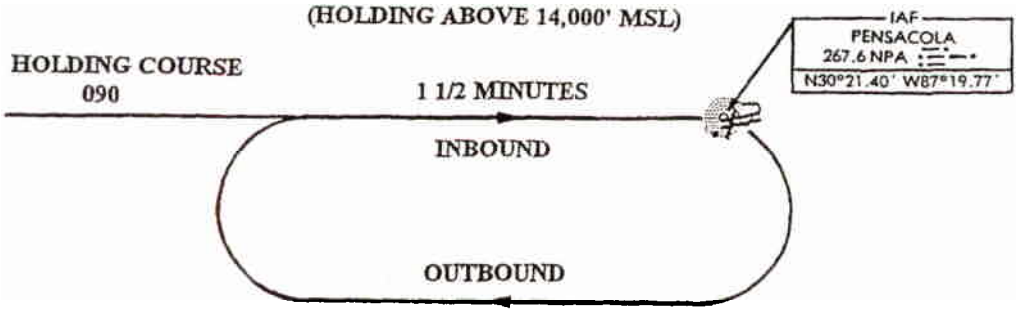
1. **For all ADF holding.**
2. **When reaching a short-range clearance limit without further clearance.**
3. **When arriving NORDO in a terminal area ahead of ETA, in IMC, and there is no published pattern on the Approach Procedure Chart; that is, holding is necessary at the IAF.**
4. **When holding in a published pattern on the Approach Procedure Chart which has no published outer limit and leg lengths have not been received from ATC.**

ADF HOLDING

For ADF holding, an inbound course to the Radio Beacon will be specified in the clearance. The Number 1 Needle is used for ADF holding in the same manner as the Number 2 Needle is used for VOR and TACAN holding. Timing will commence when abeam the Beacon. The initial outbound leg will be flown for 1 or 1 1/2 minutes, depending on altitude. Subsequent outbound legs will be flown for whatever time is necessary to make good an inbound leg of 1 or 1 1/2 minutes, depending on altitude. For ADF holding, the Radio Beacon is necessarily the holding fix since no DME is associated with ADF.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, HOLD WEST OF THE NAVY PENSACOLA RADIO BEACON, INBOUND COURSE ZERO NINER ZERO DEGREES, MAINTAIN ONE SEVEN THOUSAND. EXPECT FURTHER CLEARANCE AT 1150Z."



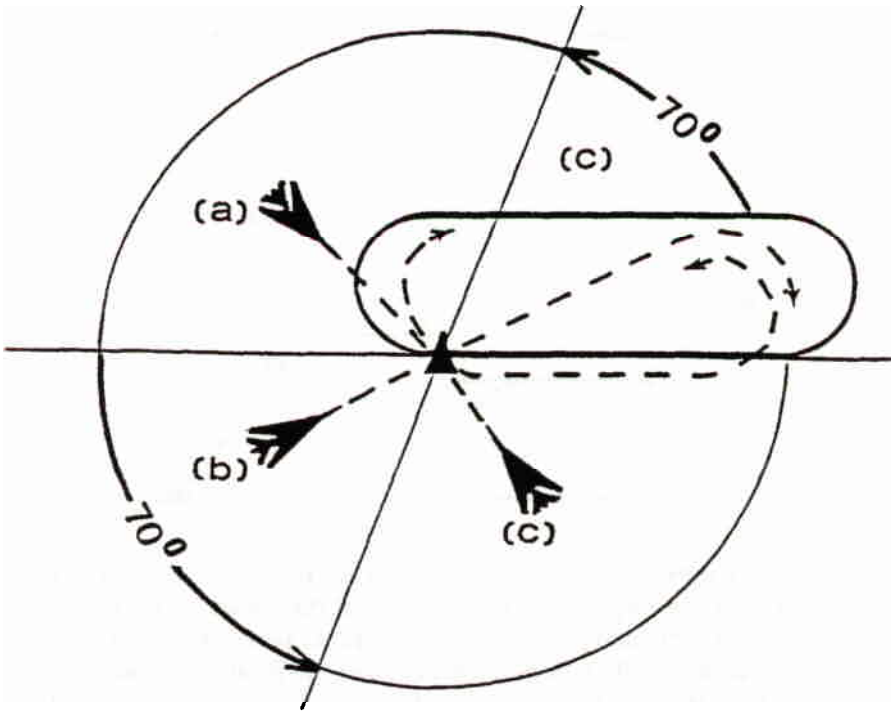
HOLDING PATTERN ENTRY

Always enter holding at the fix and leave holding at the fix unless cleared "DIRECT", then you can leave from any point in the holding pattern.

When entering holding, slow down somewhere within 3 minutes of reaching the holding fix so as to cross the holding fix at or below the T2C maximum holding airspeed of 265 knots IAS. If holding is anticipated for any length of time, hold at the normal holding airspeed of MAX ENDURANCE.

Except when in a training area where radar service is provided, make a voice report to ATC giving the time and altitude of entering holding.

Figure 10-3 depicts the holding entry pattern recommended by the FAA and is the one used by the Navy in the NATOPS Instrument Flight Manual. It is based on three types of turns as an aircraft crosses the holding fix.



STANDARD PATTERN ENTRY

Figure 10-3

These procedures are based on crossing the holding fix and turning in the shortest direction toward the holding airspace by using either a:

(a) PARALLEL PROCEDURE - Parallel the holding course (inbound course), turn left, and return to the holding fix or intercept the holding course; or,

(b) TEARDROP PROCEDURE - Proceed on an outbound track of 30 degrees or less to the holding course (inbound course), turn right and intercept the holding course; or,

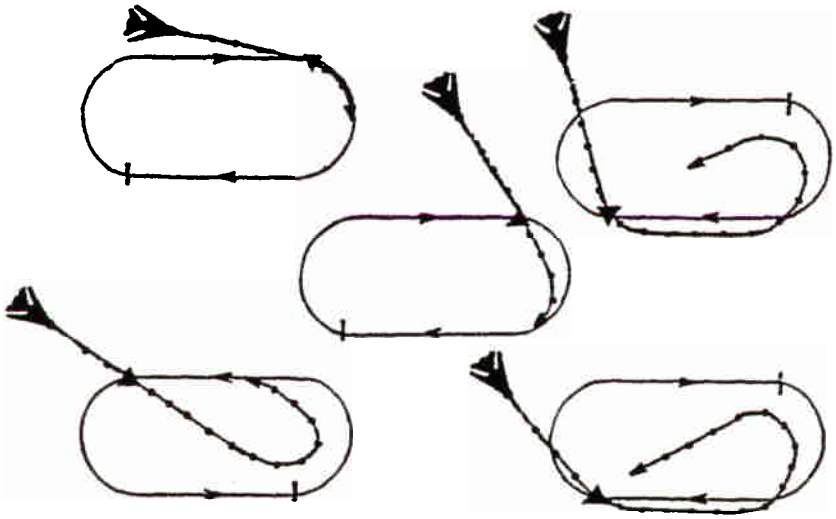
(c) DIRECT ENTRY PROCEDURE - Turn right and fly the pattern.

As you can observe from this Standard Pattern Entry, there is only one logical method by which to enter holding. Cross the holding fix and turn in the shortest direction toward the holding airspace by whichever method is necessary - parallel, teardrop, or direct entry. A turn in the opposite direction would take you away from the holding airspace.

EXAMPLES:

* **CROSS THE FIX**

* **TURN IN THE SHORTEST DIRECTION**



As depicted on the High Altitude Instrument Approach Procedure Charts (Figure 10-4), the direction to turn to enter the Published Holding Pattern is specified in the upper right-hand corner of the Chart . This is consistent with the FAA recommended entry in Figure 10-3. This depicted pattern with entry turns is always oriented exactly the same as the Published Holding Pattern for the Procedure. Do not, however, confuse the Published Holding Pattern for the Procedure with the Missed Approach Holding Pattern. The Procedure Holding Pattern is depicted as a solid line pattern, whereas, the Missed Approach Holding Pattern is depicted as a vertically spaced dashed line.

PUBLISHED HOLDING PATTERN

MISSED APPROACH HOLDING PATTERN

PATTERN ENTRY TURN

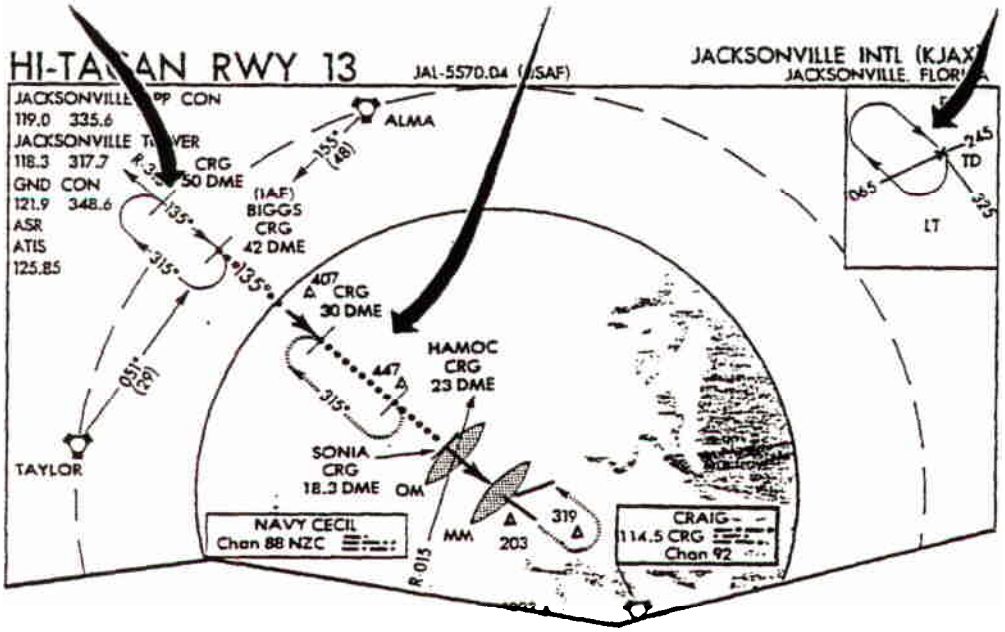


Figure 10-4

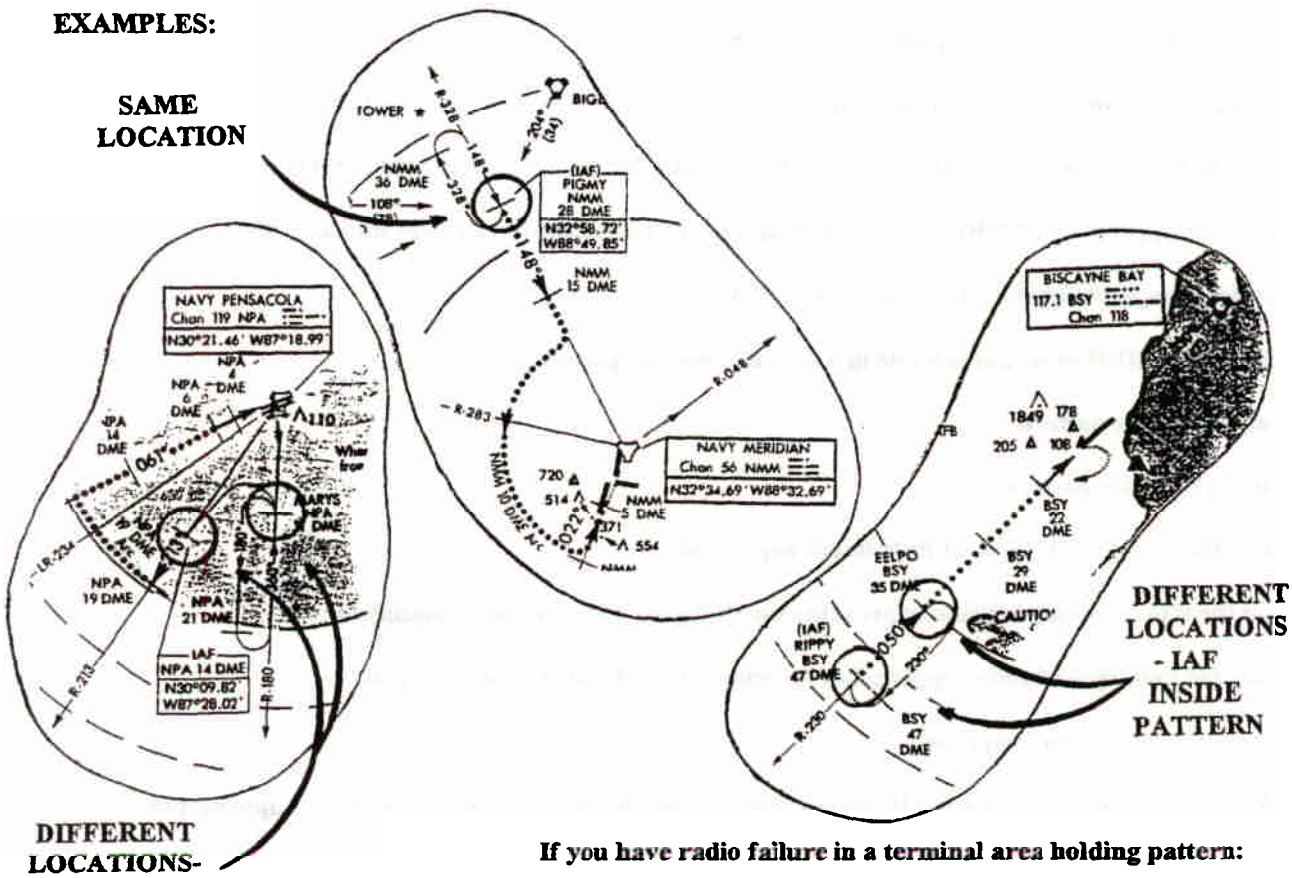
Care must also be taken not to confuse the HOLDING FIX with the INITIAL APPROACH FIX. The HOLDING FIX is the point around which ATC delays your aircraft, whereas, the INITIAL APPROACH FIX is the point from which you begin a Penetration and Approach Procedure.

CAUTION!

IAF (PENETRATION POINT) AND HOLDING FIX (DELAY POINT) ARE NOT SYNONYMOUS

EXAMPLES:

SAME LOCATION



DIFFERENT LOCATIONS - IAF INSIDE PATTERN

DIFFERENT LOCATIONS- IAF OUTSIDE PATTERN

NORDO RULE

If you have radio failure in a terminal area holding pattern:

1. **Leave the Holding Fix at or after your EFC time.**
2. **Proceed to the Initial Approach Fix.**
3. **Commence a penetration from the IAF and FROM YOUR LAST ASSIGNED ALTITUDE.**

   (The method of losing sufficient altitude for a safe approach will be presented in the "Arrival Procedures" Chapter of the course).

This rule applies to all situations of terminal area holding, regardless of where the Initial Approach Fix is located.

ARRIVAL PROCEDURES

ENABLING OBJECTIVE: Demonstrate a knowledge of ATC procedures, including special ATC procedures for military, OPNAV rules and procedures, and DOD requirements which are pertinent to the arrival phase of flight in a Naval aircraft within the United States.

SPECIFIC OBJECTIVES:

11.1 State the typical ATC control sequence for terminal areas.

11.2 Recognize the situations requiring mandatory voice reports in a terminal area.

11.3 Explain the purpose of an Enroute Descent and applicable modifications used to terminate an IFR flight.

11.4 State the appropriate NORDO procedures applicable to an Enroute Descent into a terminal area.

11.5 Explain Single Frequency Approach (SFA) service.

11.6 Explain NORDO procedures while in a terminal holding pattern:

- **a. IAF inside pattern.**
- **b. IAF outside pattern.**

11.7 State the two general types of instrument approaches.

11.8 List the types of non-precision approaches for which the T2C aircraft is equipped.

11.9 State the two types of radar approaches for which the T2C aircraft is equipped.

11.10 Explain a "No-Gyro" approach.

11.11 State pilot "read-back"/acknowledgment responsibility for instructions during radar approaches.

11.12 State the OPNAV approach weather minimums for Naval aircraft:

- **a. Single-piloted aircraft.**
- **b. Multi-piloted aircraft.**
- **c. Formations of aircraft.**

11.13 State the OPNAV restrictions on practice approaches for single-piloted aircraft.

11.14 Explain the intent of various types of ATC instrument approach clearances.

11.15 Exlain the variations of terminating IFR flights:

a. **Contact Approach.**
b. **Visual Approach.**
c. **Circling Approach.**

11.16 Define Minimum Vectoring Altitude (MVA).

11.17 Explain NORDO procedures while being vectored or within a radar approach pattern in a terminal area.

11.18 Explain missed approach to alternate NORDO procedures.

11.19 State the OPNAV difference between an actual and a simulated instrument approach.

11.20 Explain the logging of instrument time and approaches under both actual and simulated conditions in Naval aircraft:

a. **Two pilots in aircraft.**
b. **Student-Instructor relationship.**
c. **Student under instrument hood.**
d. **Formations.**

11.21 State the OPNAV requirement for closing out a flilght plan:

a. **Military installations.**
b. **Non-Military installations.**

INTRODUCTION

The typical ATC control sequence for terminating IFR flights is depicted in Figure 11-1. As you arrive in the terminal area, ARTCC will turn you over to Approach Control to terminate your IFR flight. Approach Control may issue advanced planning information as to what kind of approach or specific approach procedure to expect, or it may issue an approach clearance. At times, Approach Control may have to delay your flight by issuing a holding clearance. The normal method of termination is by an Enroute Descent and vectors to feed your aircraft into the traffic system at a lower altitude. You can request any type of approach for which your aricraft is equipped. Weather conditions permitting, you may be turned over to the Control Tower or you may be retained on Approach Control frequency.

NOTE

A clearance to land may be relayed through Approach control or a GCA facility, but landing clearances can be granted only by the Airport Traffic Control Tower.

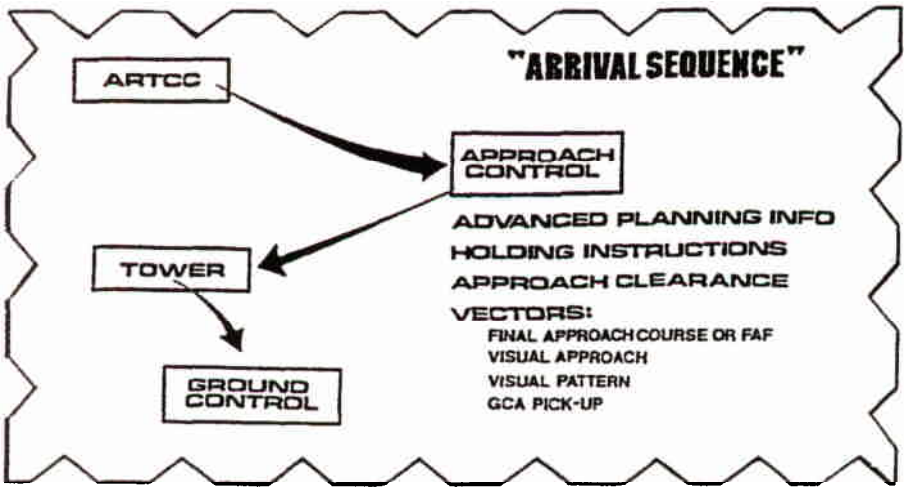


Figure 11-1

While operating in the terminal area, you should anticipate the necessity of giving certain voice reports required by ATC (Figure 11-2).

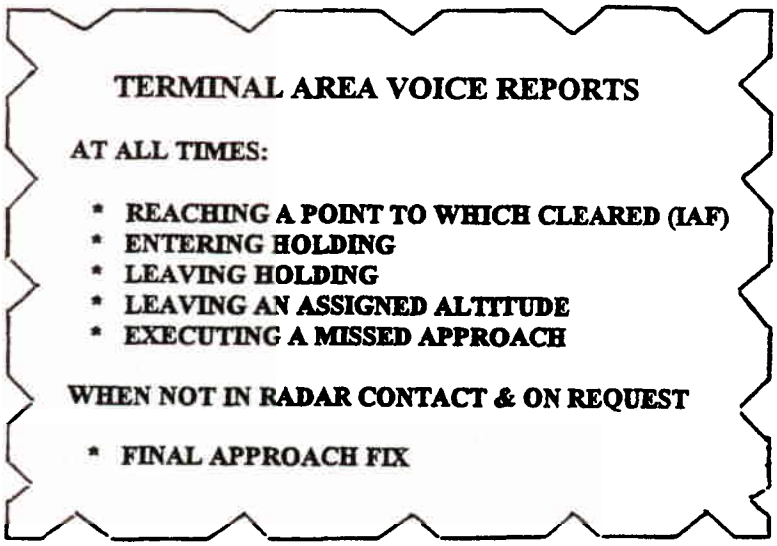


Figure 11-2

ENROUTE DESCENT

An Enroute Descent is a descent from an enroute altitude to the final approach of an established procedure without execution of the entire instrument approach procedure. The type of final approach to be flown (TACAN, PAR, or ASR) should be understood by both pilot and controller prior to commencing descent. An Enroute Descent can be requested by

the pilot or initiated by the ATC controller; however, it may be rejected by the pilot if there is a published high altitude instrument approach procedure for the airport. Once begun, a controller may not terminate the Enroute Descent without pilot consent unless dictated by radar outage or an emergency in progress.

Prior to issuing a descent clearance below the published Initial Approach Fix altitude for that airport, the controller will inform the pilot of the type of final approach, the point to which radar vectors will position the aircraft, and current weather conditions when below basic VFR minimums.

For purposes of determining adequate weather conditions for execution of any particular type approach, OPNAV states the approach is considered to have begun when your aircraft passes the highest altitude depicted on the Instrument Approach Procedure Charts for that airport, that is, the Initial Approach Fix altitude. For example, An ATC clearance specifies: "Descend and maintain two thousand feet for radar vectors to a Precision Radar final approach course". You must have PAR weather minimums to leave altitude. When you pass the published TACAN IAF altitude during this enroute descent, regardless of where your aircraft may be located, any reported changes in weather conditions are no longer a factor and descent can be continued to the assigned altitude. If reported weather conditions have deteriorated below your minimums prior to reaching the IAF altitude during this Enroute Descent, it becomes your responsibility to terminate the type of approach and request an alternative action.

Although normally used to feed your aircraft into the traffic system to final approach course of a TACAN procedure, it may be an enroute descent for radar vectors to a Final Approach Fix, a Precision Radar final approach course, an ASR final approach course, or a position from which a Visual Approach clearance can be issued.

NORDO DURING ENROUTE DESCENT INTO TERMINAL AREA

During an Enroute Descent into your terminal area, you should always have the TACAN Instrument Approach Procedure Chart out and the TACAN radial set in the ID-249 whether you intend to use it or not. Because if you should experience radio failure during the Enroute Descent, you should intercept and proceed with the published TACAN approach procedure at some convenient point. Until established on the procedure at some convenient point, however, maintain the highest of:

- **Your last assigned altitude, that is, the altitude to which you are descending; or,.**
- **The published MINIMUM SAFE (SECTOR) ALTITUDE on the Approach Chart if within 25 NM from the procedure NAVAID; or,**
- **The published EMERGENCY SAFE ALTITUDE on the Approach Chart if more than 25 NM from the procedure NAVAID.**

Since ATC can vector your aircraft below both of these emergency altitudes, the highest of these three altitudes will guarantee you obstruction clearance until you are established on the TACAN Approach Procedure at some convenient point.

SINGLE FREQUENCY APPROACH (SFA) SERVICE

This is a service provided to single-piloted jet aircraft during the hours of darkness or in instrument weather conditions which allows the use of a single UHF frequency throughout an approach to landing. If available, it will be listed in the "COMMUNICATIONS" section under the airport name in the Airport Directory of the FLIP (Enroute) IFR Supplement (Figure 11-3). At some airports, this is a mandatory service by letter-of-agreement with Approach Control. It is not mandatory at Naval installations, however, OPNAV directs it be given to the maximum extent that traffic conditions and communications capabilities permit. If you are given a Precision final approach, the PAR controller will come up on the same frequency.

If at night or in IMC and the service is listed as available, you should request a single frequency approach when you contact Approach Control on arrival in the terminal area. If the service is not available or cannot be given, ATC will keep frequency shifts to a minimum below 2500' AGL.

For the purpose of providing SFA service, ATC treats any tandem seated aircraft as if it were a single-piloted aircraft.

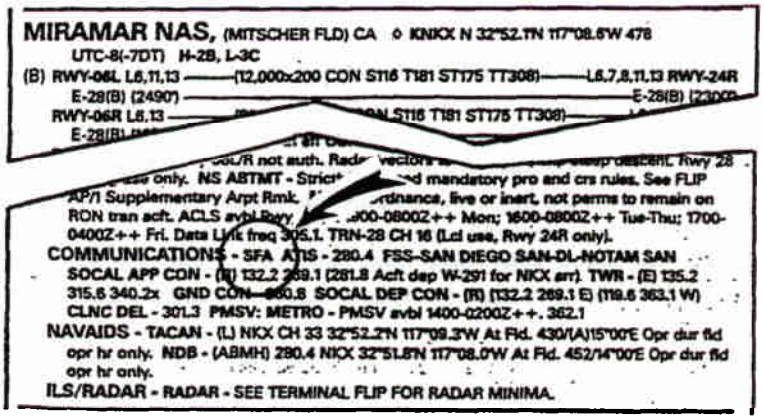

MIRAMAR NAS, (MITSCHER FLD) CA ◊ KNKX N 32°52.7'N 117°08.6'W 478
UTC-8(-7DT) H-2B, L-3C
(B) RWY-06L L8,11,13 (12,000x200 CON ST16 T181 ST175 TT308) L8,7,8,11,13 RWY-24R
E-28(B) (2490') E-28(B) (2300')
RWY-06R L8,13 ST16 T181 ST175 TT308)
E-28(B)
only. NS ABTMT - Strict d mandatory pro and crs rules. See FLIP
AP/1 Supplementary Arpt Rmk. ordinance, live or inert, not perms to remain on
RON tran acft. ACLS avbl Rwy 0600-0800Z++ Mon; 1600-0800Z++ Tue-Thu; 1700-
0400Z++ Fri. Data Link freq 305.1. TRN-28 CH 16 (Lcl use, Rwy 24R only).
COMMUNICATIONS - SFA ATIS - 280.4 FSS-SAN DIEGO SAN-DL-NOTAM SAN
SOCAL APP CON - (E) 132.2 269.1 (281.8 Acft dep W-291 for NKX arr). TWR - (E) 135.2
315.6 340.2x GND CON - 260.8 SOCAL DEP CON - (R) (132.2 269.1 E) (119.6 363.1 W)
CLNC DEL - 301.3 PMSV: METRO - PMSV avbl 1400-0200Z++. 362.1
NAVAIDS - TACAN - (L) NKX CH 33 32°52.2'N 117°09.3'W At Fld. 430/(A)15°00'E Opr dur fld
opr hr only. NDB - (ABMH) 280.4 NKX 32°51.8'N 117°08.0'W At Fld. 452/14°00'E Opr dur fld
opr hr only.
ILS/RADAR - RADAR - SEE TERMINAL FLIP FOR RADAR MINIMA.

Figure 11-3

NORDO DURING TERMINAL HOLDING

There may be times when Approach Control will delay your flight by holding due to an emergency in progress or an adverse weather condition. There may also be times when you have a radio failure enroute, arrive prior to your ETA, the airport is in IMC, and you have to hold. As long as two-way communications exist, never leave an assigned holding pattern without an ATC clearance. If you experience radio failure during terminal holding, however, you should adhere to NORDO procedures.

A. IAF INSIDE PATTERN

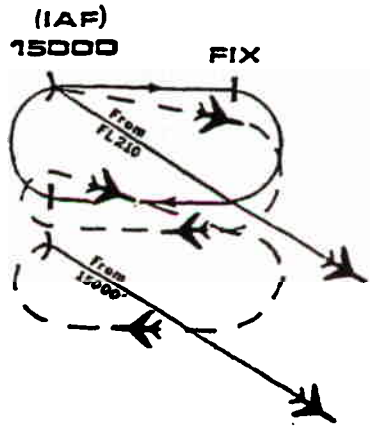
1. **<u>NORDO with an EFC time</u>:**

   a. **Begin your penetration from the IAF at or after your EFC time, and from your last assigned altitude; or,**

   b. **Begin descent from any point in the pattern at or after your EFC time, descend in the pattern to the IAF recommended altitude, and commence your penetration from the IAF.**

EXAMPLE:

Assigned FL 210 with an EFC time and go NORDO in IMC. Penetrate from the IAF at FL 210 or descend in pattern to the recommended altitude of 15,000' and penetrate from the IAF.



CAUTION

Do not leave assigned altitude until your EFC time.

2. **NORDO enroute and ahead of ETA:**

   a. **Begin your penetration from the IAF at or after your ETA, and from your last assigned altitude; or,**

   b. **Begin descent from any point in the pattern at or after your ETA, descend in the pattern to the IAF recommended altitude, and commence your penetration from the IAF.**

CAUTION

Do not leave assigned altitude until your ETA.

B. IAF OUTSIDE PATTERN

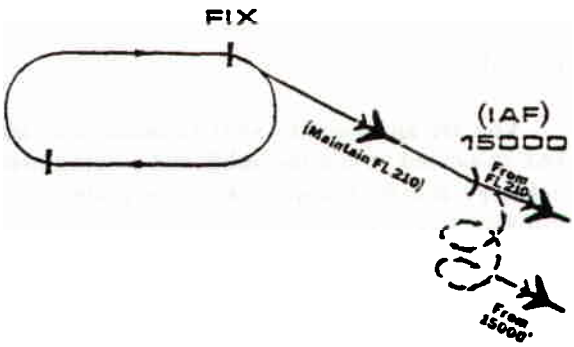
1. **NORDO with an EFC time:**

   a. **Leave the holding fix at or after your EFC time, maintain your last assigned altitude, proceed to the IAF, and commence a penetration on arrival at the IAF from your last assigned altitude; or,**

   b. **On arrival at the IAF, spiral down below the IAF to the recommended altitude and penetrate from the IAF.**

EXAMPLE:

Assigned FL 210 with an EFC time and go NORDO in IMC. Leave the holding fix at or after your EFC time and maintain FL 210 to the IAF. Penetrate from FL 210 from the IAF or spiral down below the IAF to the recommended altitude of 15,000' and penetrate from the IAF.



CAUTION

Do not leave the holding fix prior to your EFC time and do not leave assigned altitude until reaching the IAF.

2. **NORDO enroute and ahead of ETA:**

   a. **Leave the holding fix, maintain your last assigned altitude, proceed to the IAF, and commence a penetration from the IAF from your last assigned altitude, but not before your ETA; or,**

   b. **Spiral down below the IAF to the recommended altitude and penetrate from the IAF, but not before your ETA.**

CAUTION

Do not leave assigned altitude until reaching the IAF, and do not leave assigned altitude before your ETA.

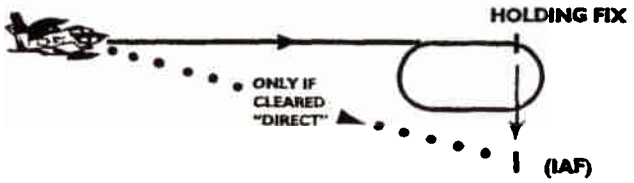
NOTE

Although you can leave the pattern early with only an ETA, the safest procedure would be to stay in the pattern and wait for your ETA instead of trying to time yourself to the IAF. With only an EFC time, you cannot leave the pattern early.

CLEARED TO HOLD - "CLEARED FOR APPROACH"

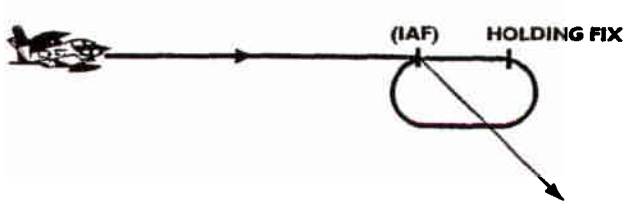
EXAMPLE 1:

You are approaching your terminal area and Approach Control issues you a holding clearance in a situation where the IAF is located outside the published holding pattern. You are subsequently "Cleared For Approach" prior to reaching the holding pattern. You are expected to proceed to the IAF via the Holding Fix to which you were previously cleared. You cannot go direct to the IAF unless cleared "Direct" or you request "Direct".



EXAMPLE 2:

You are approaching your terminal area and Approach Control issues you a holding clearance in a situation where the IAF is located within the published holding pattern. You are subsequently "Cleared For Approach" prior to reaching the holding pattern. If approaching the pattern in proximity to the IAF, you are not expected to overfly the IAF to reach the holding fix. You are expected begin your penetration and approach as you reach the IAF.



AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)

Prior to contacting Approach Control on arrival in your terminal area, you should tune in and copy the ATIS broadcast. This is the continuous broadcast of routine, but essential, non-control information at most high activity airports. The purpose of ATIS is to relieve frequency congestion on Ground Control and Approach Control frequencies. If available, it will be listed in the "COMMUNICATIONS" section under the airport name in the Airport Directory of the FLIP (Enroute) IFR Supplement (Figure 11-4). Absence of ceiling and visibility values indicate at least 5000 and 5 or better exists at the airport. When contacting Approach Control, advise the controller "HAVE INFORMATION ALFA, BRAVO, etc".

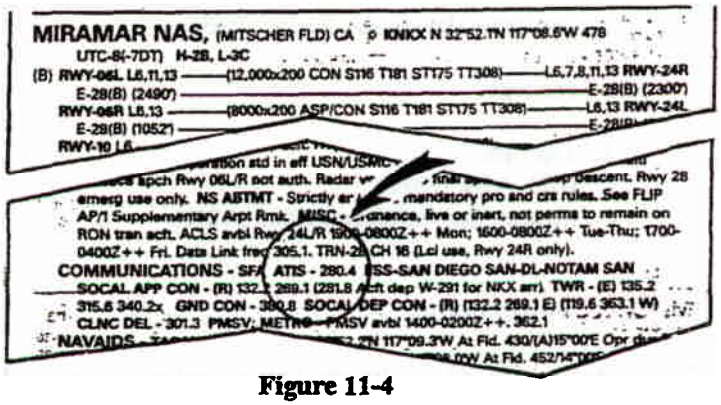


Figure 11-4

In the T2C aircraft, you can subtract 64 from the second and third digits of the ATIS frequency and obtain the preset channel on the AN/ARR-40 Auxiliary UHF Receiver to copy the broadcast.

TYPES OF APPROACHES

When contacting Approach Control on arrival in the terminal area, you can request any type approach for which your aircraft is equipped. Approval by ATC will vary depending on the density of traffic in the area, type of airport, and weather conditions.

GENERAL TYPES OF APPROACHES

* **Precision Approaches - Electronic Glidepath information.**
* **Non-Precision Approaches - No glidepath information.**

TYPES OF RADAR APPROACHES

* **Precision Approach Radar (PAR) - Electronic Glidepath information.**
* **Airport Surveillance Radar (ASR) - No glidepath information.**

T2C EQUIPPED APPROACHES

* **Precision:**

  a. **Precision Approach Radar (PAR).**

* **Non-Precision:**

  a. **TACAN.**
  b. **UHF ADF (NDB).**
  c. **Airport Surveillance Radar (ASR).**

"NO-GYRO" APPROACH

A "No-Gyro" approach can be any type of radar approach, ASR or PAR. All that is required is a controller observing your aircraft on a radar scope to direct "start turn" and "stop turn". When directed to turn, start a turn immediately and when directed to stop a turn, stop immediately. For a "No-Gyro" approach, pilots are expected to make standard rate turns in the pattern and one-half standard rate turns on final approach.

AIRPORT SURVEILLANCE RADAR APPROACH (ASR)

For an ASR approach (Figure 11-5), a pilot will be given an enroute descent, vectored to a point 5 to 8 NM from the runway, and informed when to begin descent. The controller will state the Minimum Descent Altitude (MDA) and the Missed Approach Point (MAP). When directed to begin descent, the pilot has two options:

1. **Descend immediately and level off at the MDA;**
   or,
2. **Establish an approximate 3 degree glide path and, at military installations, request the controller provide recommended altitudes each mile on final approach.**

The ASR approach is designed to place an aircraft within 500' either side of centerline at the Missed Approach Point, which is usually about 1 mile from the end of the runway.

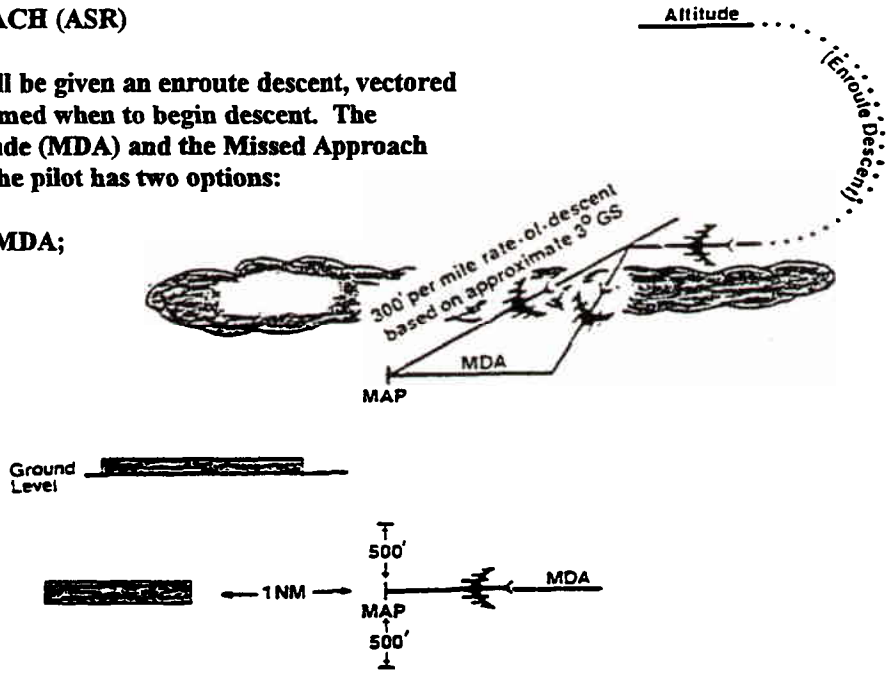


Figure 11-5

NOTE

During any radar approach, the pilot must read back all headings, altitudes, and altimeter settings, and acknowledge all other transmissions until advised otherwise by the controller.

RADAR APPROACH LOST COMM PROCEDURES

During a radar approach, if no communicaations are received for the following time periods, follow the lost communications instructions issued by the controller:

* **1 minute in an ASR or PAR pattern.**
* **15 seconds on an ASR final approach.**
* **5 seconds on a PAR final approach.**

If lost communications instructions have not been received, intercept and proceed with the published TACAN approach procedure at some convenient point. Do not descend below the TACAN Minimum Descent Altitude (MDA) without the runway environment in sight. Until established on the TACAN approach procedure at some convenient point, maintain the highest of last assigned altitude or the MINIMUM SAFE (SECTOR) ALTITUDE if within 25 NM of the procedure NAVAID. Since you can be vectored below the Minimum Safe Altitude, the highest of these two altitudes will guarantee you obstruction clearance until established on the TACAN approach procedure.

APPROACH MINIMUMS

OPNAV approach minimums for Naval aviators depends on the type of aircraft, that is, whether the aircraft is single-piloted, multi-piloted, or if it is a formation of two or more aircraft.

SINGLE-PILOTED AIRCRAFT

Single-piloted aircraft can commence practice approaches at enroute airports regardless of the reported weather conditions and descend to the published Minimum Descent Altitude (MDA) or single-piloted Decision Height (DH) if fuel has been planned on the Jet Flight Log for these practice approaches. However, the airports where practice approaches are conducted cannot be the filed destination or the filed alternate. Regardless of available fuel, if the reported weather conditions on arrival at the filed destination or filed alternate are below the OPNAV single-piloted minimums, an approach cannot be commenced in a single-piloted aircraft.

NON-PRECISION APPROACH - Reported ceiling and visibility weather conditions must be at or above the published non-precision minimums.

PRECISION APPROACH - Reported ceiling and visibility weather conditions must be at or above the published precision minimums, but in no case less than 200' ceiling and 1/2 mile visibility, or if available, 2400' Runway Visual Range (RVR).

RVR is electronically measured down the runway from the approach end, whereas Prevailing Visibility is measured from the Control Tower which may be several miles from the approach end of the runway; therefore, if given by Approach Control or in the ATIS broadcast, RVR takes prededence over Prevailing Visibility for a straight-in approach. 2400' RVR is equivalent in value to 1/2 mile Prevailing Visibility.

MULTI-PILOTED AIRCRAFT

In order for a multi-piloted aircraft to commence an instrument approach, the required reported weather conditions will depend on the capability of the aircraft to take a missed approach and proceed to a suitable alternate. Capability implies sufficient fuel, operable navigation equipment, etc.

WITH MISSED APPROACH TO ALTERNATE CAPABILITY - Weather conditions are measured from the Control Tower which may be several miles from the approach end of the runway, the aircraft has sufficient fuel, and a qualified copilot is available to assist with radios, approach charts, and watch for the runway environment; therefore, OPNAV states an approach can be commenced in a multi-piloted aircraft regardless of reported weather conditions.

WITHOUT MISSED APPROACH TO ALTERNATE CAPABILITY - OPNAV states an approach cannot be commenced in a multi-piloted aircraft unless the reported ceiling and visibility weather conditions are ABOVE (not "at") published minimums for the type of approach to be conducted.

FORMATION OF AIRCRAFT

OPNAV approach minimums for a formation of aircraft are independent of type of aircraft. A formation approach in IMC is restricted to two aircraft and the reported ceiling and visibility weather conditions must be at least equal to the published CIRCLING MINIMUMS to commence an approach. Once commenced, the formation leader can descend to the published Minimum Descent Altitude (MDA) or to the Decision Height (DH) for the formation leader's type of aircraft, that is, single-piloted or multi-piloted. Formation touch-and-go landings are prohibited.

If a Circling Approach is not authorized for the runway in use (printed in the Circling Minima Section of the Approach Chart - "Circling not authorized"), then basic VFR minimums of 1000 and 3 apply for an approach. The approach criteria is not Circling Minimums or 1000 and 3. The criteria is Circling Minimums. Basic VFR of 1000 and 3 applies only in the event a Circling Approach is not authorized.

SUMMARY

FORMS OF APPROACH CLEARANCES

When Approach Control issues an approach clearance, it can be in one of several forms depending on pilot request, available runways, surface winds, and density of traffic in the area.

"CLEARED FOR APPROACH":

Execute any published Instrument Approach Procedure to the airport, but state intentions to Approach Control.

"CLEARED FOR A TACAN APPROACH":

Execute any published TACAN Instrument Approach Procedure to the airport, but state intentions to Approach Control.

"CLEARED FOR A STRAIGHT-IN TACAN APPROACH":

Execute any published TACAN Instrument Approach Procedure to the active runway which has straight-in minimums authorized, but state intentions to Approach Control.

"CLEARED FOR THE HI-TACAN RUNWAY 24 APPROACH":

Execute the published TACAN Instrument Approach Procedure for Runway 24 and land straight-in on Runway 24.

"CLEARED FOR THE HI-TACAN RUNWAY 24 APPROACH, CIRCLE TO LAND RUNWAY 6":

Execute the published TACAN Instrument Approach Procedure for Runway 24, obtain the runway environment, and visually circle and land on Runway 6.

MODIFICATIONS OF APPROACH CLEARANCES

An approach clearance can be modified in one of several ways to terminate an IFR flight, such as: a radar pickup for vectors to a Precision Radar final approach; vectors to a Surveillance Radar final approach; or,vectors to a visual pattern entry. Three commonly used modifications are a Contact Approach, Visual Approach, and Circling Approach.

CONTACT APPROACH

This is an approach where a pilot on an IFR flight plan operating clear of clouds and having at least one mile visibility can, with ATC authorization, deviate from a published instrument approach procedure and proceed directly to the runway by visual reference to the surface. The pilot is still on Approach Control frequency with ATC providing traffic separation, but now the pilot is stating he will climb, descend, or maneuver as necessary to get to the runway by visual reference to the surface. Since ATC cannot direct a pilot to do this on an IFR flight plan, it must be requested by the pilot. In essence, a pilot is just taking a short cut to the runway; therefore, he should be thoroughly familiar with the terrain.

VISUAL APPROACH

Not to be confused with a VFR arrival, a Visual Approach is used to terminate IFR flights. This is a method used by Approach Control to bring IFR traffic down on an enroute descent and vector the traffic over the same path-over-the-ground to a point near the airport. The pilot will be directed to report the airport in sight or traffic in sight on which to take interval. When cleared for a Visual Approach, the pilot can descend to pattern altitude, contact the Control Tower when directed by Approach Control, report the break initial, and enter a normal break. This allows Approach Control to handle more IFR traffic by turning the aircraft over to the Tower. A Visual Approach can be requested by the pilot, initiated by ATC (which is the normal procedure), or rejected by the pilot in favor of an instrument approach procedure. For Approach Control to use Visual Approach procedures at airports which have weather reporting services, the reported weather conditions must be at least 1500 and 3. This varies at airports and could be higher since the ceiling value must be at least 500' above the MinimumVectoring Altitude for the area.

CIRCLING APPROACH

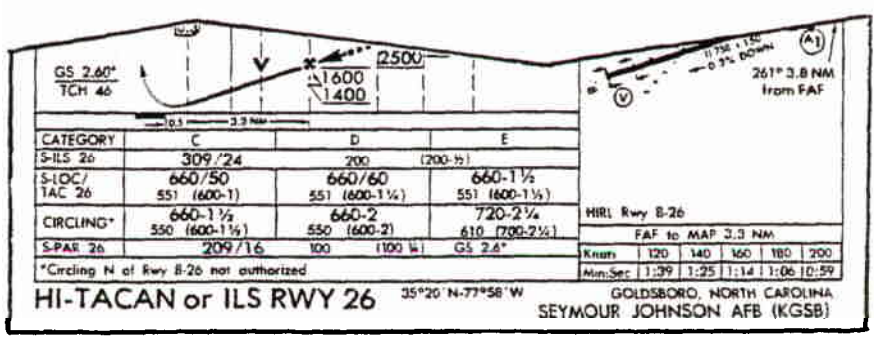
This is a visual maneuver completed after an instrument approach procedure. You will be cleared for a Circling Approach before leaving enroute altitude and you must have published circling minimums to leave altitude and commence the approach. Use the circling minimums for the approach procedure, or path-over-the-ground, specified in the ATC clearance.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, CLEARED FOR THE HIGH TACAN RUNWAY TWO-SIX APPROACH, CIRCLE TO LAND RUNWAY EIGHT."

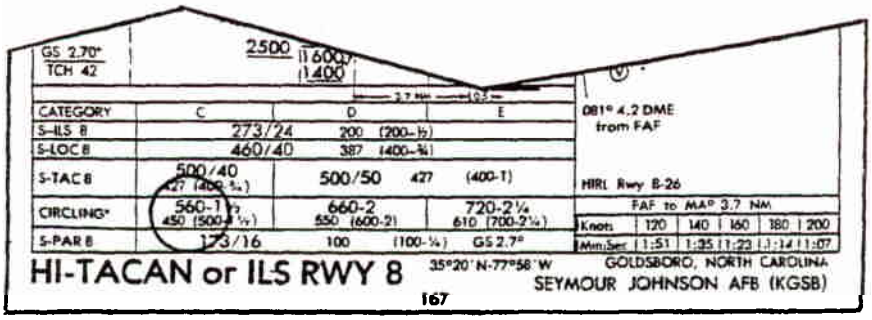
You would use the Circling Minimums for the Runway 26 Approach Procedure. This guarantees obstruction clearance on final approach segment for the path-over-the-ground you are following.

USE CIRCLING MINIMUMS FOR RUNWAY 26



CAUTION

If you used the Minimum Descent Altitude (MDA) for the Runway 8 Approach Procedure, it may not give you obstruction clearance for the path-over-the-ground you are following.



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When level at your Minimum Descent Altitude (MDA) and have the runway environment in sight, state your intentions to Approach Control and commence a visual maneuver to land on the clearance runway. Unless a maneuver is specified by Approach Control or there is a specified circling restriction printed on the Approach Procedure Chart, you can make any of the visual maneuvers depicted in Figute 11-6. You must maintain the circling MDA throughout the visual maneuver until in a position from which to make a safe landing. You cannot descend below the MDA to remain clear of clouds. If visual reference to the surface is lost while circling, execute a missed approach. You must have the runway environment in sight to commence a visual circling maneuver, but since you may be maneuvering away from the airport, it need not be kept in sight. However, you must keep visual reference to the surface.

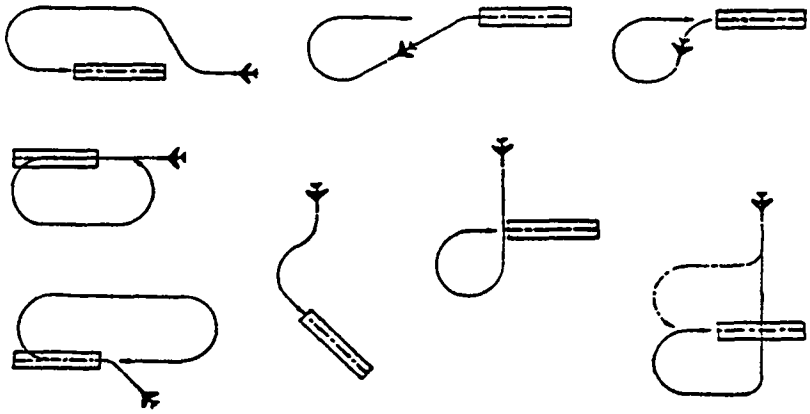


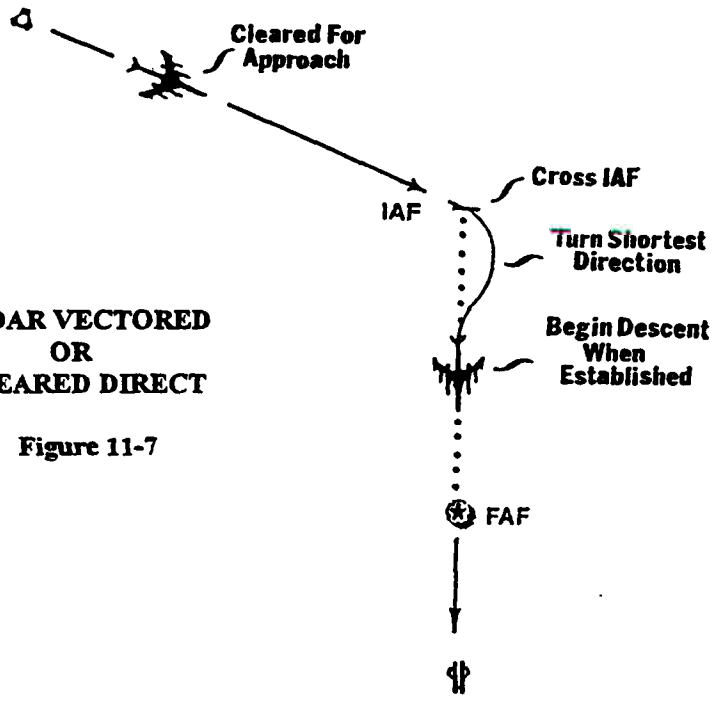
Figure 11-6

The circling Minimum Descent Altitude (MDA) will provide at least 250' obstruction clearance on final approach segment for the path-over-the-ground you are following, and at least 300' obstruction clearance for a TACAN procedure in the circling area for your Category aircraft (Category C for the T2C).

A PROCEDURE CAUTION!!

If being vectored or cleared "Direct" to an Initial Approach Fix, you will normally be assigned an altitude to maintain which will be close to the published IAF altitude. If subsequently cleared for an approach prior to reaching the IAF, you cannot leave assigned altitude until you are established on a segment of the published Instrument Approach Procedure (Figure 11-7).

It is pilot prerogative to request anything deemed necessary to best accomplish a more suitable course alignment, such as an offset entry, a turn in holding, or a 360 degree turn. Otherwise, you are expected to cross the IAF, turn in the shortest direction toward the procedure, and begin descent when established on the procedure.



RADAR VECTORED
OR
CLEARED DIRECT

Figure 11-7

MINIMUM VECTORING ALTITUDE (MVA)

Minimum Vectoring Altitude (MVA) is the lowest Mean Sea Level altitude at which an IFR aricraft can be vectored by a controller, with 1000' AGL being the minimum.

MVA PROVISIONS

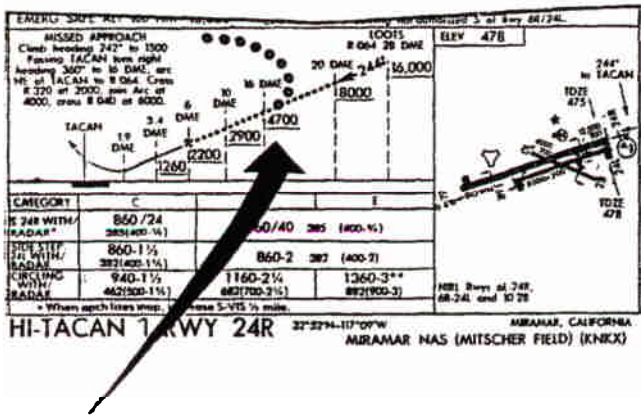
* **Obstruction clearance.**
* **Radar coverage.**
* **Communications.**

MVA CONSIDERATIONS

* **MVA can be below published MINIMUM SAFE (SECTOR) ALTITUDE.**
* **MVA can be below published EMERGENCY SAFE ALTITUDE.**
* **MVA may provide only 1000' obstruction clearance in designated mountainous areas.**

NORDO ON VECTORS OR IN A GCA PATTERN

* **If necessary, climb immediately so as to maintain the highest of last assigned altitude or the published MINIMUM SAFE (SECTOR) ALTITUDE or EMERGENCY SAFE ALTITUDE, depending on distance from the TACAN Approach Procedure NAVAID.**
* **Squawk Code 7600.**
* **Intercept and proceed with the published TACAN Approach Procedure at some convenient point.**
* **Adhere to any lower altitude restrictions along the Approach Procedure profile (Figure 11-8).**



RESPONSIBILITY FOR LOWER ALTITUDE RESTRICTIONS AFTER INTERCEPT

Figure 11-8

"NORDO" MISSED APPROACH TO ALTERNATE

You arrive at your destination after a long flight, you are low on fuel, and your destination is reporting marginal weather conditions. In this situation, it would be good headwork to file a DRAFT (flight plan) with the controller for your alternate. If you should experience radio failure during the approach and subsequently take a missed approach due to the weather conditions, you should follow the published missed approach instructions to guarantee yourself obstruction clearance and then proceed to your alternate IAF and commence an approach.

CAUTION

If you have not received a clearance to alternate, the DRAFT, or filed flight plan, constitutes a ROUTE clearance. It does not constitute an altitude clearance since you have not received an ATC clearance.

ROUTE TO ALTERNATE

A. The route received in an ATC clearance after filing a DRAFT.

B. "Expected" routing if given after filing a DRAFT.

C. The route filed in a DRAFT.

ALTITUDE TO ALTERNATE

A. The altitude received in an ATC clearance after filing a DRAFT.

B. An "expected" altitude if given one after filing a DRAFT.

C. Your option of:

1. **The highest of the two EMERGENCY SAFE ALTITUDES published on the Approach Procedure Charts for destination and alternate airports if the alternate is within 200 NM; or,**

2. **A Flight Level equivalent to 18,000' MSL.**

DETERMINING FLIGHT LEVEL

A. Destination altimeter 29.92" or higher - fly Flight Level 180.

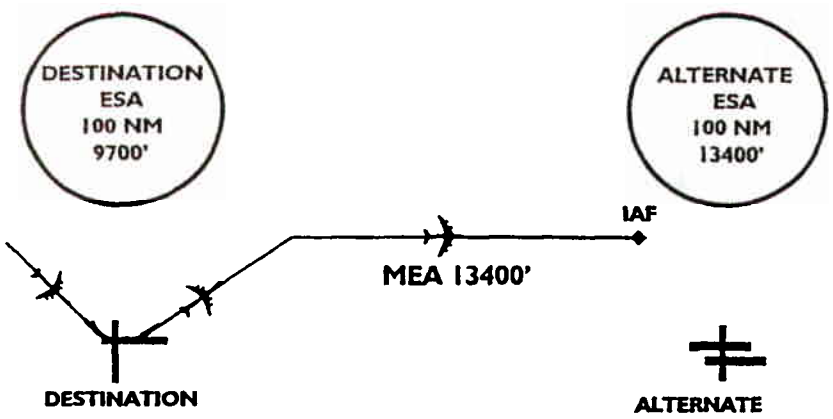
B. Destination altimeter less than 29.92" - fly Flight Level 190.

EXAMPLE:

On arrival, your destination is reporting marginal weather conditions with an altimeter setting of 29.89". You file a draft to alternate located 175 NM distant. You file for "Direct" flight at 17,000'. You experience radio failure, have not received a clearance, and take a missed approach due to weather conditions. The highest of the two published EMERGENCY SAFE ALTITUDEs would give you an MEA to fly of 13,400' MSL.

"NORDO" MA TO ALTERNATE

• HIGHEST OF TWO ESA



LOGS

APPROACH AND LANDING

* Log only the approach executed to a missed approach or landing.

  Example: For a TACAN approach to a PAR final approach, you would log only the PAR approach.

* If actual instrument conditions are encountered less than 1000' AGL, you would log an ACTUAL instrument approach, otherwise, a SIMULATED instrument approach.
* In a student-Instructor relationship, and in actual instrument conditions, both the student and the instructor will log an ACTUAL instrument approach.
* For a formation approach, only the formation leader will log the approach.
* Only the pilot physically controlling the aircraft will log a landing.

INSTRUMENT TIME

* In actual instrument conditions, both pilots in an aircraft will log ACTUAL instrument time.
* Only the pilot physically controlling the aircraft will log SIMULATED instrument time.
* If a student is under the instrument"hood" and actual instrument conditions exist outside the aircraft, the student will log ACTUAL instrument time.

CLOSING FLIGHT PLAN

Cancelling instruments with ATC while inflight does not serve to close out your Military Flight Plan. For safety and accountability of its aircraft, the Navy requires verbal closing of flight plans on the ground through:

a. **Ground Control; or, if not available,**
b. **The Control Tower; or,**
c. **Base Operations personnel.**

At non-military installations, close by any means available. Collect, long-distance telephone service can be used to close with a Flight Service Station (FSS) by identifying yourself as a pilot.

Closing a flight plan on the ground ensures a proper arrival report will be filed and accountability of your aircraft.

INSTRUMENT APPROACH PROCEDURES

ENABLING OBJECTIVE: Demonstrate a working knowledge of the FLIP (Terminal) High Altitude Instrument Approach Procedures and their associated terms and symbols.

SPECIFIC OBJECTIVES:

12.1 Use the Legends to properly interpret information depicted on Approach Procedure Charts.

12.2 Determine rate-of-descent for a specific Precision Radar final approach course when given airspeed and wind information.

12.3 State the four distinct sections of an Instrument Approach Procedure Chart.

12.4 Explain the NDB to MAP section of an ADF Approach Procedure Chart.

12.5 Explain the terms:

- **a. Missed Approach Point (MAP).**
- **b. Emergency Safe Altitude (ESA).**
- **c. Minimum Safe (Sector) Altitude (MSA).**
- **d. Visual Descent Point (VDP).**
- **e. Minimum Descent Altitude (MDA).**
- **f. Decision Height (DH).**
- **g. Touchdown Zone (TDZ).**
- **h. Touchdown Zone Elevation (TDZE).**
- **i. Height Above Touchdown (HAT).**
- **j. Airport Elevation.**
- **k. Height Above Airport (HAA).**
- **l. Ceiling.**
- **m. Prevailing Visiility (PV).**
- **n. Runway Visual Range (RVR).**
- **o. Side-Step**

12.6 Determine required reported weather conditions for commencing published Instrument Approach Procedures in Naval aircraft.

12.7 Interpret VASI/PAPI Visual Glide Slope Indicator Lights.

INTRODUCTION

There are four (4) booklets of FLIP (Terminal) High Altitude Instrument Approach Procedures (Figure 1-5) which contain procedures for those airports depicted in BLUE color on the FLIP (Enroute) High Altitude Charts for which DOD has a common need to use. There are some airport symbols in blue for which the FLIP (Terminal) booklets will not contain approach procedures. These procedures are guides which enable a pilot to maneuver his aircraft, in instrument conditions,

from an enroute altitude to a position from which a safe landing can be effected by following a specified path-over-the-ground. You should be thoroughly familiar with all the terms and symbols used on these charts and DO NOT USE AN OUT-OF-DATE CHART.

EFFECTIVE DATE AND AREA OF COVERAGE

The four booklets of High Altitude Instrument Approach Procedures are issued every 56 days. Depicted on the front cover of each booklet is the area of coverage for that booklet and the effective date. Depicted on the rear cover of each booklet is the area of coverage for all four booklets (Figure 12-1).

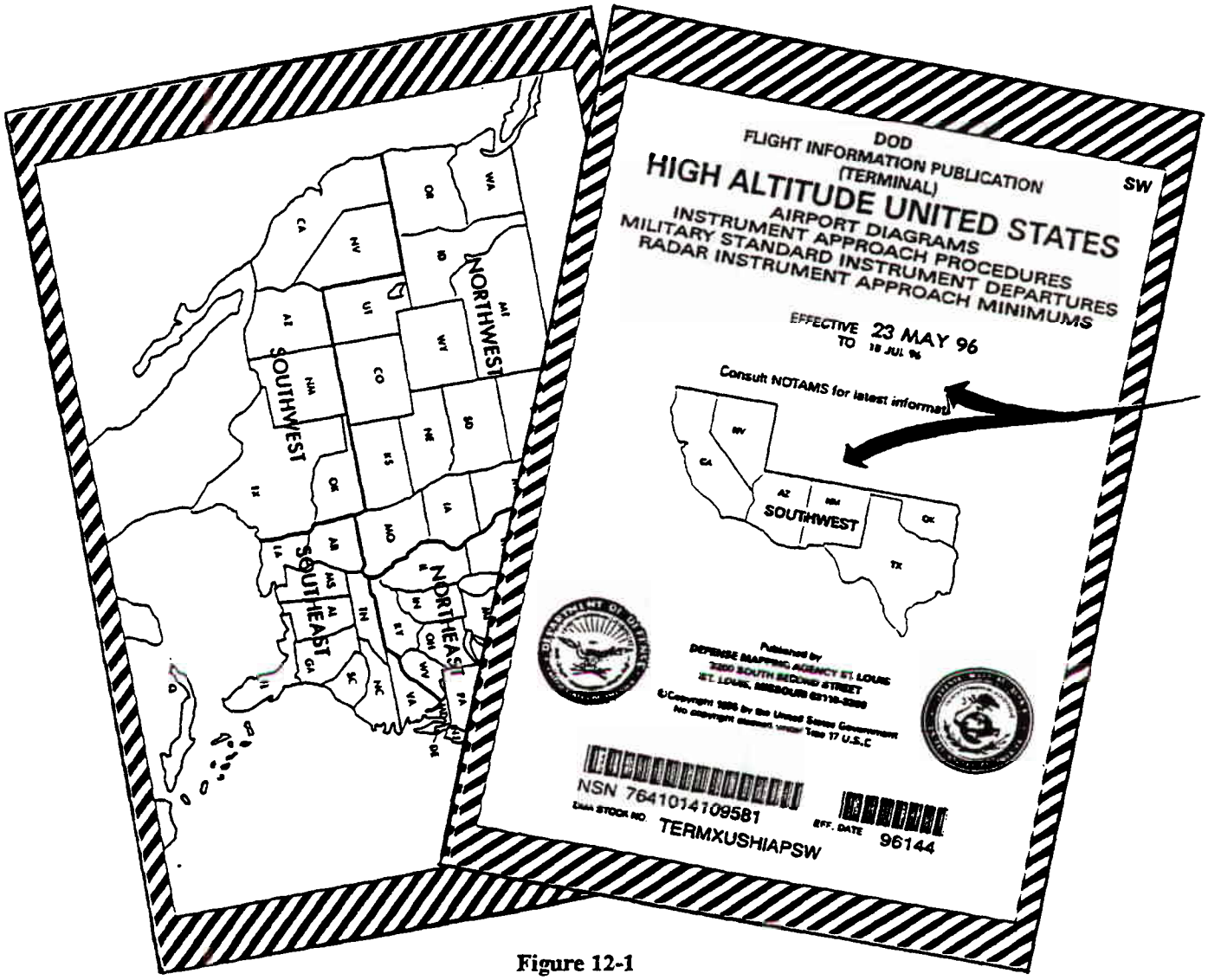


Figure 12-1

CONTENTS

As depicted in Figure 12-2, Each of the four booklets contains Instrument Approach Procedures, DOD Standard Instrument Departures (SIDs) where available, Radar Instrument Approach Minimums, and full page Airport Diagrams. These Airport Diagrams are to be used only for ground operations and they depict ramp spot/field elevations which can be used to ensure your altimeter is within operational limits of +/-·75 feet.

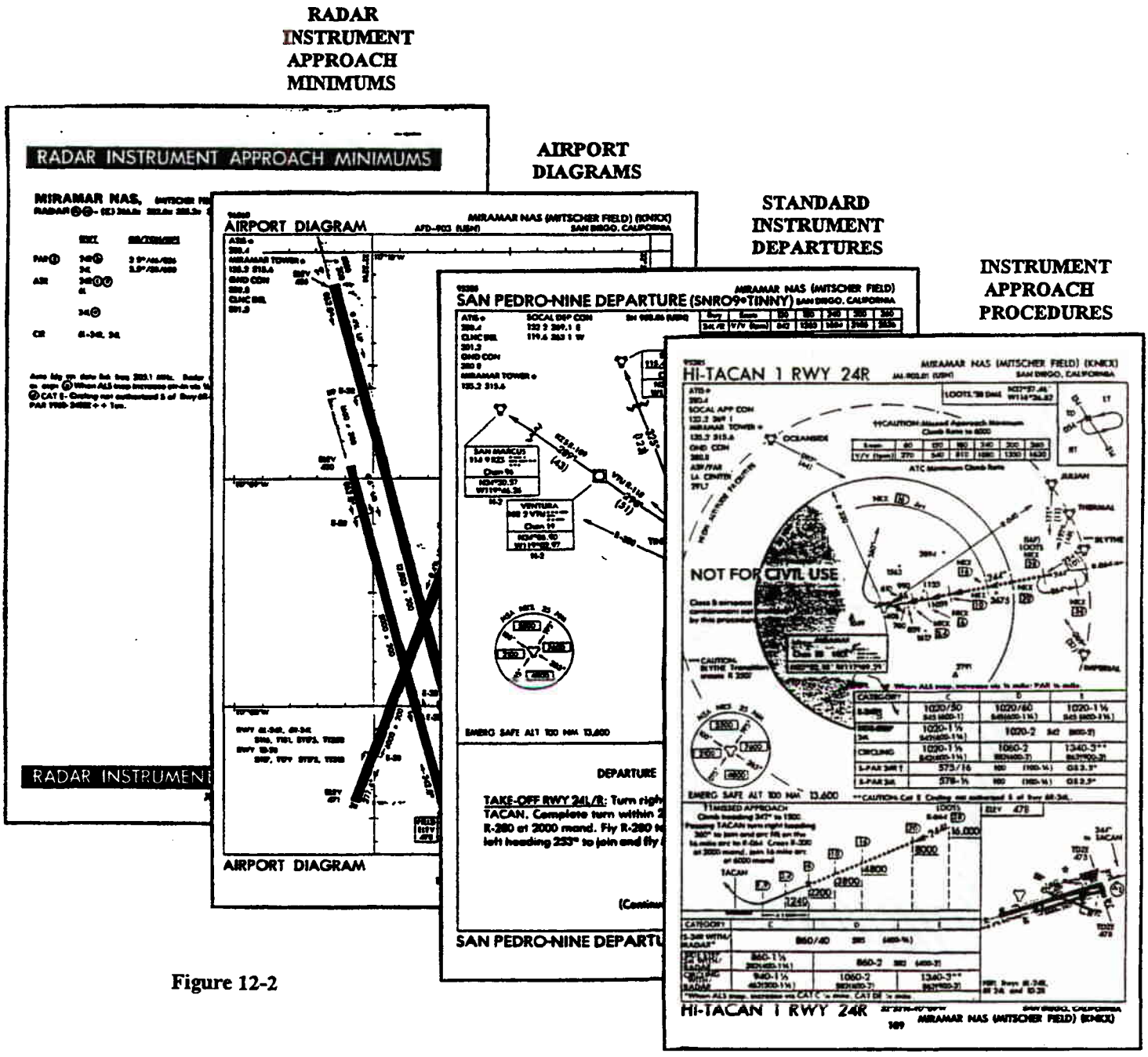


Figure 12-2

RATE-OF-DESCENT TABLE

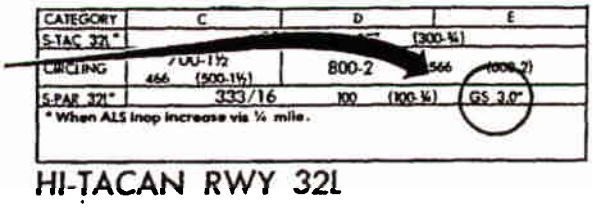
On the inside back cover is a Rate-Of-Descent Table used primarily for Precision Radar Approaches. Rate-of-descent will depend on approximate GROUNDSPEED and GLIDESLOPE angle.

EXAMPLE:

For a Precision Radar Approach to Runway 32L, with a wind from the Northwest at 5 knots, and a planned approach speed of 125 KIAS, the rate-of-descent on glidepath would be approximately 600 fpm.

*** GROUNDSPEED (125 KIAS - 5 K HW) = 120 K**

*** GLIDESLOPE 3 DEGREES**



CATEGORY	C	D	E
S-TAC 321*			(300-1¼)
CIRCLING	466 (500-1½)	800-2	(600-2)
S-PAR 321*	333/16	100 (100-¼)	GS 3.0°

* When ALS inop increase vis ¼ mile.

HI-TACAN RWY 32L

*** Entering the table with**

GROUNDSPEED

and

GLIDESLOPE

results in an approximate rate-of-descent of 600 fpm.

INSTRUMENT TAKEOFF OR APPROACH PROCEDURE CHARTS
RATE OF CLIMB/DESCENT TABLE
(ft. per min)

A rate of climb/descent table is provided for use in planning and executing climbs or descents under known or approximate ground speed conditions. NOTE: The relationship between climb/descent angle (degrees) and climb/descent gradient (FT/NM) is based on the assumption that 1 degree equals 100 FT/NM.

CLIMB/ DESCENT ANGLE	CLIMB/ DESCENT GRADIENT FT/NM	GROUND SPEED (knots)											
		60	90	120	150	180	210	240	270	300	330	360
2.0	200	200	300	400	500	600	700	800	900	1000	1100	1200
2.5	250	250	375	500	625	750	875	1000	1125	1250	1375	1500
3.0	300	300	450	600	750	900	1050	1200	1350	1500	1650	1800
3.5	350	350	525	700	875	1050	[illegible]	1400	1575	1750	1925	2100
[illegible]												
9.5	950	950	[illegible]	1900	2375	2850	3325	3800	[illegible]	[illegible]	[illegible]	5700
10.0	1000	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000

PARTS OF A PROCEDURE CHART

An Instrument Approach Procedure Chart consists of four major sections (Figure 12-3):

*** PLANVIEW** *** PROFILE** *** MINIMA SECTION** *** AIRPORT SKETCH**

PLANVIEW

PROFILE

MINIMA SECTION

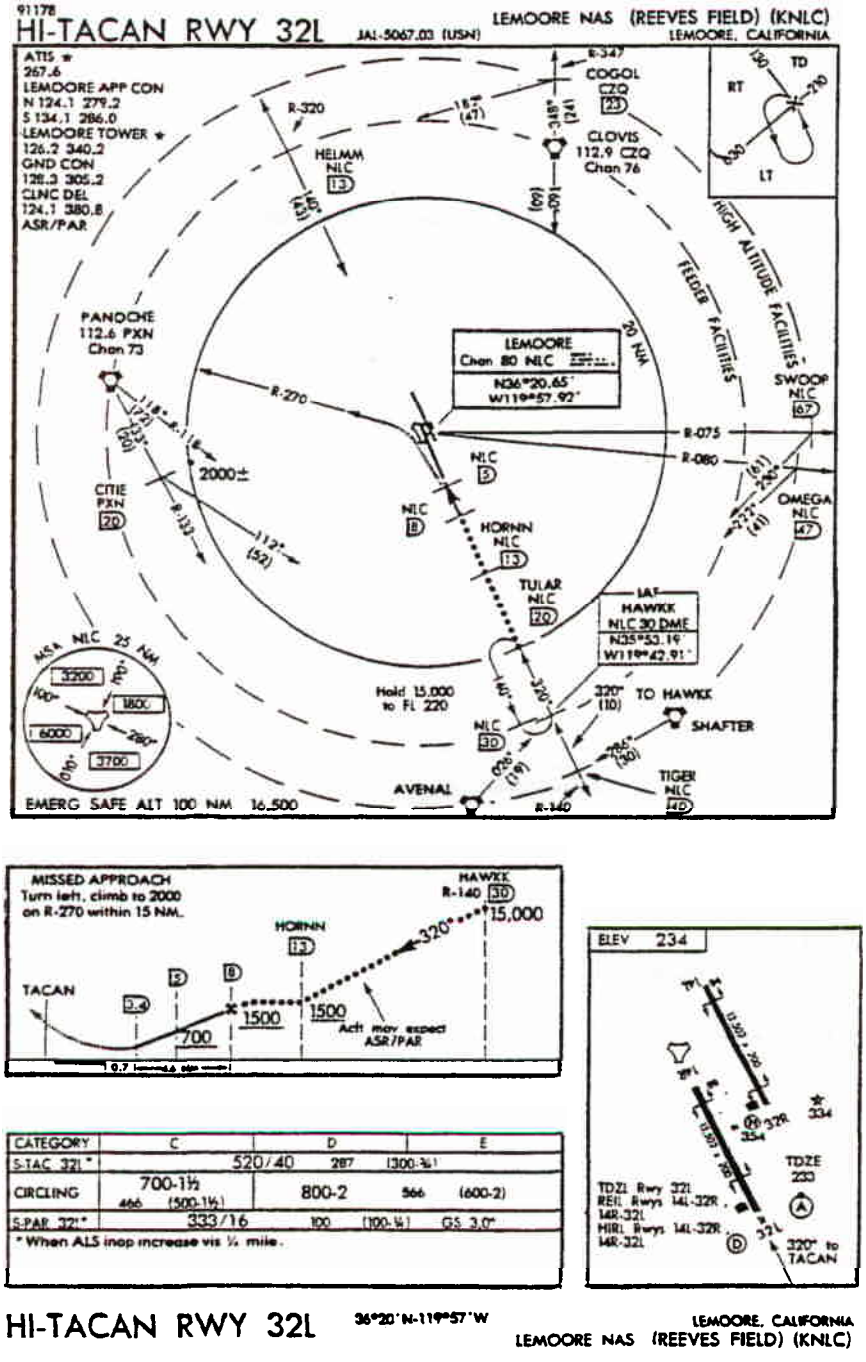


Figure 12-3

AIRPORT SKETCH

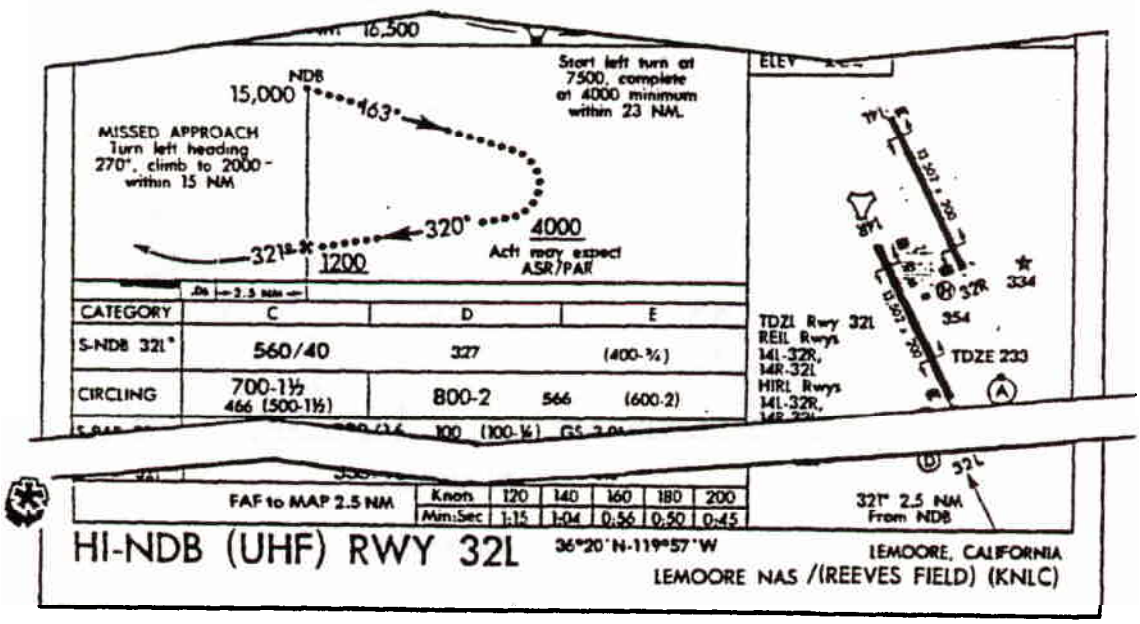
FAF (NDB) TO MAP SECTION

NOTE

High Altitude ADF (NDB) Instrument Approach Procedures (including the one in Figure 12-4) are being systematically eliminated within the continental United States; however, these procedures remain quite common throughout other parts of the world. You should possess a basic knowledge of ADF (NDB) procedures; therefore, they will be briefly discussed in this course.

One additional section is required for those ADF (NDB) approaches where the Radio Beacon is located away from the airport. Since the procedure is used without DME, a "FAF to MAP" section is required to determine the Missed Approach Point (MAP) in relation to the Final Approach Fix (Radio Beacon). The table in this section (Figure 12-4) is presented as TIME to fly at an approximate GROUNDSPEED.

TIME/GROUNDSPEED TABLE

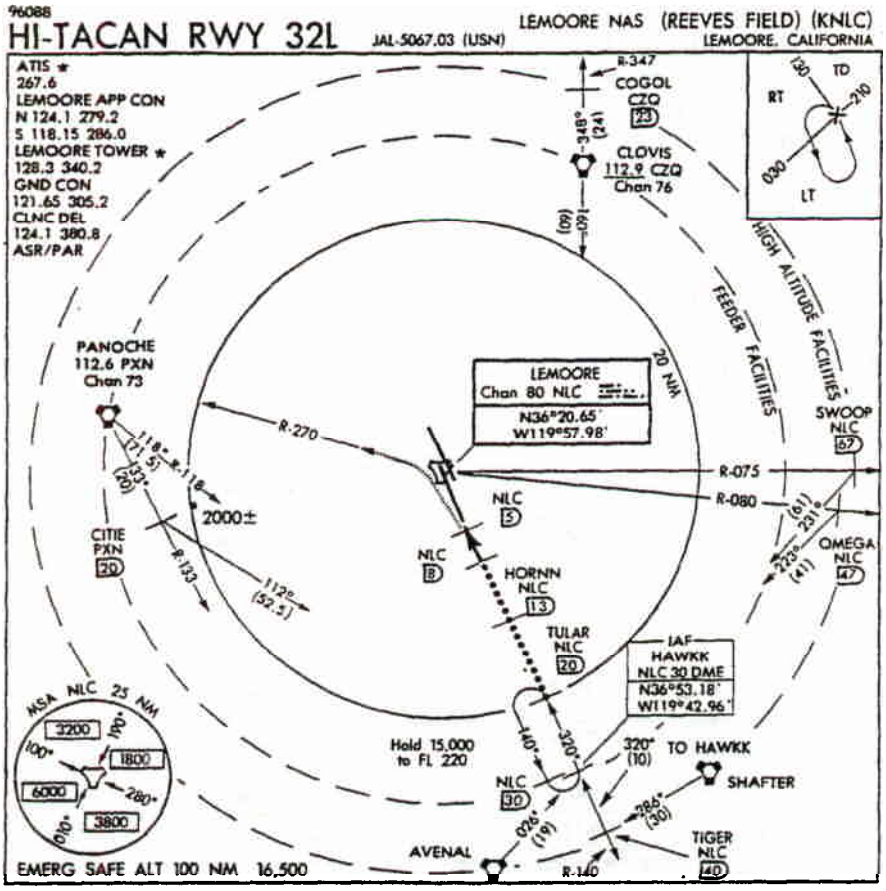


ADF (NDB) APPROACH PROCEDURE

Figure 12-4

PLANVIEW

The first section of the Approach Procedure Chart is the Planview, or top view (Figure 12-5).



PLANVIEW

Figure 12-5

The designation of the specific approach procedure separates that path-over-the-ground from all others to the airport.

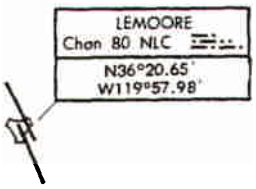
HI-TACAN RWY 32L

ATIS ★
267.6
LEMOORE APP CON
N 124.1 279.2
S 118.15 286.0
LEMOORE TOWER ★
128.3 340.2
GND CON
121.65 305 2
CLNC DEL
124.1 380.8
ASR/PAR

Depicted are applicable frequencies for terminal area operations, which are also located in the IFR Supplement.

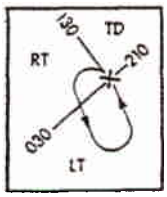
REMINDER

The T2C aircraft is only equipped for UHF communications.

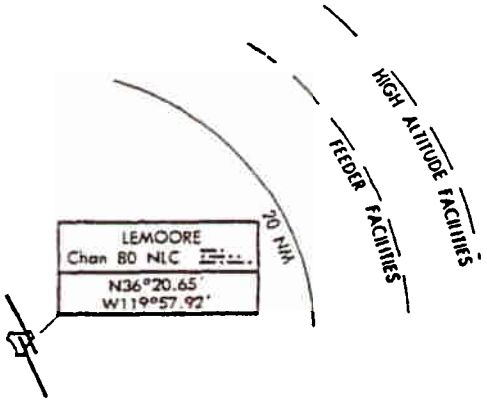


In the center of the Procedure Chart is the NAVAID on which the procedure is based, with the Name, Channel, Identifier, and Morse Code Identifier.

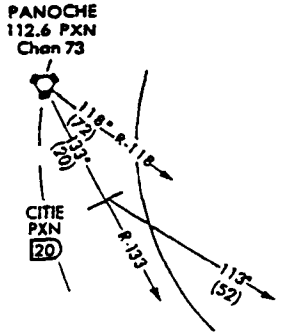
A display is shown with the same orientation as the procedure holding pattern. The holding fix is depicted by a bold print cross and the direction of turn to enter holding is a RIGHT TURN, LEFT TURN, or a TEARDROP as you cross the holding fix.



A 20 NM circle indicates procedure information inside the circle is to scale, or approximately to scale. NAVAIDs on the "FEEDER FACILITIES" circle may be only on Low Altitude Enroute Charts or may also be on High Altitude Enroute Charts, and the use of this circle depends on local need for control of traffic. It may or may not be found on High Altitude Instrument Approach Procedure Charts. The "HIGH ALTITUDE FACILITIES" circle will always be on High Altitude Instrument Approach Procedure Charts and the NAVAIDs on this circle will be on High Altitude Enroute Charts.



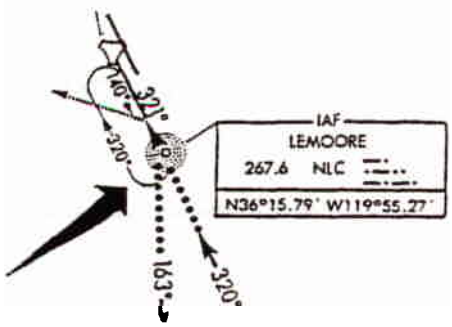
Arrows emanating from these NAVAIDs may obviously go to a Feeder Fix, or may be footnoted as going to another fix, but they will normally give course and distance to the Initial Approach Fix (IAF).



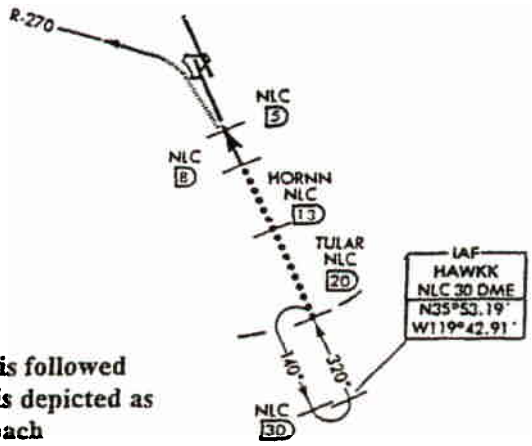
The Initial Approach Fix is depicted by the letters IAF and is the point from which a penetration is begun.

For TACAN, the IAF will be a DME point along a radial;

whereas, for an ADF (NDB) approach, the IAF is the the Radio Beacon.



The PENETRATION TRACK is a path-over-the-ground that is followed to lose excess altitude. It begins at the IAF and is depicted by a bold print dotted line which ends at the Final Approach Fix (FAF). Accent lines across the track refer to altitude restrictions which are depicted in the Profile Section of the Chart.



The solid line PROCEDURAL TRACK is a path-over-the-ground that is followed while flying the aircraft down to published landing minimums. It begins at the FAF and ends at the Missed Approach Point (MAP).

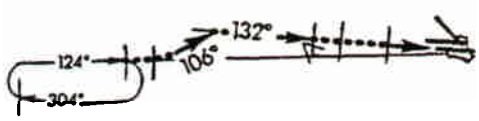
The MISSED APPROACH TRACK is a path-over-the-ground that is followed to guarantee obstruction clearance in event of a missed approach. It is depicted as a vertically spaced dashed line and begins at the MAP. Missed Approach Instructions are published in the Profile Section of the Chart.

CAUTION

Approach Procedures are not to be varied, even if in VMC, unless clearance has been received for a Contact Approach, a Visual Approach, or you request "CANCEL INSTRUMENTS" (cancel your IFR flight plan).

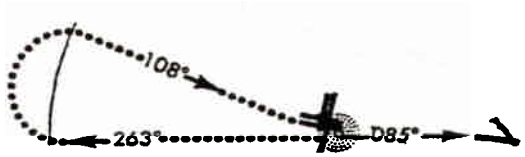
Figure 12-6 depicts the four basic penetration patterns used on High Altitude Instrument Approach Procedure Charts to allow a pilot to lose altitude while proceeding from the Initial Approach Fix to the final approach course. These patterns may be combined in any manner on any one Approach Procedure Chart.

STRAIGHT-IN



OFF-SET

ARCING



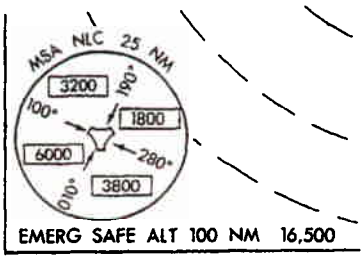
TEARDROP

Figure 12-6

There are two MINIMUM SAFE ALTITUDES depicted on the Approach Procedure Charts for emergency use. These emergency altitudes are identified as:

1. **MINIMUM SAFE (SECTOR) ALTITUDE (MSA).**

   This altitude will only provide a base obstruction clearance of 1000' within 25 NM of the procedure NAVAID in all areas.



2. **EMERGENCY SAFE ALTITUDE (ESA).**

   This altitude will provide a base obstruction clearance of 1000' within 100 NM of the procedure NAVAID in all areas; however, in FAA designated mountainous areas, this altitude will provide a base obstruction clearance of 2000'.

PROFILE

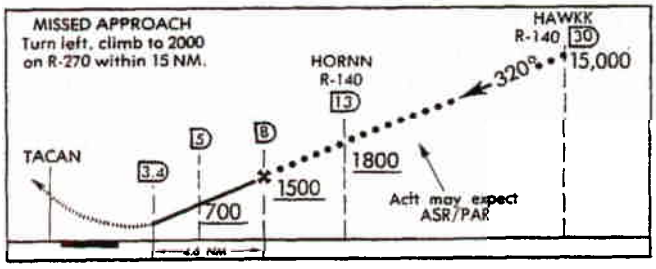


Figure 12-7

The Profile Track , or cross section view, of the Approach Procedure (Figure 12-7) depicts the Initial Approach Fix (IAF), Penetration Track, Final Approach Fix (FAF) as a bold print cross, the Procedural Track, and the DME Missed Approach Point (MAP) at the end of the Procedural Track. Also depicted are the Missed Approach Instructions which you should follow until further instructions are received from ATC. Altitude restrictions are depicted prior to the accent lines in the direction of flight.

On non-precision approach procedures where a Visual Approach Slope Indicator (VASI) or a Precision Approach Path Indicator (PAPI) is available, a Visual Descent Point (VDP) will be depicted on the Procedural Track by a bold print "V" (Figure 12-8). This is the DME position where a pilot, with the runway environment in sight, could leave the Minimum Descent Altitude (MDA), make a 300-400 feet per mile rate-of-descent, and land in the Touchdown Zone. It is also the DME point there the lowest usable VASI or PAPI Glide Slope Indicator glidepath will intercept the MDA. When level at your MDA, it is the DME point where you will see the "on glidepath lights" of a VASI (Red over White) or a PAPI (two Red and two White).

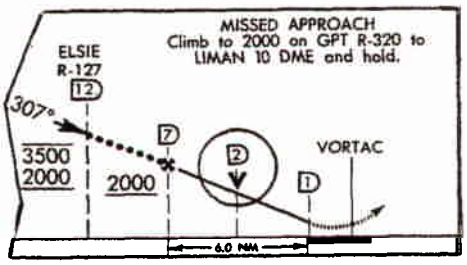


Figure 12-8

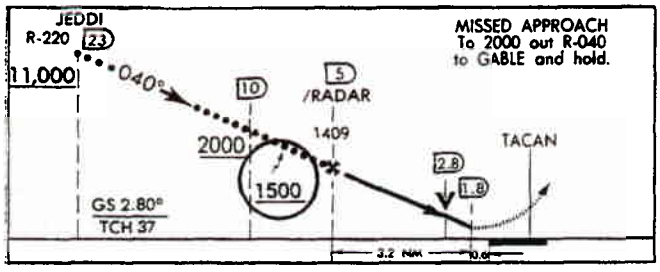
NOTE

The Visual Descent Point (VDP) is a good safety guide point for leaving the MDA since it provides for a visual reference to a Glide Slope Indicator. It is recommended that you remain at the MDA until reaching the VDP, if one is published, especially if you are not thoroughly familiar with the terrain below the MDA. However,

THE VDP IS NOT A MANDATORY PART OF THE APPROACH PROCEDURE.

If you have the runway environment in sight and are in a position from which to make a safe landing, it is your prerogative to leave the MDA from any DME point.

On combination ILS and TACAN Instrument Approach Procedure Charts (Figure 12-9) , the absence of a published altitude restriction prior to the accent line at the TACAN FAF (bold print cross) indicates that the TACAN FAF altitude is the same as the ILS, or Precision Glide Slope, Intercept Altitude. This altitude is depicted by a small arrow [/ 1500] and is the Final Approach Fix for an ILS Approach. Aircraft are vectored to an ILS final approach course below the Glide Slope. The point of intercept, 1500' on this Chart, is the Final Appraoch Fix. When established on the ILS Glide Slope for this Chart, an aircraft should be at 1409' MSL when reaching the 5 DME fix. Since an altitude is not published prior to the 5 DME fix accent line, the TACAN FAF altitude is 1500' MSL, the same as the ILS FAF altitude.



HI-TACAN or ILS 1 RWY 4L

Figure 12-9

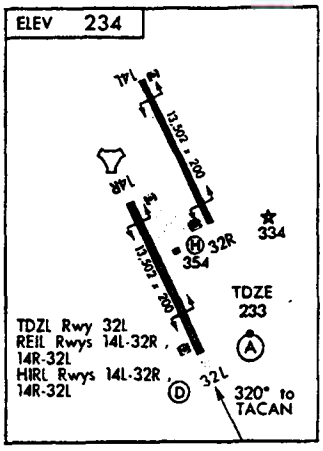
AIRPORT SKETCH

Depicted in the Airport Sketch (Figure 12-10) are:

- **Runway lengths and widths.**
- **Location of Arresting Gear.**
- **Types of Approach Lighting Systems and Glide Slope Indicators (circles with letters and numbers).**
- **Runway lighting information.**
- **Airport Elevation.**
- **Touchdown Zone Elevation.**
- **Obstructions.**

NOTE

All obstructions are depicted in Mean Sea Level (MSL) to provide for an altimeter reference in the aircraft.



LEMOORE, CALIFORNIA
LEMOORE NAS (REEVES FIELD) (KNLC)

Figure 12-10

APPROACH LIGHTING SYSTEMS

The types of Approach Lighting Systems are depicted in the FLIP (Enroute) Flight Information Handbook (Figure 12-11), displaying what you will see as you approach the runway.

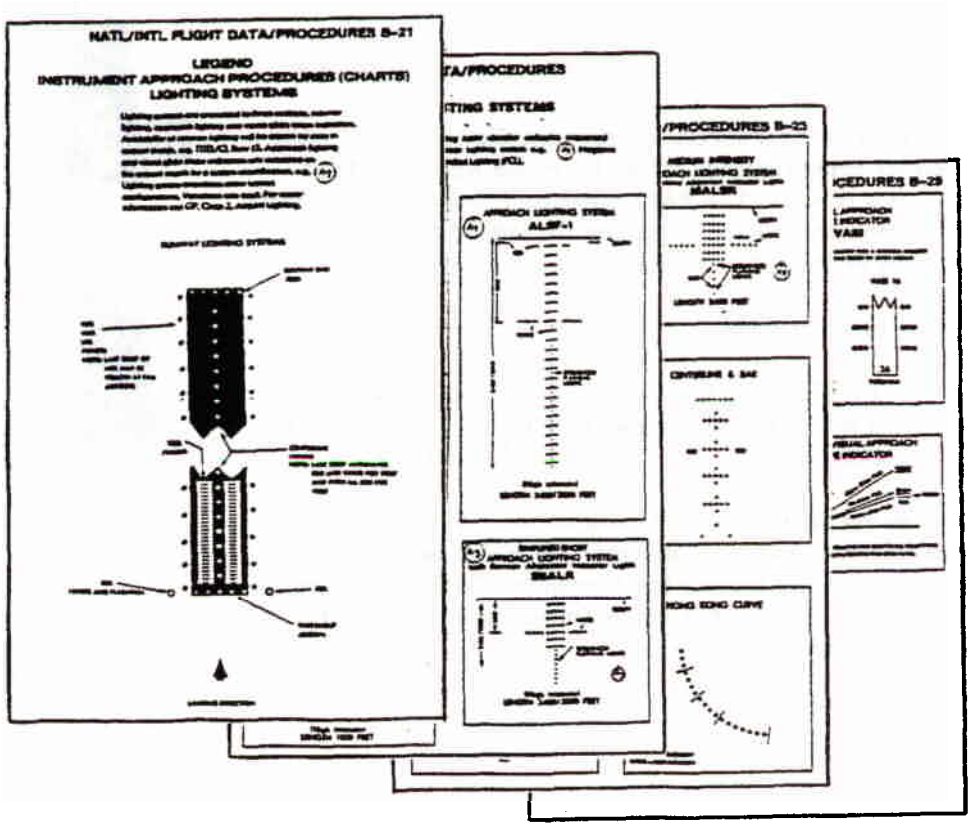


Figure 12-11

VISUAL GLIDE SLOPE INDICATORS

Visual Glide Slope Indicators are depicted along with types of Approach Lighting Systems in the FLIP (Enroute) Flight Information Handbook, displaying what you will see at the Visual Descent Point, if published, and when established on glidepath to the Touchdown Zone. The two most common types in use at military installations are the Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI). These are graphically depicted in Figure 12-12.

The Visual Approach Slope Indicator (VASI) consists of two rows of three lights each located on both sides of the runway. They are normally visible 5 miles during daylight and 15 to 20 miles at night to aid a pilot in staying on the proper glidepath to the Touchdown Zone.

The Indicators are:

WHITE over WHITE - too HIGH
RED over WHITE - on GLIDEPATH
RED over RED - too LOW

Some runways may have a three-bar system with two glidepaths. In tactical jet type aircraft, the pilot sits low to the ground and will see the lower glidepath indicator of:

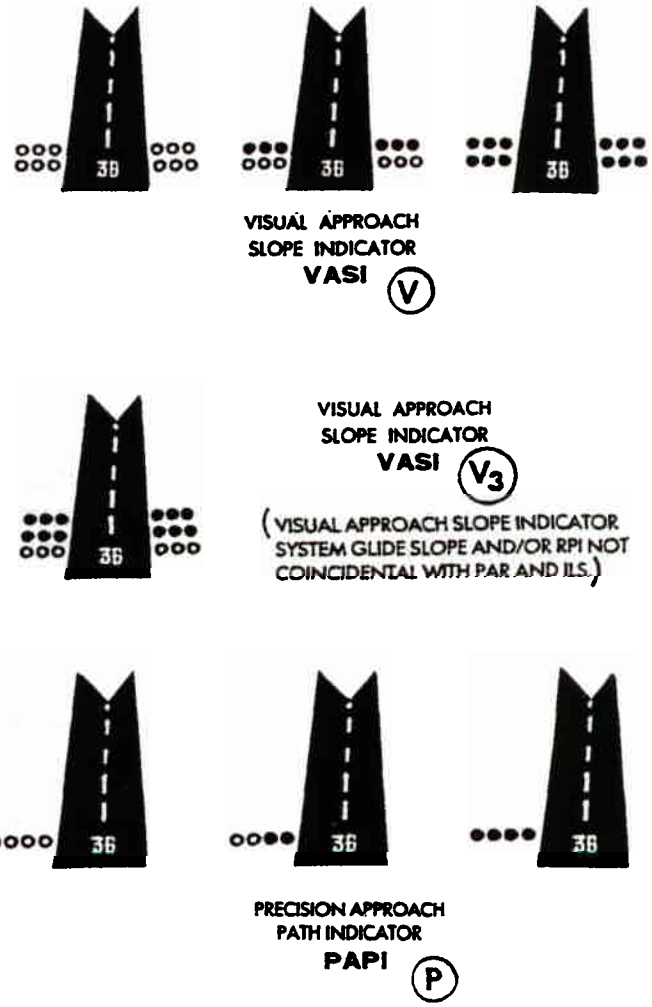
RED over RED over WHITE - on GLIDEPATH

By international agreement through the ICAO, the VASI is slowly being replaced by the Precision Approach Path Indicator (PAPI). The PAPI consists of four lights in a single row which are usually located on the left side of the runway, but may be located on both sides at some airports.

The Indicators are:

FOUR WHITE - too HIGH
TWO WHITE and TWO RED - on GLIDE PATH
FOUR RED - too LOW

When deviating from glidepath on the VASI, there is an area referred to as a "Pink Area" for which there is no clear indicator of high or low tendency. The PAPI has no "Pink Area". The indicators go immediately from Red to White or White to Red.



GRAPHIC DEPICTION OF
VISUAL GLIDE SLOPE INDICATORS

Figure 12-12

MINIMA SECTION

You should be thoroughly familiar with all the terms in the Minima Section (Figure 12-13) and visualize the location of your aircraft during an Instrument Approach in relation to these terms. REMINDER: The T2C is a Category C aircraft for planning and takeoff purposes, and for both straight-in and circling approaches.

CATEGORY	C	D	E
S-TAC 32L*	520/40 287 (300-¾)		
CIRCLING	700-1½ 466 (500-1½)	800-2 566 (600-2)	
S-PAR 32L*	333/16 100 (100-¼)		GS 3.0°
* When ALS inop increase vis ¼ mile.			

HI-TACAN RWY 32L

Figure 12-13

MINIMUM DESCENT ALTITUDE (MDA)

Minimum Descent Altitude (MDA) (Figure 12-14) is the lowest Mean Sea Level altitude, as read on your altimeter, to which you can descend on a non-precision approach until you have the runway environment in sight and, in your judgment, you are in a position from which to effect a safe landing. It is a "hard" altitude.

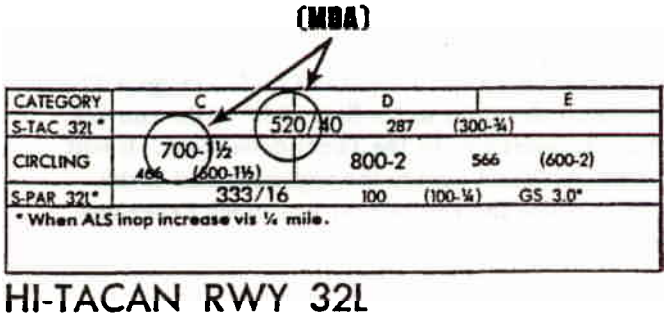


Figure 12-14

DECISION HEIGHT (DH)

Decision Height (DH) (Figure 12-15) is the Mean Sea Level altitude, as read on your altimeter, at which you must initiate a Missed Approach on a Precision Approach if you do not have the runway in sight or you are not in a position from which to effect a safe landing. Unlike an MDA, you are in a constant rate-of-descent and will descend below this altitude in the process of adding power, cleaning up your aircraft, and commencing a climb; however, you must initiate a Missed Approaach the <u>first time</u> you reach this MSL altitude.

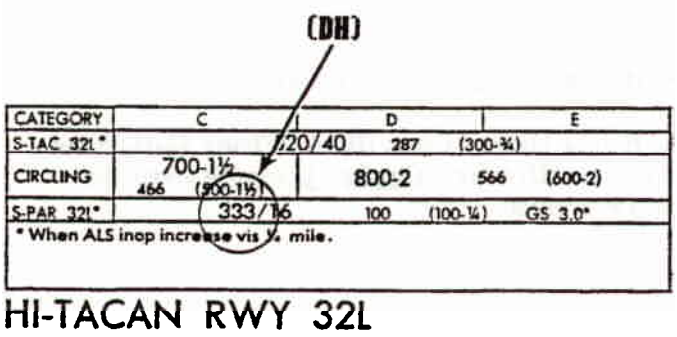


Figure 12-15

HEIGHT ABOVE TOUCHDOWN (HAT)

The Height Above Touchdown (HAT) (Figure 12-16) is the height of the MDA or the DH for straight-in approaches above the Touchdown Zone Elevation (TDZE).

CAUTION

In accordance with OPNAVINST 3710.7, Decision Height (DH) for a single-piloted aircraft cannot be less than 200' Height Above Touchdown (HAT). In this example Minima Section, single-piloted Decision Height (DH) would be 433' MSL.

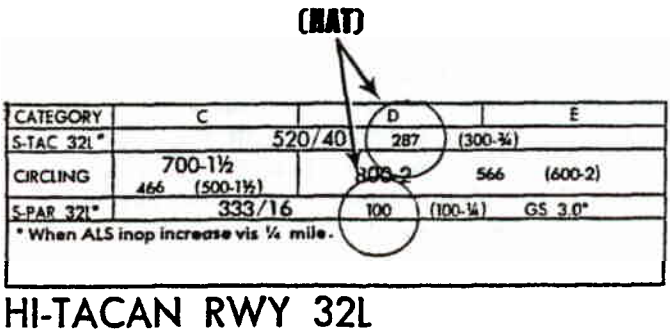


Figure 12-16

TOUCHDOWN ZONE ELEVATION (TDZE)

The Touchdown Zone Elevation (TDZE) (Figure 12-17) is the highest elevation in the first 3000' of the runway, which is considered to be the Touchdown Zone. It will always be published next to the approach end of the runway to which the Instrument Approach Procedure is aligned.

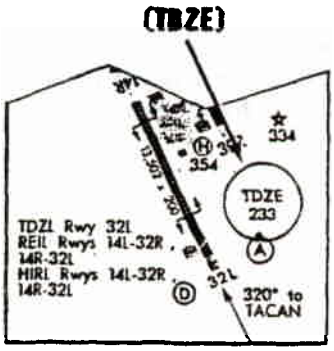


Figure 12-17

HEIGHT ABOVE AIRPORT (HAA)

The Height Above Airport (HAA) (Figure 12-18) is the height of the MDA for a Circling Approach above the Airport Elevation.

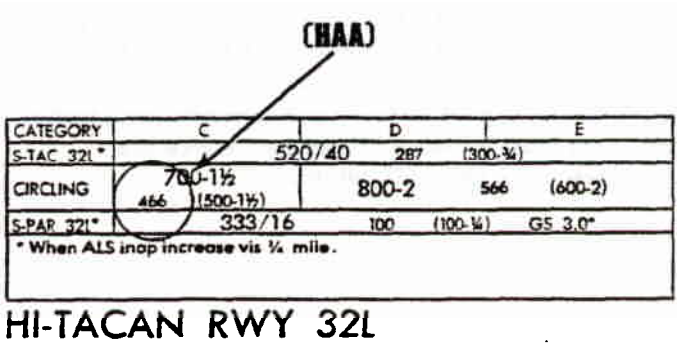


Figure 12-18

AIRPORT ELEVATION

Published in the top left corner of the Airport Sketch, the Airport Elevation (Figure 12-19) is the highest elevation on any usable landing surface of the airport.

CAUTION

Do not confuse Airport Elevation with Touchdown Zone Elevation or with the Ramp/Spot elevations depicted on full page airport diagrams which are used for altimeter ground-checks.

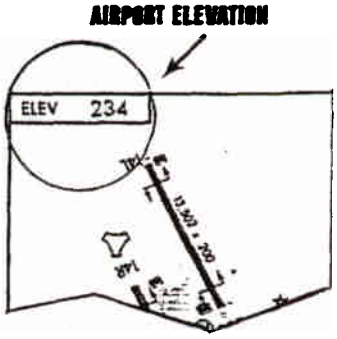


Figure 12-19

PUBLISHED WEATHER MINIMUMS

Navy pilots must have both ceiling and visibility minimums for the planning, takeoff, and approach phases of a flight. Always use the published weather minimums (Figure 12-20) and apply your absolute minimums to each value to ensure you meet the OPNAV criteria for each phase of flight.

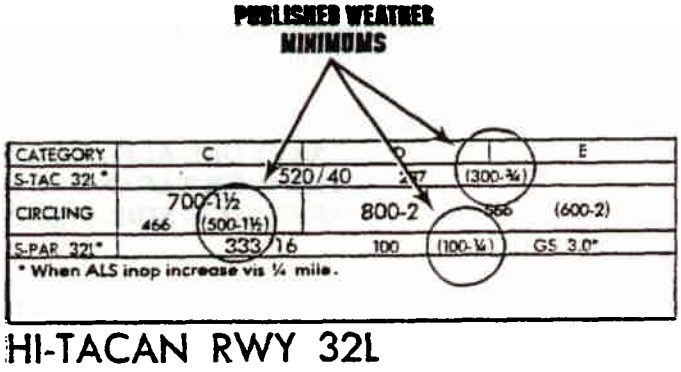


Figure 12-20

VISIBILITY VALUES

PREVAILING VISIBILITY (PV)

Normally observed from the Control Tower over an average of 1/2 the horizon, Prevailing Visibility (PV) (Figure 12-21) is used for planning purposes, takeoff purposes, and for all Circling Approaches. It is only used for Straight-In Approaches in absence of a Runway Visual Range (RVR) value.

RUNWAY VISUAL RANGE (RVR)

Being electronically measured down the runway from the approach end and automatically transmitted to the Control Tower, Runway Visual Range (RVR) (Figure 12-21) takes precedence over Prevailing Visibility (PV) for Straight-In Approaches.

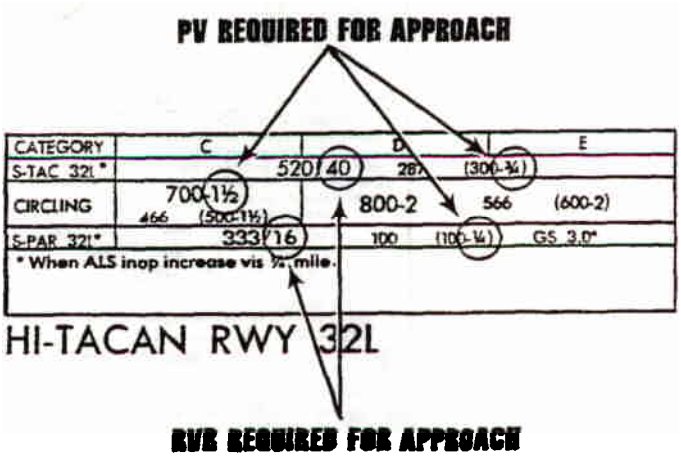


Figure 12-21

NOTE

OPNAVINST 3710.7 establishes absolute minimums for single-piloted aircraft instrument approaches at 200' ceiling and 1/2 mile Prevailing Visibility (PV), or 2400' Runway Visual Range (RVR) if available.

SIDE-STEP PROCEDURE

Side-Step procedures are used at most military airports which operate tactical jet type aircraft and have parallel runways separated by 1200' or less. There is always the possibility of an aircraft fouling the primary instrument runway and airborne tactical jet aircraft becoming fuel critical. The Side-Step Procedure is an approach to the primary instrument runway which terminates with a visual maneuver to side-step and land on the parallel runway. Since the procedure requires a visual maneuver, but not a full circling maneuver, Side-Step Minimums are higher than Straight-In Minimums and at or below Circling Minimums (Figure 12-22). You will be cleared to Side-Step prior to leaving altitude and you must have the Side-Step Minimums to commence the penetration and approach.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, CLEARED FOR THE HIGH TACAN ONE RUNWAY TWO-FOUR RIGHT APPROACH, SIDE-STEP RUNWAY TWO-FOUR LEFT."

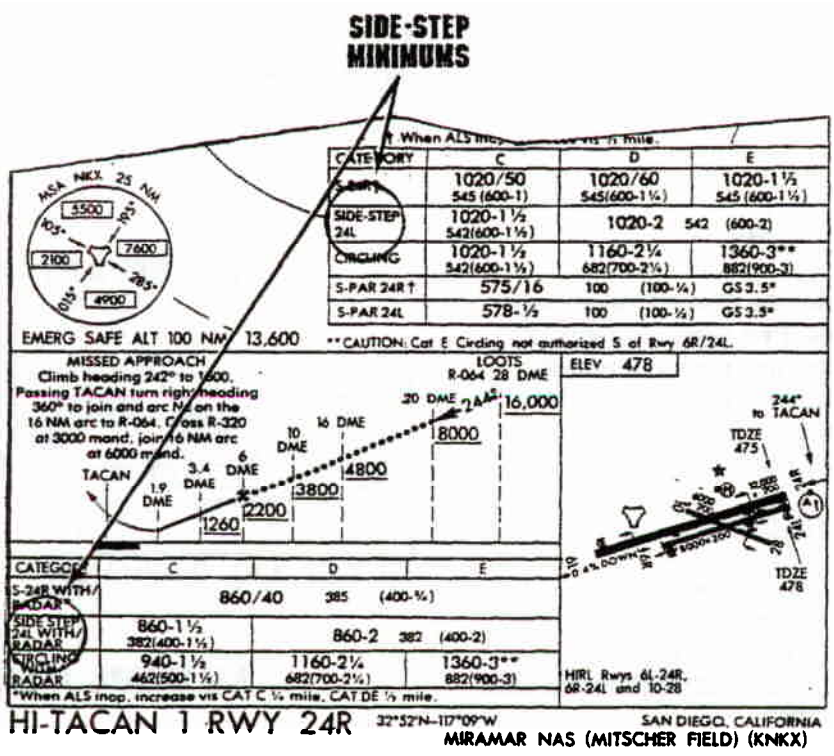


Figure 12-22

PERSPECTIVE

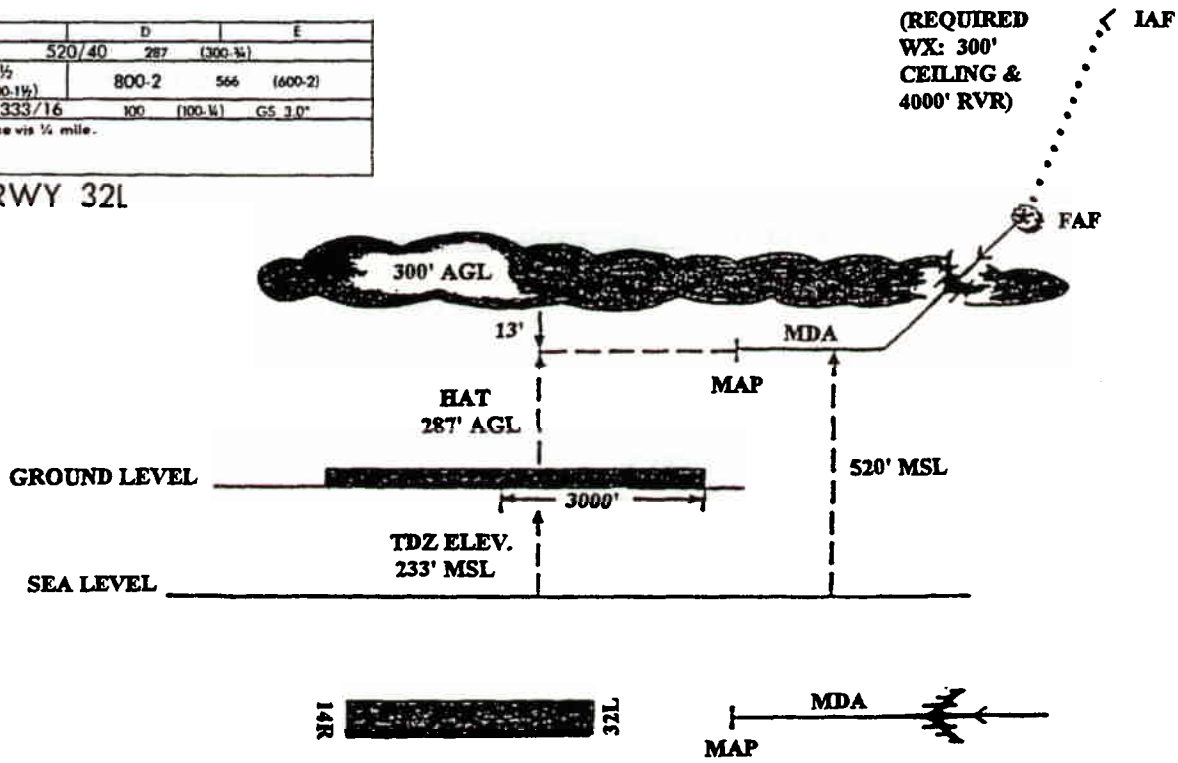
The published minimum ceiling value for an approach is the minimum height of the ceiling (AGL) above the published Airport Elevation. Ceilings are seldom uniform in AGL height; therefore, in the following illustrations, aircraft distances below the published minimum ceiling values are, in actuality, approximations.

STRAIGHT-IN TACAN APPROACH (S-TAC-32L)

CATEGORY	C	D	E
S-TAC 32L*	520/40	287 (300-¾)	
CIRCLING	700-1½ 466 (500-1½)	800-2	566 (600-2)
S-PAR 32L*	333/16	100 (100-¼)	GS 3.0°

* When ALS inop increase vis ¼ mile.

HI-TACAN RWY 32L



YOU MUST HAVE REPORTED WEATHER CONDITIONS OF AT LEAST 300' CEILING AND 4000' RVR BEFORE COMMENCING THE PENETRATION AND APPROACH. WHEN REACHING MINIMUM DESCENT ALTITUDE OF 520' MSL, YOU WILL BE 287' ABOVE THE HIGHEST ELEVATION IN THE TOUCHDOWN ZONE OF 233' MSL

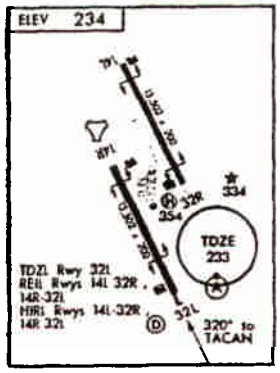
287' AGL
+ 233' MSL

520' MSL

AND APPROXIMATELY 13' BELOW THE CEILING OF 300' AGL.

300' AGL
- 287' AGL

13'



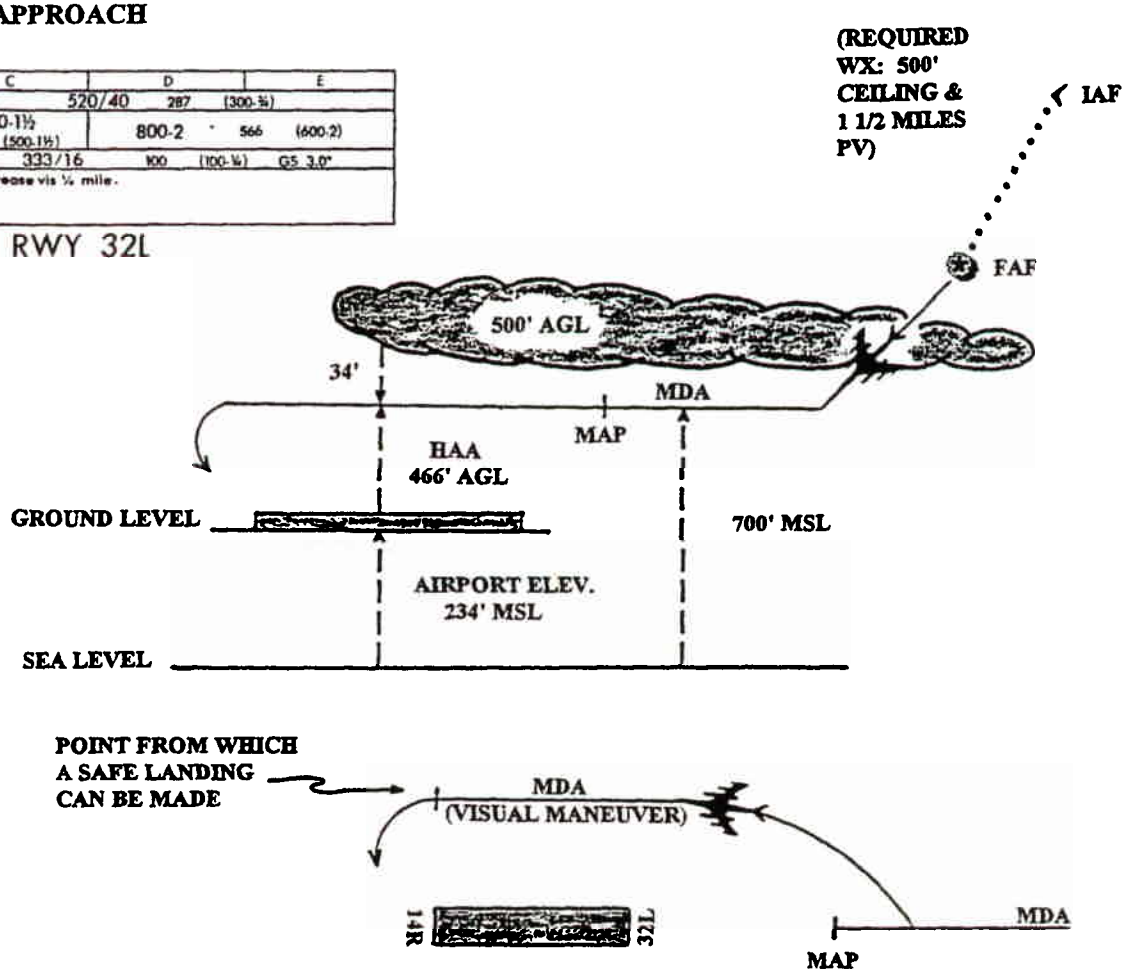
LEMOORE, CALIFORNIA
LEMOORE NAS (REEVES FIELD) (KNLC)

CIRCLING TACAN APPROACH

CATEGORY	C	D	E
S-TAC 32L*	520/40 287 (300-¾)		
CIRCLING	700-1½ 466 (500-1½)	800-2 566 (600-2)	
S-PAR 32L*	333/16 100 (100-¼)	G/S 3.0°	

* When ALS inop increase vis ½ mile.

HI-TACAN RWY 32L



YOU MUST HAVE REPORTED WEATHER CONDITIONS OF AT LEAST 500' CEILING AND 1 1/2 MILES PREVAILING VISIBILITY BEFORE COMMENCING THE PENETRATION AND APPROACH. WHEN REACHING MINIMUM DESCENT ALTITUDE OF 700' MSL, YOU WILL BE 466' ABOVE THE AIRPORT ELEVATION OF 234' MSL

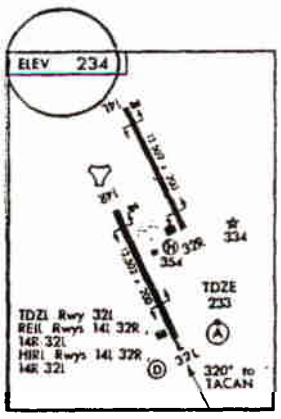
466' AGL
+ 234' MSL

700' MSL

AND APPROXIMATELY 34' BELOW THE CEILING OF 500' AGL.

500' AGL
- 466' AGL

34'



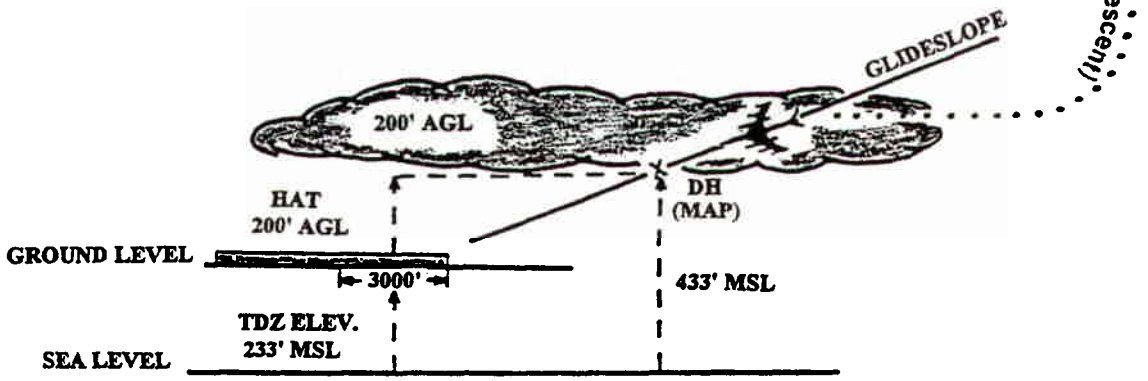
LEMOORE, CALIFORNIA
LEMOORE NAS (REEVES FIELD) (KNLC)

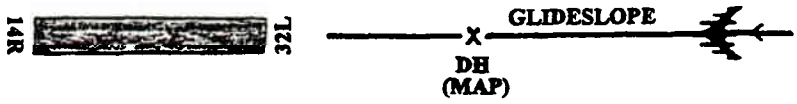
STRAIGHT-IN PRECISION APPROACH (S-PAR-32L)

CATEGORY	C	D	E
S-TAC 32L*	520/40 287 (300-¾)		
CIRCLING	700-1½ 466 (500-1½)	800-2 566 (600-2)	
S-PAR 32L*	333/16	100 (100-¼)	GS 3.0°

* When ALS inop increase vis ½ mile.

HI-TACAN RWY 32L





PUBLISHED PRECISION WEATHER MINIMUMS ARE 100' CEILING AND 1600' RVR. IN ACCORDANCE WITH OPNAVINST 3710.7, SINGLE-PILOTED AIRCRAFT MUST HAVE REPORTED WEATHER CONDITIONS OF AT LEAST 200' CEILING AND 2400' RVR TO LEAVE ALTITUDE FOR A PRECISION APPROACH.

CAUTION

KNOW YOUR OWN DECISION HEIGHT (DH), WHICH CANNOT BE LESS THAN 200' HEIGHT ABOVE TOUCHDOWN (HAT) FOR SINGLE-PILOTED NAVAL AIRCRAFT.

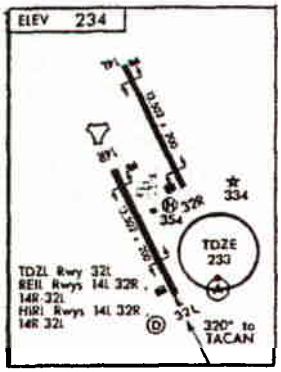
WHEN REACHING SINGLE-PILOTED DECISION HEIGHT OF 433' MSL, YOU WILL BE 200' ABOVE THE HIGHEST ELEVATION IN THE TOUCHDOWN ZONE OF 233' MSL

200' AGL
+ 233' MSL

433' MSL

AND APPROXIMATELY AT OR BELOW THE CEILING OF 200' AGL.

200' AGL HAT = 200' CEILING

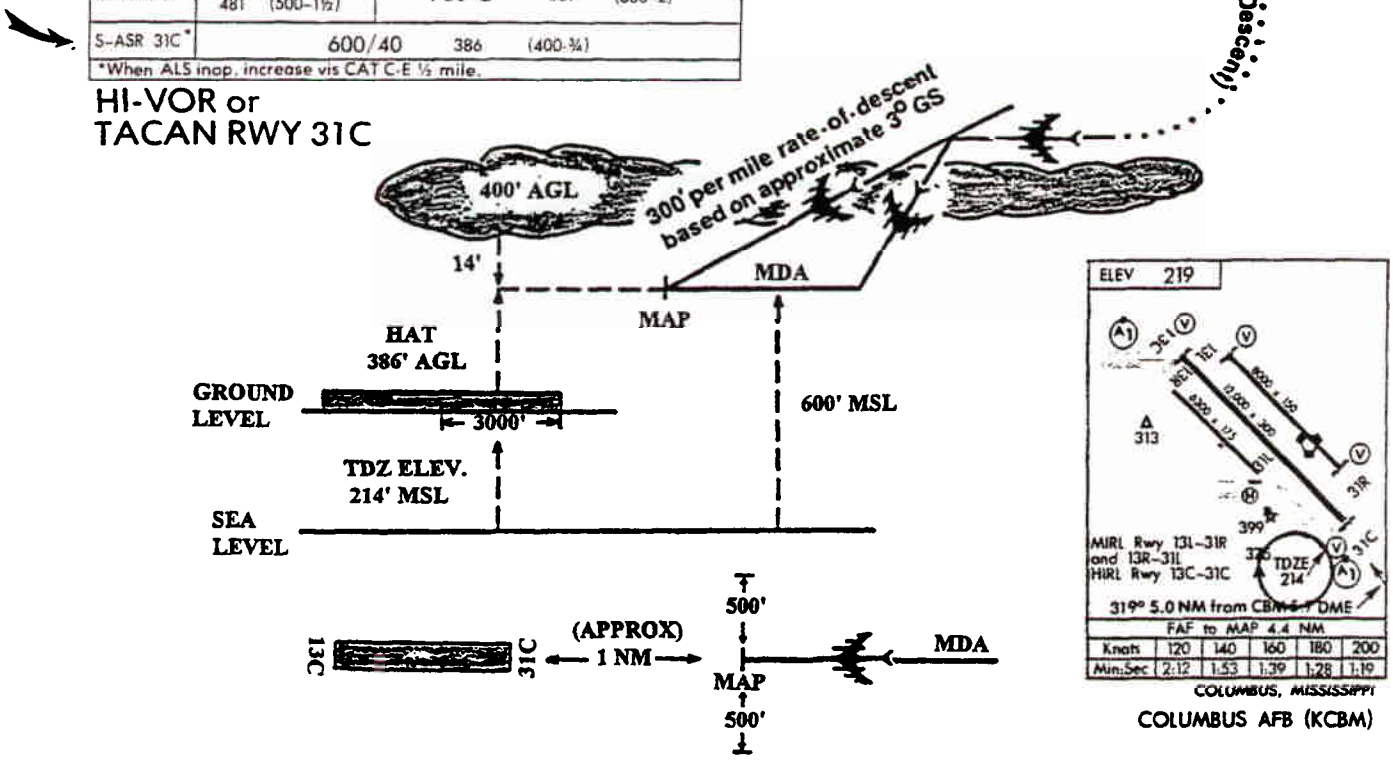


LEMOORE, CALIFORNIA
LEMOORE NAS (REEVES FIELD) (KNLC)

STRAIGHT-IN SURVEILLANCE APPROACH (S-ASR-31C)

CATEGORY	C	D	E
S-31C *	600/40 386 (400-¾)		
CIRCLING	700–1½ 481 (500–1½)	780–2 561 (600–2)	
S-ASR 31C *	600/40 386 (400-¾)		

*When ALS inop, increase vis CAT C-E ½ mile.



COLUMBUS AFB (KCBM)

THIS IS AN EXAMPLE OF AN AIRPORT SURVEILLANCE RADAR (ASR) APPROACH, WHICH IS NON-PRECISION SINCE ELECTRONIC GLIDEPATH INFORMATION IS NOT PROVIDED. YOU MUST HAVE REPORTED WEATHER CONDITIONS OF AT LEAST 400' CEILING AND 4000' RVR TO LEAVE ALTITUDE FOR THE ASR APPROACH. AFTER TURNING TO FINAL APPROACH COURSE, AND USUALLY BETWEEN 5 AND 8 MILES FROM THE RUNWAY, THE CONTROLLER WILL TELL YOU WHEN TO BEGIN DESCENT, STATE THE MISSED APPROACH POINT, AND UNLESS PUBLISHED, STATE THE MDA. AT THIS TIME, YOU MAY EITHER DESCEND TO THE MDA AND LEVEL OFF, OR AT MILITARY AIRPORTS, REQUEST THE CONTROLLER PROVIDE RECOMMENDED ALTITUDES EACH MILE ON THE FINAL APPROACH SEGMENT. THESE ALTITUDES ARE BASED ON AN APPROXIMATE 300' PER NM RATE-OF-DESCENT, WHICH APPROXIMATES A 3 DEGREE GLIDESLOPE. WHEN REACHING THE MDA OF 600' MSL, YOU WILL BE 386' ABOVE THE HIGHEST ELEVATION IN THE

TOUCHDOWN ZONE OF 214' MSL	**386' AGL + 214' MSL**	**AND APPROXIMATELY 14' BELOW THE CEILING VALUE OF 400' AGL**	**400' AGL - 386' AGL**
	600' MSL		**14'**

ASR APPROACHES ARE DESIGNED TO PLACE AN AIRCRAFT WITHIN 500' EITHER SIDE OF CENTERLINE AT THE MISSED APPROACH POINT (MAP), WHICH IS NORMALLY AN APPROXIMATE DISTANCE OF 1 MILE FROM THE APPROACH END OF THE RUNWAY. AN ASR APPROACH IS ALMOST IDENTICAL TO A TACAN APPROACH WITH THE SAME WEATHER MINIMUMS, SAME MDA, AND APPROXIMATELY THE SAME PATH OVER-THE-GROUND; HOWEVER, COURSE INFORMATION IS PROVIDED BY A RADAR CONTROLLER.

HI-NDB (UHF) APPROACH - RADIO BEACON LOCATED AT THE AIRPORT

NOTE

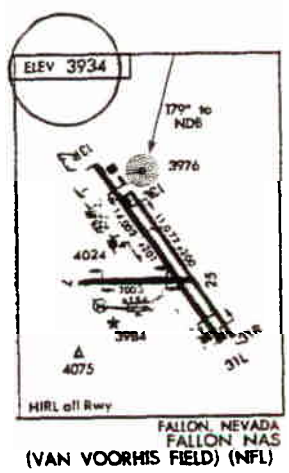
High altitude ADF (NDB) Approaches are being eliminated in the United States, including the following example; however, since they are still common in other areas of the world, you should be basically familiar with ADF procedures.

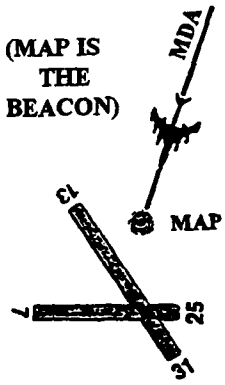
Except for the necessity that weather minimums are higher for ADF Approaches than for the more accurate TACAN Approaches, straight-in ADF procedures where the Beacon is located away from the airport are the same as for TACAN procedures. The #2 Needle on the BDHI is used for TACAN Approaches and the #1 Needle is used for ADF Approaches.

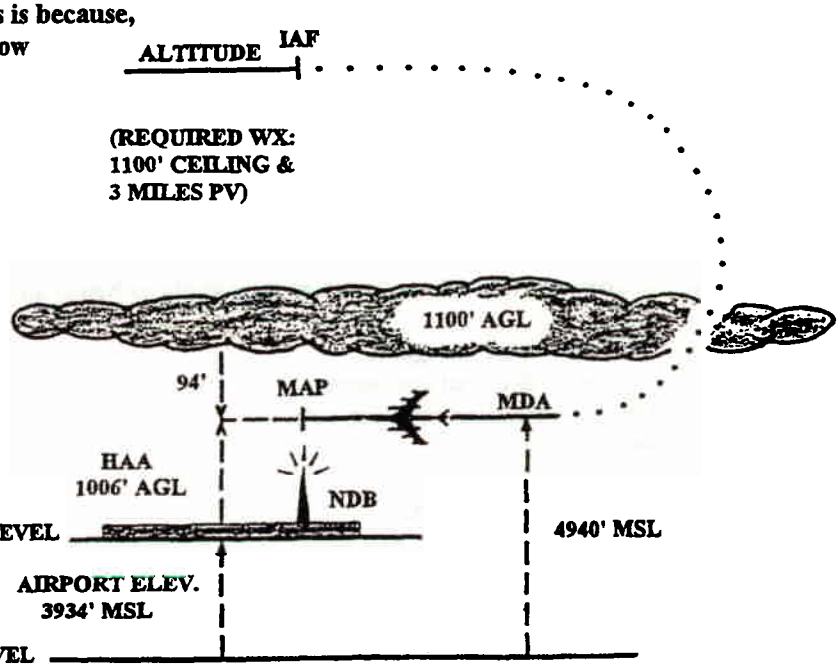
An ADF Approach where the Beacon is located at the airport requires higher minimums than for an ADF Approach where the Beacon is located away from the airport, because without supplemental DME and/or radar, there is no FAF for reference. A straight-in or a circling approach may be authorized when the Beacon is located at the airport, each with its own weather minimums; however, the MDAs will be the same. This is because, in effect, the absence of a FAF makes the approach a low visibility maneuver.

CATEGORY	C	D	E
S-ND6	NOT AUTHORIZED		
CIRCLING	4940-3 1006 (1100-3)		4980-3 1046 (1100-3)

HI-NDB (UHF) A







YOU MUST HAVE REPORTED WEATHER CONDITIONS OF AT LEAST 1100' CEILING AND 3 MILES PREVAILING VISIBILITY TO LEAVE ALTITUDE AND COMMENCE A PENETRATION AND APPROACH. WHEN REACHING THE MINIMUM DESCENT ALTITUDE (MDA) OF 4940' MSL, YOU WILL BE 1006' ABOVE THE HIGHEST ELEVATION ON ANY USABLE LANDING SURFACE (AIRPORT ELEVATION) OF 3934' MSL

1006' AGL	AND APPROXIMATELY 94'	1100' AGL
+ 3934' MSL	BELOW THE CEILING OF	- 1006' AGL
	1100' AGL	
4940' MSL		94'

CHAPTER 13

FAR PART 91

ENABLING OBJECTIVE: **Demonstrate a knowledge of the pertinent provisions of the Federal Aviation Regulations, Part 91, applicable to flights in Naval aircraft within the United States.**

SPECIFIC OBJECTIVES:

13.1 **State the scope of FAR 91 as it applies to the operations of Naval aircraft.**

13.2 **Explain pilot responsibility for adherence to FAR rules, regulations and procedures.**

13.3 **Describe pilot preflight responsibilities.**

13.4 **Explain pilot responsibility for aircraft airworthiness.**

13.5 **Explain pilot responsibility to avoid reckless operation of an aircraft.**

13.6 **Explain pilot responsibilities in areas where temporary flight restrictions apply.**

13.7 **State the rules for formation flight.**

13.8 **State pilot responsibility for avoidance of other aircraft.**

13.9 **State the aircraft right-of-way rules as they apply to Naval aircraft:**

- **a. Crossing - same category.**
- **b. Crossing - different categories.**
- **c. OPNAV formation crossing rule.**
- **d. Head-on.**
- **e. Overtaking.**
- **f. Airport traffic pattern.**
- **g. Aircraft in distress.**

13.10 **State clearance requirements for IMC operations in controlled airspace.**

13.11 **State pilot responsibilities when "Cancelling IFR".**

13.12 **State pilot responsibility for adherence to ATC instructions.**

13.13 State airspeed limitations applicable to Naval aircraft:

a. Within CLASS B AIRSPACE.
b. Below the lateral limits of CLASS B AIRSPACE.
c. In a designated VFR corridor through CLASS B AIRSPACE.
d. Within CLASS C AIRSPACE.
e. Within CLASS D AIRSPACE.
f. Below 10,000' MSL in CLASS E and CLASS G AIRSPACE.
g. In a holding pattern.

13.14 State the meaning of Control Tower directional light signals:

a. Ground operations.
b. Inflight operations.

13.15 State the minimum altitudes applicable to Naval aircraft for VFR flight:

a. General safety rule applicable in all areas of flight.
b. Congested areas.
c. Uncongested areas.
d. Sparsely populated areas and over open water.
e. OPNAV fixed-wing aircraft rule.

13.16 Explain the meaning of a "TAXI TO" clearance.

13.17 State the airport traffic pattern rules for turbine powered aircraft relating to:

a. Civil airport pattern entry altitude.
b. Direction of turns.
c. Noise abatement procedures.
d. Departure altitude.

SCOPE

FAR Part 91 applies to the operations of all aircraft within the United Staates and within 12 NM of the United States over international waters. All provisions of FAR Part 91 apply to Naval aircraft unless OPNAVINST 3710.7 is more stringent, or unless deviations are covered by letters-of-agreement.

PILOT RESPONSIBILITIES

AIRCRAFT OPERATION

The pilot-in-command is directly responsible for, and is the final authority as to, the operation of an aircraft.

ADHERENCE TO RULES

The pilot-in-command is responsible for knowledge of and adherence to all flight regulations. The pilot can deviate from any rule or procedure in the event of an emergency, but should inform ATC by radio as soon as possible of such deviations. If requested by ATC, a detailed written report of a deviation or of a situation where ATC grants the pilot priority over other traffic must be submitted to the local FAA facility chief within 48 hours.

PREFLIGHT

Each pilot-in-command shall, before beginning a flight, familiarize himself with all available informatioon concerning that flight, such as weather conditions, fuel requirements, NOTAMs in effect, airport facility status, etc., and brief formation members if applicable.

AIRWORTHINESS

No person shall operate an aircraft unless it is in an airworthy condition. The pilot shall discontinue flight when unairworthy mechanical, structural, or electrical conditions occur.

RECKLESS OPERATION

LIFE/PROPERTY ON SURFACE

No person shall operate an aircraft in a careless or reckless manner so as to endanger the life or property of another. Criteria: Did the other person reasonably feel his life or property was endangered by the operation of an aircraft.

OTHER AIRCRAFT

No person may operate an aircraft so close to another as to create a collision hazard. Criteria: Did the other pilot reasonably feel his aircraft was endangered by the operation of another aircraft.

TEMPORARY FLIGHT RESTRICTIONS

Aircraft shall not be operated in areas where temporary flight restrictions apply: disaster areas; areas of civil disturbance; major sporting events; space vehicle launch/recovery areas; etc., unless on an IFR clearance. Avoidance altitudes/distances will be specified by NOTAMs. In absence of a NOTAM, avoid these areas by at least 2000' and 2 NM.

FORMATION FLIGHT

Formation flight requires permission from the pilot-in-command of each aircraft prior to joining the formation, either by arrangements on the ground prior to flight or by radio when inflight. Carrying passengers for hire in formation flight is prohibited.

SEE-AND AVOID

It is pilot responsibility to see-and-avoid all traffic at any time operating in VMC, regardless of the type of flight plan on which operating. Outside of CLASS B and C AIRSPACE, ATC only has a statutory responsibility to separate IFR aircraft. An IFR clearance does not provide separation between IFR and VFR traffic, or between IFR traffic and IFR "VFR-On-Top" traffic. A controller may or may not call VFR traffic, depending on his workload and radar presentation.

RIGHT-OF-WAY RULES

CROSSING: DIFFERENT CATEGORIES

In order of priority, right-of-way is given to:

1. Balloons
2. Gliders
3. Airships
4. Aircraft and Rotorcraft

EXCEPTION: Aircraft towing or refueling have the right-of-way over all other engine-driven aircraft.

CROSSING: SAME CATEGORY

This rule is compatible with approaching a four-way intersection in an automobile. When crossing at the same altitude, the aircraft on the right has the right-of-way.

OPNAV EXCEPTION: When a single Naval aircraft is in a crossing situation with a formation of aircraft, the formation has the right-of-way and the single Naval aircraft will give way.

CAUTION

OPNAV only has control of Naval aircraft, and FAR Part 91 makes no provision for formations in the right-of-way rules. Do not assume your formation of Naval aircraft always has the right-of-way. In a crossing situation with a civil aircraft, the civil aircraft is following FAR Part 91 right-of-way rules, which state the aircraft on the right has the right-of-way.

HEAD-ON

When approaching head-on, or nearly so, neither aircraft has the right-of-way. Both aircraft will alter course to the right to pass well clear.

OVERTAKING

When overtaking another aircraft, the overtaken aircraft has the right-of-way and the overtaking aircraft will alter course to the right to pass well clear.

AIRPORT TRAFFIC PATTERN

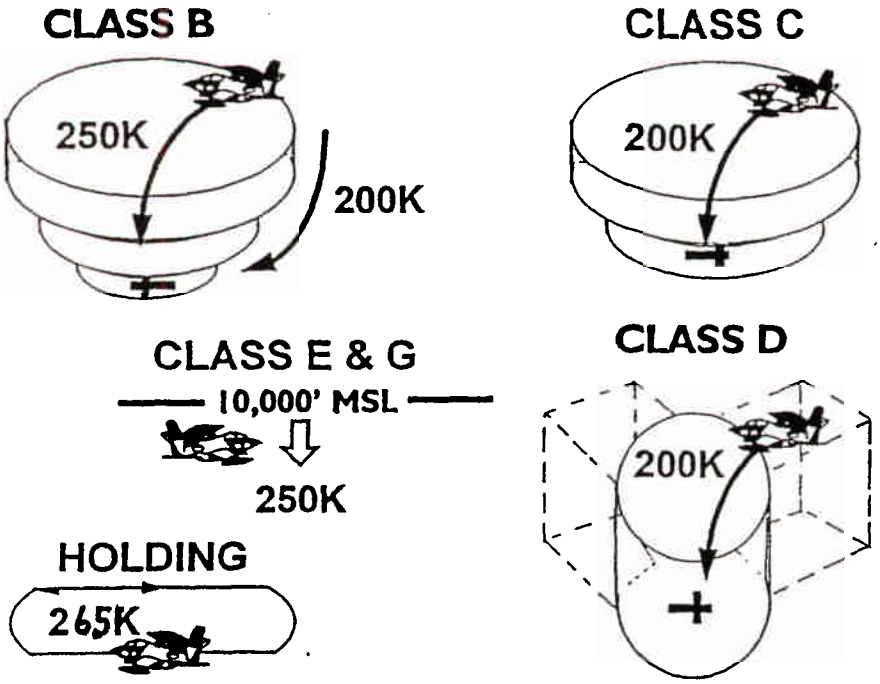
As a general rule, the lower aircraft in the pattern has the right-of-way; however, the pilot of that aircraft should not overtake or pass another aircraft that is on final approach.

GENERAL EXCEPTION

An aircraft in distress has the right-of-way over all other air traffic.

AIRSPEED LIMITATIONS

(A review of Chapter 4: Airspeed Limitations)



The military has various letters-of-agreement with the FAA which allow higher airspeeds in certin CLASS C and D IRSPACE airports, on Low Level Military Training Routes, in Military Operatins Areas, and in Restricted Areas. Most rports which operate tactical jet type military aircraft will have higher pattern airspeeds. Airport pattern airspeeds may : published in the Supplemental Remarks Section of FLIP Planning Section AP/1. Unless published otherwise or you quest pattern airspeed from the Control Tower, do not enter CLASS C or D AIRSPACE in excess of 200 knots.

Radar controllers cannot read your indicated airspeed on their scopes. If you are below 10,000', a controller asks you to crease airspeed for traffic separation, and you will exceed 250 knots, it is your responsibility to tell ATC you cannot mply. Unless the controller states it is an emergency, ATC has no authority to ask you to exceed 250 knots and you have authority to exceed 250 knots unless you must exercise your emergency authority for some reason. On an enroute scent, ATC anticipates you will temporarily level off at 10,000' to reduce your airspeed.

EXCEPTION: When operating an aircraft which for some reason has a minimum safe operating airspeed in excess of the maximum allowable airspeeds, you are expected to operate at the minimum safe operating airspeed. Inform ATC as to your aircraft limitations and the airspeed at which you must operate.

IFR CLEARANCE REQUIREMENTS

IMC IN CONTROLLED AIRSPACE

All pilots intending to operate in IMC in controlled airspace must have filed and received an IFR clearance prior to operating in IMC. Pilots filing inflight must maintain VMC until an IFR clearance is received.

ADHERENCE TO INSTRUCTIONS

Except in an emergency, no person shall operate an aircraft contrary to ATC clearances and instructions.

CANCELLING IFR FLIGHT PLAN

It is a pilot prerogative to cancel IFR at any time when operating below CLASS A AIRSPACE. If in CLASS A AIRSPACE, you must request a descent to below 18,000' MSL in order to cancel.

PILOT RESPONSIBILITIES:

1. **Fly VFR cruising altitudes.**
    a. **Eastbound - Odd thousands plus 500'.**
    b. **Westbound - Even thousands plus 500'.**
2. **Squawk Mode 3 Code 1200.**
3. **Maintain the FAR cloud clearance and visibility requirements for VFR flight.**
4. **Verbally confirm closing of your military flight plan on the ground to ensure a proper arrival report is filed.**

LIGHT SIGNALS

All pilots are equally responsible for adhering to light signals as well as radio communicated signals. The explanation of Airport Control Tower directional light signals is located in the FLIP (Enroute) Flight Information Handbook.

GROUND SIGNALS

1. **FLASHING GREEN - Cleared to taxi.**
2. **STEADY RED - Stop and hold position.**
3. **ALTERNATING RED AND GREEN - Exercise extreme caution.**
4. **FLASHING WHITE - Return to starting point on airport.**
5. **STEADY GREEN - Cleared for takeoff.**
6. **FLASHING RED - Taxi clear of runway in use.**

INFLIGHT SIGNALS

1. STEADY GREEN - Cleared to land.
2. FLASHING RED - Airport unsafe, do not land.
3. STEADY RED - Give way to other traffic, continue circling.
4. FLASHING GREEN - Return for landing.
5. ALTERNATING RED AND GREEN - Exercise extreme caution.

MINIMUM VFR ALTITUDES

GENERAL SAFETY RULE

The general safety rule applies everywhere. It states that a pilot on a VFR flight shall maintain a minimum altitude from which an emergency landing can be accomplished without undue hazard to persons or property on the surface. There are some areas, however, where absolute minimum altitudes are established below which a pilot cannot fly.

CONGESTED AREAS

A pilot shall not fly less than 1000' above the highest obstacle within a horizontal distance of 2000'. Even though an emergency landing might be accomplished from a lower altitude, 1000' is the minimum. It is pilot responsibility to fly at a higher altitude over a congested area if needed to effect an emergency landing without undue hazard to persons or property.

UNCONGESTED AREAS

In uncongested areas, a pilot shall not fly less than 500' above the surface.

SPARSELY POPULATED AREAS OR OVER OPEN WATER

In sparsely populated areas or over open water, a minimum altitude is not specified in FAR Part 91. A VFR aircraft could be flown right near the surface since an emergency landing could be accomplished without undue hazard to persons or property. However, FAR Part 91 specifies a VFR aircraft shall not be flown closer than 500' to any person, vehicle, vessel, or structure.

OPNAV EXCEPTION: Even though a minimum altitude is not specified in FAR Part 91, OPNAV specifies that fixed-wing Naval aircraft shall not be flown less than 500' above the surface in any uncongested area, sparsely populated area, or over open water unless conducting a specified mission which dictates a lower altitude. Naval aircraft are still responsible for the 500' clearance from any person, vehicle, vessel, or structure.

AIRPORT TRAFFIC PROCEDURES

ON AN AIRPORT

No person shall operate to, from, or on an airport without two-way radio communications with the Control Tower, or taxi onto or across an assigned runway without Control Tower approval.

A "TAXI TO" clearance is a clearance to cross all intersecting runways enroute to the assigned runway, but not to taxi onto or across the assigned runway without specific approval.

ARRIVAL/DEPARTURE PROCEDURES

Each pilot shall comply with the rules established by ATC for arrivals and departures. Pilots should reference the REMARKS SECTION of the airport name in the IFR Supplement and the SUPPLEMENTAL REMARKS SECTION of FLIP Planning Section AP/1 for arrival and departure procedures in effect at an airport. Should safety of flight dictate, notify ATC and request another procedure.

PATTERN ALTITUDE

Pattern altitudes may be specified in the REMARKS SECTION of the airport name in the IFR Supplement or in the SUPPLEMENTAL REMARKS SECTION of FLIP Planning Section AP/1. The pattern altitude can always be requested from the Control Tower. Unless published otherwise or directed otherwise by the Tower, turbine powered aircraft will enter civil airport traffic patterns at an altitude of at least 1500' AGL.

TRAFFIC PATTERN TURNS

Within controlled airport traffic patterns, make all turns to the left unless directed otherwise by the Control Tower.

Within uncontrolled airport traffic patterns, make all turns to the left unless published otherwise or, by some means, right turns are specified. For example, a flashing amber beacon at night indicates a right-hand pattern or there may be a lighted segmented circle near the center of the airport displaying a right-hand pattern.

NOISE ABATEMENT PROCEDURES

When filing to an airport, pilots should reference the SUPPLEMENTAL REMARKS SECTION of FLIP Planning Section AP/1 for any noise abatement procedures which may be in effect at that airport. If specifically assigned a noise abatement runway, pilots are expected to use that runway unless safety of flight dictates the use of another runway. Notify ATC of any safety of flight restriction and request another runway, but not just for your own convenience. Much planning, coordination, and expense has been expended in establishing noise abatement programs in high density terminal areas.

DEPARTURE ALTITUDE

Unless published otherwise, or requested otherwise from the Control Tower, the pilot of a turbine powered aircraft will climb to at least 1500' AGL as soon as practicable after departure from an airport.

OPNAVINST 3710.7

ENABLING OBJECTIVE: Demonstrate a knowledge of those provisions of OPNAVINST 3710.7 which set forth the safety and operations criteria for flights in Naval aircraft.

SPECIFIC OBJECTIVES:

14.1 State the conditions under which Naval aviators may purchase non-contract fuel.

14.2 State the conditions for conducting ACMs.

14.3 State the conditions for conducting supersonic flight.

14.4 Define aerobatic flight and state the conditions for conducting such flight.

14.5 State avoidance criteria and restrictions for:

- **a. Firing at fish and wildlife.**
- **b. Wildlife habitats.**
- **c. Commercial air carriers.**
- **d. Noise sensitive areas - fur/poultry farms, national beaches/monuments/resorts.**

14.6 State restrictions and pilot responsibilities for:

- **a. Fuel dumping.**
- **b. Jettisoning external stores.**
- **c. Blood donations.**
- **d. Alcoholic beverages.**
- **e. Illicit/hallucinating/over-the-counter drugs.**
- **f. Inoculations and dental drugs.**

14.7 State the conditions for using civil airports.

14.8 Define "night time".

14.9 Define "flight time".

14.10 State the conditions for displaying position and anti-collision lights.

14.11 Define "single-piloted" and "multi-piloted" aircraft.

14.12 State the minimum annual flying hour requirements for operational aviators.

14.13 State the requirements for an annual NATOPS qualification and Instrument Rating renewal.

14.14 State the maximum annual pilot requirements which may be substituted in a flight simulator.

14.15 Explain the conditions under which a flight violation may be assigned to a Naval aviator.

14.16 Explain the authority vested in a flag or general officer aboard a Naval aircraft.

14.17 Explain the duties and responsibilities of a formation leader.

14.18 Define a "standard formation".

INTRODUCTION

The OPNAVINST 3710.7 series sets forth the criteria for authorization, flight planning, safety, and operations of Naval aircraft. The majority of the OPNAV criteria has already been stated in the preflight, departure, enroute, and arrival chapters of this Student Guide. This chapter will be for items not stated elsewhere. The provisions of 3710.7 apply to Naval aviators where it is more stringent than FAR Part 91, but does not apply where a provision of 3710.7 conflicts with a provision of the appropriate aircraft NATOPS Operating Manual. In situations of conflict, the provisions of the aircraft NATOPS Operating Manual apply.

PURCHASE OF FUEL/OIL

Navy/Marine Corps personnel are not authorized to purchase fuel and oil from other than military or contract sources except under certain specified conditions:

1. **When a flight is classified as "Official Business".**
2. **When a flight terminates at an airport as a result of a bonified emergency.**
3. **When a flight terminates at an alternate airport in lieu of the filed destination.**
4. **When purchase is necessary to complete an assigned mission.**

Due to the excessive cost of non-contract fuel, cross-country training flights are normally restricted to destination airports which have military or contract fuel available.

SIMULATED ACMs

Simulated ACMs will be conducted:

a. **Only in designated areas.**
b. **During daylight VMC.**
c. **With a defined horizon.**
d. **With a minimum visibility of 5 miles.**
e. **Above a minimum of 5000' above the terrain or an undercast.**
f. **At lest 2000' vertically and 1 mile from other clouds.**

If visual contact with the target is lost at any time, a pilot is expected to break off an ACM.

SUPERSONIC FLIGHT

Supersonic flight shall be conducted:

a. **Only in designated areas.**
b. **Above an altitude of 30,000'.**

EXCEPTION: When an aircraft is over water and more than 30 miles from any inhabited land area.

AEROBATIC FLIGHT

Aerobatic flight is an intentional maneuver involving an abrupt change of an aircraft attitude greater than:

a. **45 degrees angle-of-pitch; or,**
b. **60 degrees angle-of-bank; or,**
c. **2.0 g's acceleration.**

NOTE

The airport traffic pattern "Break" maneuver is not Aerobatic Flight. It is an authorized NATOPS maneuver.

Restrictions to Aerobatic Flight:

1. **It must be conducted in VMC with at least 3 miles visibility.**
2. **Minimum altitude is 1500' above the highest obstruction and cloud tops within 5 miles.**

Aerobatic Flight is not allowed:

a. **If prohibited by the appropriate aircraft NATOPS Operating Manual.**
b. **Over congested areas.**
c. **Within controlled airports.**
d. **Over open air assemblies.**
e. **On Federal Airways.**

VISION RESTRICTING DEVICE

At some time during his flying career, a pilot may find it necessary to practice instrument flight by using an instrument hood or other type of vision restricting device. OPNAV states that in an aircraft with only one pilot, a vision restricting device may not be used below 1000' AGL except on Precision Radar (PAR) Approaches, where a device can be used down to 500' AGL. At all times when a vision restricting device is being used, there must be a chase aircraft to watch for other traffic and ensure general flight safety.

LANDINGS

A pilot will log a landing each time the aircraft returns to the deck:

a. Bolter; or,
b. Touch-and go; or,
c. Full stop.

AVOIDANCE CRITERIA AND RESTRICTIONS

FISH AND WILDLIFE

The firing at fish and wildlife is prohibited.

WILDLIFE HABITATS

Designated wildlife habitats, conservation areas, designated nesting areas, wildlife reserves, etc. shall be avoided by at least 3000'.

COMMERCIAL AIR CARRIERS

Avoidance of air carriers is the most critical of all avoidance criteria. Except when operating in terminal areas, commercial air carriers shall be avoided by at least 500' vertically (a VFR aircraft-IFR aircraft separation situation) or one (1) mile laterally. Pilots should not make any abrupt, erratic, or aerobatic maneuvers in the vicinity of air carriers.

NOISE SENSITIVE AREAS

Noise sensitive areas shall be avoided by at least 3000'. These include:

a. Fur and poultry farms.
b. Breeding farms.
c. Designated national seashores.
d. Resort areas.
e. National monuments.

RESTRICTIONS AND RESPONSIBILITIES

FUEL DUMPING

As a general rule, fuel dumping should not be performed below 6000' AGL for evaporation purposes. Should weather conditions or an emergency situation dictate dumping at a lower altitude, every effort should be made to avoid populated areas.

JETTISONING EXTERNAL STORES

The jettisoning of external stores and ordnance is confined to the high seas or Restricted Areas where an area commander is responsible for safety. During emergency jettisoning, the pilot is directly responsible for his actions and every effort should be made to avoid populated areas.

BLOOD DONATIONS

Pilots will not be regular blood doners, donate within four (4) weeks of shipboard flight operations, or donate within four (4) days of local flight operations. Should a situation arise which dictates you donate blood and you are scheduled for flight operations, you should consult with a Flight Surgeon.

ILLICIT/HALLUCINATING DRUGS

The use of illicit and/or hallucinating drugs is prohibited. Over-the-counter drugs are prohibited unless approved by a Flight Surgeon. You will be flying high performance aircraft in unusual maneuvers and using oxygen. Not being medically trained, you have no conception of what affect any drug may have on your body. For your own protection, you should not take any kind of prescription or non-prescription drug and conduct flight operations without first consulting a Flight Surgeon.

ALCOHOLIC BEVERAGES

The use of alcoholic beverages within twelve (12) hours of assuming preflight duties is prohibited. FAR Part 91 specifies eight (8) hours, but OPNAV is more stringent. It is responsibility of the pilot to ensure he is free from all hangover effects before assuming preflight duties.

INOCULATIONS AND DENTAL DRUGS

As a general rule, flight personnel should be grounded for twelve (12) hours following inoculations and twenty-four (24) hours for an injectable dental drug. Should you be attended by a civilian doctor or dentist and are scheduled for flight operations, you should consult a Flight Surgeon.

UNAUTHORIZED LANDING FIELDS

Naval jet aircraft engaged in training or itinerent flight are prohibited from landing at civil airports. There are, however, exceptions to this rule. Civil airports can be used:

1. If the airport has a military tenant activity which operates aircraft, such as the Air National Guard, Air Reserve Units, etc.
2. As weather alternates on military flight plans.
3. For conducting Official Business at or near the airport.
4. For the procurement, acceptance, modification, test, or delivery of aircraft, such as a maintenance facility or manufacturing delivery point.
5. To conduct low approach training, no landing intended, with Approach Control approval.
6. To accomplish an assigned mission provided prior coordination has been affected with airport authorities. If the airport is not listed as a "P" field in the Supplement, however, the airport may charge landing and/or service fees.

LOCAL FLYING AREA

The Local Flying Area is an area designated by the Commanding Officer not to exceed 350 NM from a facility. These areas will be posted in the local Base Operations flight planning room. If flying from an Air Station which requires flight plans, just enter the word "LOCAL" in the ROUTE-OF-FLIGHT Section of the flight plan indicating you will remain within the Local Flying Area.

FLIGHT TIME

For record purposes, a flight begins with takeoff roll and terminates when:

a. The engines are secured; or,
b. The aircraft has been on the deck for five (5) minutes; or,
c. A change is made in pilot-in-command.

Always make a note of the takeoff time for three basic purposes:

1. Computing an ETA in event of radio failure while enroute.
2. Computing ETAs for position reporting if necesary.
3. Completing the necessary logs and records after a flight.

NIGHT TIME

"Night Time" is that time measured from official sunset to official sunrise on the ground below.

LIGHTING

POSITION LIGHTS

Aircraft will display Position Lights:

1. From 30 minutes prior to sunset to 30 minutes after sunrise.
2. Any time the engines are turning at night.
3. Whenever the aircraft is parked at night so as to create a ground collision hazard.
4. Whenever the inflight visibility is less than basic VMC of 3 miles.

ANTI-COLLISION LIGHTS

Naval aircraft will display Anti-Collision Lights any time the engines are turning; however, they may be turned off if pilot visibility is restricted.

SINGLE-PILOTED AIRCRAFT

A single-piloted aircraft is any aircraft which has:

a. Only one set of flight controls; or,
b. Two sets of flight controls, but being operated by only one designated pilot who is NATOPS qualified in model.

NOTE

A T2C aircraft occupied by a student pilot and a designated instructor pilot will always be single-piloted.

EXCEPTION: An aircraft with only one set of flight controls, equipped with side-by-side seating, and manned with a NATOPS instrument rated NFO to assist the pilot is classified as a multi-piloted aircraft for purposes of receiving approach clearances.

MULTI-PILOTED AIRCRAFT

A multi-piloted aircraft is any aircraft which has two sets of flilght controls and instruments and is manned by two designated pilots who are both NATOPS qualified in model.

NOTE

A T2C aircraft occupied by two designated instructor pilots, both NATOPS qualified in model, is a multi-piloted aircraft. For planning purposes, however, it will always have the status of a single-piloted aircraft since it is equipped with only one radio. Radar minimums cannot be used to select an alternate.

RECOMMENDED MAXIMUM FLIGHT TIME

The recommended maximum flight time table in OPNAVINST 3710.7 is a guideline for Commanding Officers in the interest of safety. This table may of necessity be varied due to squadron mission and squadron efficiency, but should not be varied without good cause.

SINGLE-PILOTED AIRCRAFT

a. Daily:
6.5 hours pilot time, but a maximum of 3 flights.
b. Weekly:
30 pilot hours.
c. Monthly:
65 pilot hours.

DESIGNATION AS PILOT-IN-COMMAND
(NO NATOPS GUIDANCE)

If NATOPS guidance is not available for a praticular model aircraft, a pilot may not be designated as Pilot-In-Command unless the following currency requirements are satisfied:

1. **Two (2) takeoffs and landings within the last ninety (90) days;**
2. **At least five (5) hours in model within the last ninety (90) days; and,**
3. **A total of ten (10) hours first pilot flight time in that model aircraft.**

MINIMUM ANNUAL FLYING HOUR REQUIREMENTS

An operational aviator must satisfy the OPNAV minimum annual flying hour requirements. Only the CNO or the Commandant of the Marine Corps can waive these requirements. These requirements are pro-rated for the number of months each year that the pilot is assigned to an operational billet involving flying. Every Fiscal Year, an operational aviator must accumulate:

1. **Forty (40) flight hours in each six (6) month period and a total of 100 flight hours for the year;**

2. **Six (6) hours night time in each six (6) month period and a total of twelve (12) hours night time for the year; and,**

3. **Six (6) hours instrument time in each six (6) month period and a total of twelve (12) hours instrument time for the year (actual and/or simulated).**

ANNUAL INSTRUMENT RATING
AND
NATOPS QUALIFICATION
RENEWAL REQUIREMENTS

Within every twelve (12) month period, an operational aviator must renew his Instrument Rating and NATOPS qualification. Most squadrons prefer to renew both at the same time. Commanding Officers can grant a ninety (90) day extension if due to deployment and up to a six (6) month extension if renewal was beyond control of the aviator due to hospitalization or temporary removal from flight status. Failure to meet these renewal requirements will result in a Commanding Officer Field Board with recommendations to the CNO or Commandant of the Marine Corps.

Every twelve (12) months, an operational aviator must:

1. **Log twelve (12) instrument approaches (actual and/or simulated) within six (6) months of an instrument flight check - six (6) Precision and six (6) Non-Precision;**

2. **Log eighteen (18) instrument approaches (actual and/or simulated) for the year - twelve (12) Precision and six (6) Non-Precision;**

3. **Attend a formal instrument review course if one is available;**

4. Complete a written instrument examination within sixty (60) days of an instrument flight check; and,

5. Complete an instrument flight check and a NATOPS flight check, which can be combined into one flight check.

Expiration of the Instrument Rating will be dated to expire on the last day of the renewal month plus one year.

FLIGHT SIMULATOR SUBSTITUTION

If an appropriately configured and approved flight simulator is available, an operational aviator may substitute:

a. Fifty (50) percent of annual fllight hour requirements (50 hours);

b. Fifty (50) percent of annual instrument time requirements (6 hours);

c. Fifty (50) percent of annual instrument approach requirements (9 approaches); and,

d. If approved locally, perform the instrument and NATOPS flight checks in the simulator.

OPNAV specifies that:

a. All night time requirements must be in an aircraft; and,
b. Fifty (50) percent of the flight time that is actually performed in an aircraft must be First Pilot Time. Therefore, every year an operational aviator must have at least twenty-five (25) hours First Pilot Time, since the minimum flight time in an aircraft is fifty (50) hours.

FLIGHT RULE VIOLATIONS

Navy Regulations and OPNAVINST 3710.7 requires that any alleged violation of a flying rule must be thoroughly investigated by the Commanding Officer, using JAG guidelines, and pilot fault assigned prior to any entry being noted in the aviators flight records. Investigation results of an alleged violation and Commanding Officer recommendations will be forwarded to CNO for final determination. Sole authority to issue a flight violation to a Naval Aviator rests with the CNO. In the case of an International Student, issuance of a violation must be approved by the appropriate Embassy.

FLAG/GENERAL OFFICER AUTHORITY

A pilot-in-command with a Flag or General Officer aboard the aircraft who is eligible for command at sea or in the field is subject to the orders of that officer. When that officer exercises his authority command of an aircraft, he assumes full responsibility for the safe and orderly conduct of the flight. He should not, however, disregard the judgment of the pilot-in-command and cannot physically fly the aircraft unless NATOPS qualified in model. Any alleged violations of flying rules will be directed to that Flag or General Officer.

NOTE

For a Flag or General Officer to issue orders to a pilot-in-command or assume command of an aircraft, he must be a Line Officer, that is, not of the Staff Corps. All Marine Corps officers are Line Officers.

FORMATION FLIGHT

For a formation flight, the formation leader will execute one flight plan for the flight and ensure that:

a. **All formation members are thoroughly briefed on the mission requirements and pertinent information concerning the flight, such as weather conditions, NOTAMs in effect , etc;**
b. **Each member understands his responsibilities within the formation;**
c. **Each member holds a valid instrument rating if required;**
d. **Adequate publications for completion of the mission are aboard each aircraft; and,**
e. **Formation integrity is maintained inflight.**

A standard formation will be controlled as a single aircraft by ATC unless the formation leader requests otherwise. In a "Standard Formation", all members will remain within 100' vertically and within one mile of the formation leader.

FLIGHT PLANNING PROBLEM ONE

ENABLING OBJECTIVE: Demonstrate the ability to apply knowledge learned from the Instrument Ground Training Course in planning an IFR cross-country flight.

SPECIFIC OBJECTIVES:

15.1 Demonstrate ability to plan an IFR flight by:

a. Completing a workable Jet Flight Log based on a practical problem in air navigation.

b. Accurately completing a Military Flight Plan (DD Form 175) based on a practical problem in air navigation.

15.2 Realize the necessity and importance of having a working knowledge of instrument flight rules and procedures and of FLIP Publications for the successful planning and completion of an IFR flight.

INTRODUCTION

This is the first of two flight planning problems provided for this course. These problems will aid you in applying the material you have learned to the actual planning of a flight. They serve as a review of the course, and if you spend a reasonable amount of time working and studying them, the material in this course should fall into place. Although no new material is presented, do not skim over these problems. They are a vital part of the course and a working knowledge of flight planning is essential for the remainder of your flight training syllabus. Practice Problem 1 will take you through the preflight, departure, enroute and arrival phases of a typical IFR cross-country flight. Practice Problem 2 will provide only the basic data needed to plan for a typical IFR cross-country flight.

PROBLEM

Plan a one-leg IFR flight from NAS MERIDIAN, MS to NAS KINGSVILLE, TX using the information provided.

ETD:	**0700 CST, 6 JANUARY**	**ROUTE:**	**REQUEST RADAR DEPARTURE TO MERIDIAN J22 CORPUS CHRISTI DIRECT NAS KINGSVILLE IAF**
AIRCRAFT:	**T2C, BUNO 152443 TD CODE "P" CALL SIGN 1A901 ASSIGNED VT-19/NMM**	**REMARKS:**	**REQUEST SERVICING AT NAS KINGSVILLE**
PIC:	**YOURSELF ASSIGNED VT-19/NMM**		

PRELIMINARY WEATHER BRIEFING

You have determined your destination will be NAS KINGSVILLE,TX. Your first step prior to beginning preflight planning is a trip to the Weather Office for a preliminary briefing. It would be pointless to waste your time flight planning for your planned destination only to find that the weather conditions will be unsuitable for flight into that area. As a jet aircraft pilot, there are some particular things you should look for in the Weather Office.

* **Look at the WW plotting board for Severe Weather Warning areas. This board is normally located just inside the office entrance.**

* **Take a look at the posted facsimile charts:**

  Surface Weather Depiction Chart - To determine the areas of IFR (colored in red) and marginal VFR (colored in blue) weather conditions. This will be helpful in determining a direction to fly for emergency airports if the need arises inflight.

  Radar Summary Chart - For locations of thunderstorm cells and lines of cells in relation to your planned route-of-flight.

  Surface Weather Prognostic Chart - To determine the forecast locations of frontal systems in relation to your planned route-of-flight.

  Significant Weather Prognostic Chart - To locate the forecast areas and altitudes of turbulence in relation to your planned route-of-flight.

* **Obtain the forecast weather conditions for your planned destination, based on estimated time of departure (ETD) and a roughly determined estimated time enroute (ETE). If it appears that an alternate is required, obtain the forecast weather conditions for suitable airports in your destination area which will be within your range of flight.**

* **Obtain the best flight level to fly, weather permitting, for the most favorable winds aloft along your planned route-of-flight, and the forecast winds and temperatures over each NAVAID at that best flight level. These winds and temperatures the forecaster will take from the Winds Aloft Forecast (FD) and state them for each planned leg of your flight.**

* **Obtain the forecast surface winds for your planned destination and suitable alternate airports in order to plan for the probable runways in use.**

Consult the NOTAM display board in the flight planning area, decide on a suitable alternate, and begin your preflight planning by completing a Jet Flight Log.

Based on forecast weather conditions at NAS KINGSVILLE and at available suitable alternate airports, you determine that an alternate is required and select NAS CORPUS CHRISTI, TX as the best available alternate within your flight range.

REMINDER

PAR minimums, not less than 200 - 1/2, can be used to evaluate destination conditions, but use TACAN minimums plus 300 - 1 to select the alternate due to having only one radio in the T2C.

WEATHER BRIEFING INFORMATION

ALTITUDE: The most favorable winds and weather enroute are at FLIGHT LEVEL 310.

CLIMB WINDS: The training squadrons do not use climb winds in tactical jet type aircraft. Refer to the NATOPS data chart provided in this chapter and read distance, time, and fuel required for climb to leveloff directly from the data chart for the appropriate altitude. Interpolate on the chart for intermediate altitudes.

WINDS ALOFT:

MERIDIAN	to	McCOMB	300 Degrees/40 Knots
McCOMB	to	LAKE CHARLES	300 Degrees/40 Knots
LAKE CHARLES	to	PALACIOS	280 Degrees/30 Knots
PALACIOS	to	CORPUS CHRISTI	280 degrees/30 Knots
CORPUS CHRISTI	to	KINGSVILLE	280 Degrees/30 Knots

NAS KINGSVILLE IAF to NAS CORPUS CHRISTI IAF at KINGSVILLE IAF altitude of 17,000' — 270 Degrees/20 Knots

TERMINAL FORECAST:

NAS KINGSVILLE		NAS CORPUS CHRISTI	
Ceiling	- 800'	Ceiling	- 900'
Visibility	- 2 Miles	Visibility	- 3 Miles
Wind	- 020 Degrees/5 Knots	Wind	- 010 Degrees/5 Knots
Altimeter	- 29.98" ^	Altimeter	- 29.99" ^

PLANNING

Obtain the following materials:

* FLIP Enroute High Altitude Chart H-5
* FLIP (Enroute) IFR Supplement
* FLIP (Enroute) Flight Information Handbook
* Circular Flight Computer

Use the following materials which are provided in this chapter:

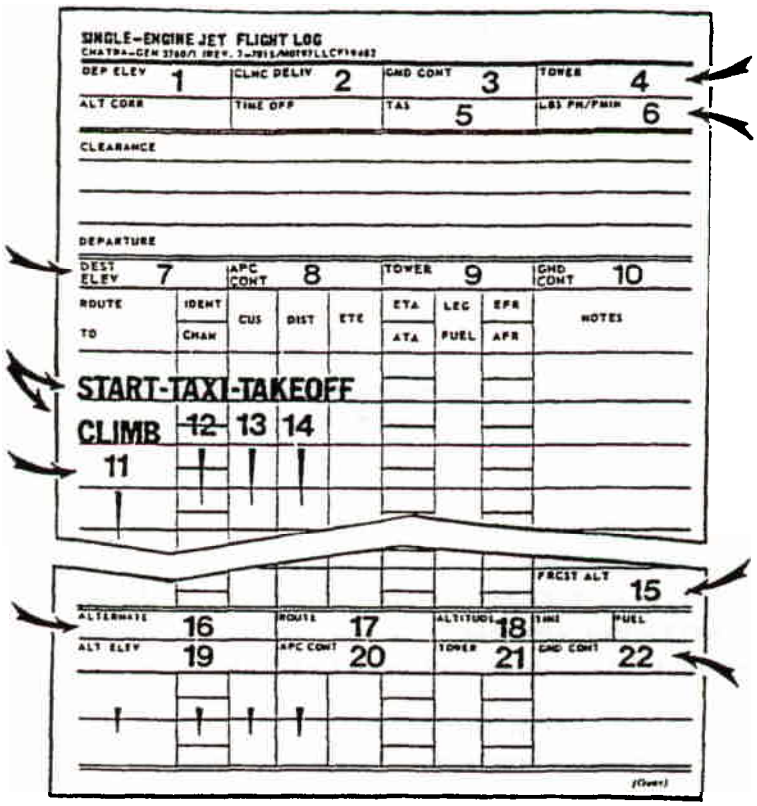
* Blank Jet Flight Logs (Front and Back)
* Blank Military Flight Plan (DD Form 175)
* NAS KINGSVILLE HI-TACAN RWY 35L/R Approach Procedure Chart
* NAS CORPUS CHRISTI HI-TACAN RWY 31L Approach Procedure Chart
* T2C Flight Planning NATOPS Data Chart

NOTE

Always use the Approach Procedure Chart for the probable runway in use based on forecast surface winds at both planned destination and alternate.

15-196 PLANNING PROBLEM ONE

Your first step in flight planning will be to complete the front side of your Jet Flight Log with available information (Items designated 1-22).



1-4 IFR SUPPLEMENT

5-6 T2C DATA CHART

7-10 IFR SUPPLEMENT

START-TAXI-TAKEOFF & CLIMB FROM T2C DATA CHART

11-14 ENROUTE CHART

16-18 DECISION FROM WX BRIEF AT CRUISE FL

15 WX BRIEF

19-22 IFR SUPPLEMENT

NOTE

Course and distance from the NAS KINGSVILLE IAF to the NAS CORPUS CHRISTI IAF is best determined by selecting a "common" facility from the Instrument Approach Procedure Charts, such as BROWNSVILLE or LAREDO in this problem, and using the POINT-TO-POINT method of navigation on the Wind Side of the circular computer. CAUTION! CORPUS CHRISTI VORTAC and NAVY CORPUS CHRISTI TACAN are not synonymous.

Your second step will be to determine the Estimated Time Enroute (ETE), leg fuel, and Estimated Fuel Remaining (EFR) for each leg of flight to destination and alternate. For this step, you will use the following:

* **T2C NATOPS Flight Planning Data Chart (Interpolate for FL 310).**
* **Forecast Winds Aloft (From preliminary weather briefing).**
* **Circular Computer.**

REMINDER

When computing Groundspeed for each leg to determine time and fuel required, use Magnetic Variation depicted on the Enroute Chart for each leg of flight. As you fly farther East or West, this factor becomes more significant.

T2C NATOPS FLIGHT PLANNING DATA

Flight planning data is reproduced from the T2C Flight Training Instructions (FTIs) and NATOPS Flight Manual. It is to be used in completing your Jet Flight Log and Military Flight Plan (DD Form 175). NATOPS Climb Data has been adjusted to reflect a maximum climb IAS of 250 knots below 10,000' in the United States.

NOTE

T2C Planning Data for this problem and for Planning Problem Two is based on the use of JP5 fuel and Standard Day conditions.

FULL FUEL LOAD JP5	4699 lbs
(FULL FUEL LOAD JP4	4492 lbs)
START/TAXI/TAKEOFF	375 lbs
PENETRATION/APPROACH	300 lbs
RESERVE (20 min at max endurance for 10,000'	600 lbs

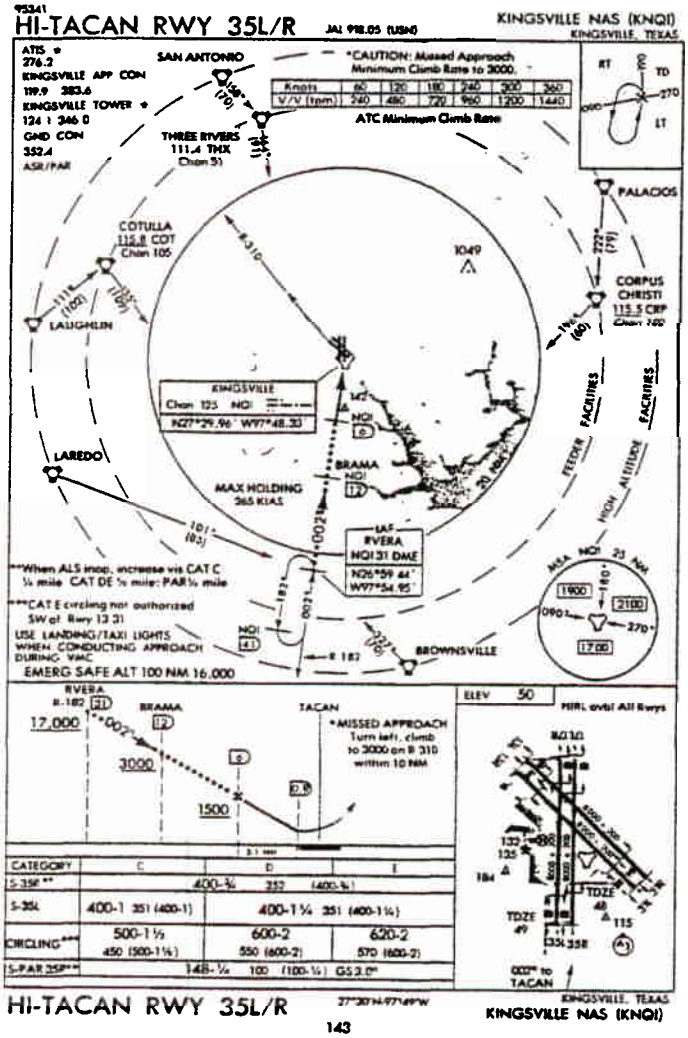
NO-WIND CLIMB DATA

*ALTITUDE	DISTANCE	TIME	FUEL
10,000'	10 nm	3.0 min	275 lbs
15,000'	16 nm	3.5 min	375 lbs
20,000'	23 nm	4.0 min	450 lbs
25,000'	33 nm	6.0 min	525 lbs
30,000'	44 nm	8.0 min	600 lbs
35,000'	61 nm	11.0 min	675 lbs
37,000'	68 nm	14.0 min	725 lbs

CRUISE DATA

*ALTITUDE	TAS	FUEL FLOW
10,000'	280 K	2000 PPH
15,000'	290 K	1800 PPH
20,000'	295 K	1625 PPH
25,000'	312 K	1425 PPH
30,000'	324 K	1360 PPH
35,000'	345 K	1300 PPH
37,000'	350 K	1300 PPH

*Interpolate for other altitudes



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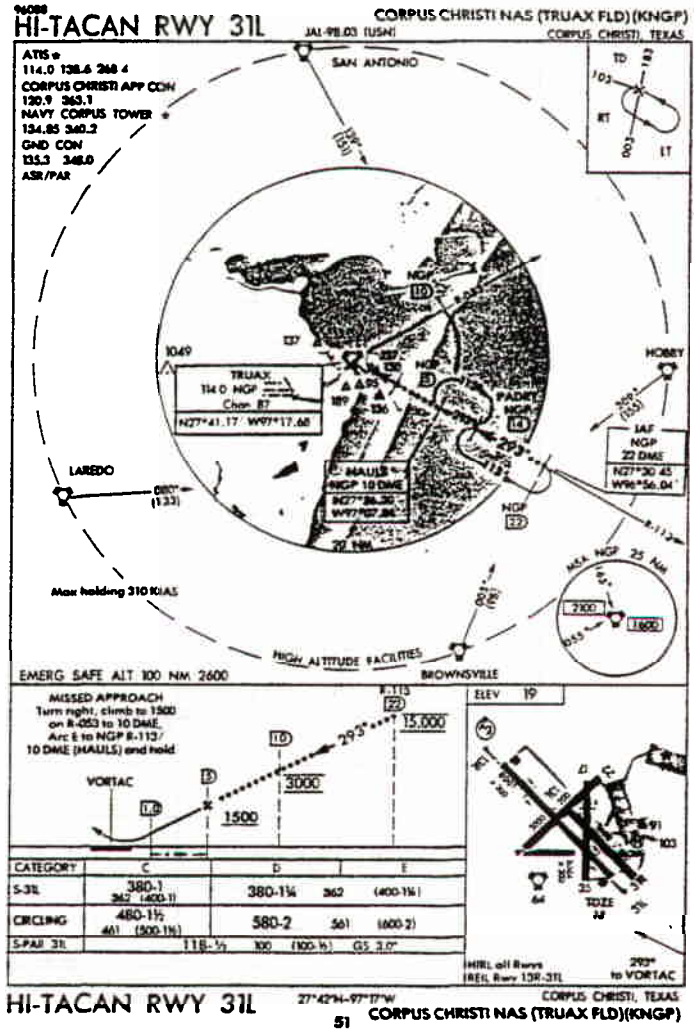
NAS KINGSVILLE
HI-TACAN RWY 35L/R



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NAS CORPUS CHRISTI
HI-TACAN RWY 31L

15-199 PLANNING PROBLEM ONE

SINGLE-ENGINE JET FLIGHT LOG
CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482

DEP ELEV	CLNC DELIV	GND CONT	TOWER
ALT CORR	TIME OFF	TAS	LBS PH/PMIN

CLEARANCE

DEPARTURE

DEST ELEV		APC CONT			TOWER			GND CONT
ROUTE	IDENT	CUS	DIST	ETE	ETA	LEG	EFR	NOTES
TO	CHAN				ATA	FUEL	AFR	
								FRCST ALT

ALTERNATE	ROUTE	ALTITUDE	TIME	FUEL
ALT ELEV	APC CONT	TOWER	GND CONT	

(Over)

Your third step will be to complete the FUEL PLAN on the back side of the Jet Flight Log.

FUEL PLAN

1. CLIMB/ROUTE DEST IAF		6. START/TAXI	
2. ROUTE ALT IAF (If required)		7. TOTAL REQUIRED (4, 5 & 6)	
3. APPROACHES		8. TOTAL ABOARD	
4. TOTAL (1, 2 & 3)		9. SPARE FUEL (8-7)	
5. RES 10% of 4 (Min 20 mins)			

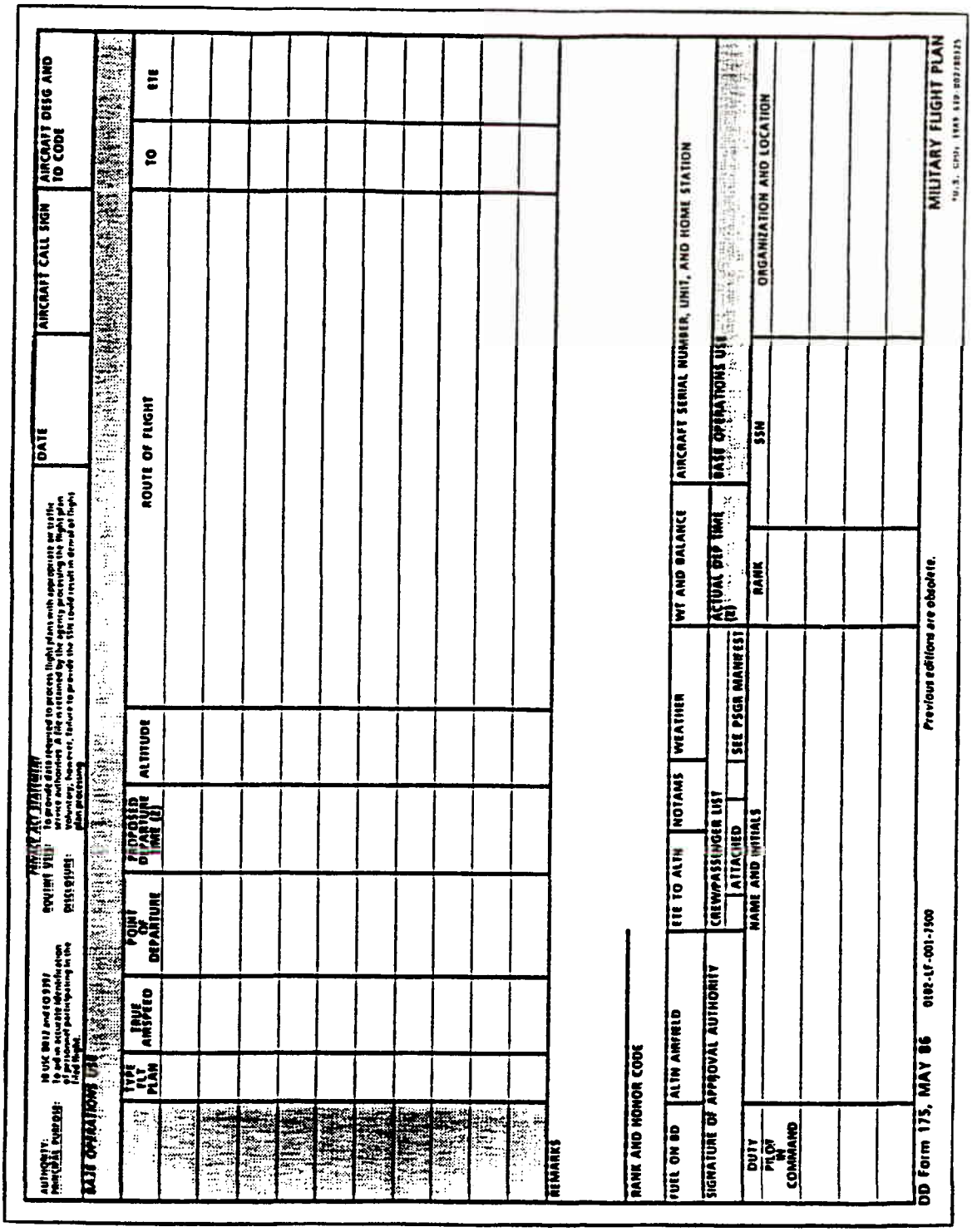
EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT		+		+		=	
INITIAL APP ALT		+		+		=	
EMER SAFE ALT		+		+		=	

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH			
LIGHTING			ID
FUEL/JASU/LOX			CH
UHF/ADF			PAGE NO.
UHF/DF			
RAPCON			
PAR MINS			
TAC MINS			
ARR GEAR			
PUBS			
NOTAMS			
FUEL PACKET			
FLASHLIGHT WALLET, ETC.			

CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482(BACK)

Your fourth step will be to complete a Military Flight Plan (DD Form 175) by using the information from your completed Jet Flight Log.



After completing your Jet Flight Log and Military Flight Plan, you should proceed to the Weather Office for a formal weather briefing. The forecaster will complete a Flight Weather Briefing (DD Form 175-1), conduct a formal briefing from that form, and give you a copy. Insert the Weather Briefing Number onto your Military Flight Plan.

You should now proceed to the Flight Clearance Desk at the Base Operations Building, file your flight plan, and retain a copy. Your flight plan should be filed at least 30 minutes prior to planned departure time. This is adequate time for your flight plan to be processed by ATC and your flight worked into the traffic system.

Prior to every IFR flight outside the local training aarea, you should have three documents in your possession:

* A copy of the Military Flight Plan (DD Form 175).
* A copy of the Flight Weather Briefing (DD Form 175-1).
* A completed Jet Flight Log.

FLIGHT PROCEDURES

DEPARTURE

After preflight of your aircraft and before starting engines, you should copy the ATIS broadcast and call CLEARANCE DELIVERY for your ATC clearance.

EXAMPLE:

"McCAIN CLEARANCE DELIVERY, NAVY ONE ALFA NINER ZERO ONE, VT NINETEEN RAMP, IFR NAVY KINGSVILLE."

"NAVY ONE ALFA NINER ZERO ONE IS CLEARED TO THE NAVY KINGSVILLE AIRPORT AS FILED, MAINTAIN FLIGHT LEVEL THREE ONE ZERO. DEPARTURE CONTROL FREQUENCY THREE FOUR THREE POINT SEVEN. SQUAWK MODE THREE CODE TWO ONE ZERO ZERO PRIOR TO DEPARTURE."

"Cleared as filed" is only for the route. A SID, if assigned, the SID transition point, and the altitude to maintain must be specifically stated separately in a clearance.

There is no ATC requirement for the spontaneous readback of any clearance; however, OPNAV requires a readback if the clearance received differs from that filed by the pilot.

The issuance of departure instructions will vary according to local procedures. They may come from Clearance Delivery, Ground Control, Tower, or Departure Control. Just ensure you have complete departure instructions prior to takeoff.

When ready for taxi, call GROUND CONTROL for taxi clearance and instructions.

EXAMPLE:

"McCAIN GROUND CONTROL, NAVY ONE ALFA NINER ZERO ONE, VT NINETEEN RAMP, TAXI IFR NAVY KINGSVILLE, HAVE INFORMATION BRAVO."

"NAVY ONE ALFA NINER ZERO ONE, TAXI TO RUNWAY ONE RIGHT, HOLD SHORT OF RUNWAY ONE RIGHT AND CONTACT McCAIN TOWER FOR DEPARTURE INSTRUCTIONS."

"NAVY ONE ALFA NINER ZERO ONE, ROGER, HOLD SHORT OF RUNWAY ONE RIGHT."

OPNAV requires "HOLD SHORT" and "POSITION AND HOLD" instructions be read back, not just acknowledged.

As you approach the warm-up/hold short area of the active runway, you should check your TACAN equipment with the posted signs which depict a TACAN Channel, Radial, and DME. Ensure your TACAN equipment is within operational limits of +/- 4 degrees and within 1/2 mile, or 3 percent of the distance whichever is greater, of the posted Radial and DME.

When ready for departure, contact the Control Tower. Never taxi onto or across an assigned runway without specific Tower approval.

EXAMPLE:

"McCAIN TOWER, NAVY ONE ALFA NINER ZERO ONE, READY FOR IFR DEPARTURE."

"NAVY ONE ALFA NINER ZERO ONE, DEPARTURE INSTRUCTIONS: AFTER DEPARTURE, MAINTAIN RUNWAY HEADING UNTIL TWO THOUSAND FEET, RIGHT TURN, DIRECT MERIDIAN. WIND THREE SIX ZERO AT FIVE KNOTS, CHANGE TO ASSIGNED DEPARTURE CONTROL FREQUENCY, MONITOR GUARD, CLEARED FOR TAKEOFF."

"NAVY ONE ALFA NINER ZERO ONE, ROGER."

You should now set in the TACAN Channel you will use for departure, not to exceed 40 NM for "Direct" flight. To comply with departure instructions for this flight, you could use MERIDIAN VORTAC (MEI, Channel 117). Switch your Transponder to "NORMAL", change to assigned Departure Control frequency, note the takeoff time on your Jet Flight Log, taxi onto the runway and make your departure.

You are airborne at 1305Z and contact Departure control.

EXAMPLE:

"MERIDIAN DEPARTURE CONTROL, NAVY ONE ALFA NINER ZERO ONE, TWO THOUSAND FEET, CLIMBING TO MAINTAIN FLIGHT LEVEL THREE ONE ZERO."

"NAVY ONE ALFA NINER ZERO ONE, RADAR CONTACT, REPORT PASSING EIGHT THOUSAND."

"NAVY ONE ALFA NINER ZERO ONE, WILCO."

At some point or altitude after departure, Departure Control will transfer control of your aircraft to an Air Route Traffic Control Center for the enroute portion of your IFR flight.

EXAMPLE:

"MERIDIAN DEPARTURE CONTROL, NAVY ONE ALFA NINER ZERO ONE, PASSING EIGHT THOUSAND."

"NAVY ONE ALFA NINER ZERO ONE ROGER, CONTACT MEMPHIS CENTER TWO EIGHT FIVE POINT FOUR."

"NAVY ONE ALFA NINER ZERO ONE ROGER, MEMPHIS CENTER TWO EIGHT FIVE POINT FOUR."

"MEMPHIS CENTER, NAVY ONE ALFA NINER ZERO ONE, PASSING ONE ONE THOUSAND FEET, CLIMBING TO MAINTAIN FLIGHT LEVEL THREE ONE ZERO."

"NAVY ONE ALFA NINER ZERO ONE, MEMPHIS CENTER ROGER, RADAR CONTACT."

If unable to contact Memphis Center on assigned frequency, you should first attempt to recontact your transferring controller.

Passing 18,000', you should set your altimeter to 29.92".

ENROUTE

Two things you should do when passing one of the preplanned fixes is to note the actual time of arrival (ATA) and the actual fuel remaining (AFR). These items can be noted on your Jet Flight Log to aid you in making decisions as to how well the flight is progressing in relatioon to preplanned time and fuel. If one or both of these items differ considerably from estimated values of time and fuel, ETA/EFR, thought should be given as to the cause and possibly as to selecting a new destination.

You will be making three basic types of voice reports during the enroute phase of flight:

1. Initial contact reports as you proceed from sector to sector wihtin an ARTCC area and from ARTCC to ARTCC areas of responsibility.
2. Position reports in the event radar contact cannot be maintained by ARTCC (a very seldom occurence within the United States).
3. Additional reports, such as PIREPs, leaving assigned altitude, changing airspeeds, etc.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, CONTACT HOUSTON CENTER THREE SIX ZERO POINT SEVEN."

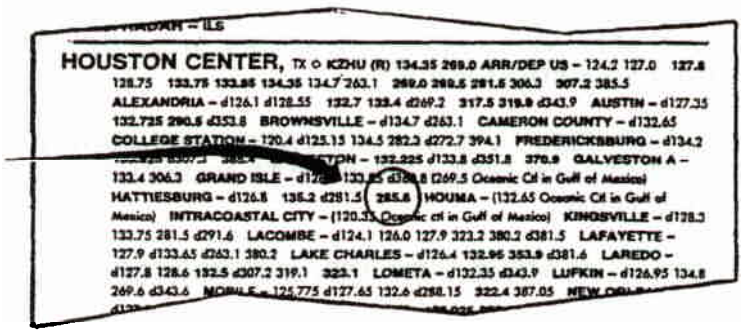
You have been in radar contact by Memphis Center; therefore, you assume you are still in radar contact and just give Identification and Altitude to your new controller. It is a verification process, that is, you are on his frequency and verifying your altitude.

EXAMPLE:

"HOUSTON CENTER, NAVY ONE ALFA NINER ZERO ONE, LEVEL FLIGHT LEVEL THREE ONE ZERO."

If unable to contact Houston Center on assigned frequency and unable to recontact your transferring Memphis Center controller, you should obtain the Houston Center sector controller frequency from the IFR Supplement.

BOLD PRINT FOR NEAREST LOCATION: CITY, AIRPORT, or NAVAID


HOUSTON CENTER, TX ○ KZHU (R) 134.35 269.0 ARR/DEP US – 124.2 127.0 127.8 128.75 133.75 133.85 134.35 134.7 263.1 269.0 269.5 281.5 306.3 307.2 385.5 ALEXANDRIA – d126.1 d128.55 132.7 133.4 d269.2 317.5 319.9 d343.9 AUSTIN – d127.35 132.725 290.5 d353.8 BROWNSVILLE – d134.7 d263.1 CAMERON COUNTY – d132.65 COLLEGE STATION – 120.4 d125.15 134.5 282.3 d272.7 394.1 FREDERICKSBURG – d134.2 [illegible] – 132.225 d133.8 d351.8 370.9 GALVESTON A – 133.4 306.3 GRAND ISLE – d12[illegible] d269.5 Oceanic Ctl in Gulf of Mexico) HATTIESBURG – d126.8 135.2 d281.5 285.6 HOUMA – (132.65 Oceanic Ctl in Gulf of Mexico) INTRACOASTAL CITY – (120.[illegible] Oceanic ctl in Gulf of Mexico) KINGSVILLE – d128.3 133.75 281.5 d291.6 LACOMBE – d124.1 126.0 127.9 323.2 380.2 d381.5 LAFAYETTE – 127.9 d133.65 d263.1 380.2 LAKE CHARLES – d126.4 132.95 353.9 d381.6 LAREDO – d127.8 128.6 132.5 d307.2 319.1 323.1 LOMETA – d132.35 d343.9 LUFKIN – d126.95 134.8 269.6 d343.6 MOBILE – 125.775 d127.65 132.6 d258.15 322.4 387.05 NEW ORL[illegible]

When calling Center on this sector frequency, state the frequency to alert the controller you are not on assigned frequency and the frequency on which he should reply.

EXAMPLE:

"HOUSTON CENTER, NAVY ONE ALFA NINER ZERO ONE ON TWO EIGHT FIVE POINT SIX, LEVEL FLIGHT LEVEL THREE ONE ZERO."

As you proceed enroute,:

* Keep ATC advised of any malfunction of communications, navigation, or transponder equipment.
* Do not leave assigned altitude without permission.
* Do not deviate from the cleared route without permission.
* Do not leave an assigned frequency without permission.

Since your terminal area is forecast to be marginal at your ETA, you should keep abreast of possible changes in these weather conditions while you are enroute. You could wait and tune in the Kingsville ATIS broadcast, or you could contact a METRO facility before arriving in your terminal area. This would allow you to make a decision whether to continue as planned or divert to another airport. You can determine the nearest METRO by referencing the METRO Facility Map in the Flight Information Handbook.

Before making a frequency change, however, obtain Center approval to leave assigned frequency.

EXAMPLE:

"HOUSTON CENTER, NAVY ONE ALFA NINER ZERO ONE, REQUEST TO LEAVE YOUR FREQUENCY TO CONTACT METRO."

"NAVY ONE ALFA NINER ZERO ONE, REQUEST APPROVED, REPORT BACK ON THIS FREQUENCY."

"NAVY ONE ALFA NINER ZERO ONE, WILCO."

When you arrive in the vicinity of your terminal area, ARTCC will transfer control of your aircraft to the appropriate Approach Control Facility at some point and/or altitude. If time permits, use your AUX RECEIVER to copy the ATIS braodcast (subtract 64 from the middle two digits of the ATIS frequency for your preset AUX RECEIVER channel).

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE, DESCEND TO AND MAINTAIN ONE SEVEN THOUSAND, CONTACT KINGSVILLE APPROACH CONTROL THREE EIGHT THREE POINT SIX."

"NAVY ONE ALFA NINER ZERO ONE, LEAVING FLIGHT LEVEL THREE ONE ZERO FOR ONE SEVEN THOUSAND."

ARRIVAL

Normally, Approach Control will terminate your IFR flight by method of an enroute descent to feed your aircraft into the traffic flow at a lower altitude. It may be an enroute descent with vectors to the TACAN final approach course, Final Approach Fix, to a Visual Approach, or to a Precision Radar final approach course. You can request any type of approach for which your aircraft is equipped.

EXAMPLE:

"KINGSVILLE APPROACH CONTROL, NAVY ONE ALFA NINER ZERO ONE, LEVEL ONE SEVEN THOUSAND, REQUESTING A HIGH TACAN APPROACH NAVY KINGSVILLE, HAVE INFORMATION DELTA."

"NAVY ONE ALFA NINER ZERO ONE, KINGSVILLE APPROACH CONTROL, RADAR CONTACT TEN DME NORTHEAST CORPUS CHRISTI VORTAC. FLY HEADING TWO ZERO FIVE FOR RADAR VECTORS TO RIVIERA INITIAL APPROACH FIX, MAINTAIN ONE SEVEN THOUSAND, SQUAWK ONE ONE ZERO ZERO. EXPECT A HIGH TACAN RUNWAY THREE FIVE RIGHT APPROACH. KINGSVILLE ALTIMETER TWO NINER NINER NINER."

ATC requires a readback of all vector headings, altitude assignments, and altimeter settings.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE ROGER, HEADING TWO ZERO FIVE, MAINTAINING ONE SEVEN THOUSAND, ALTIMETER TWO NINER NINER NINER."

When cleared "Direct" or being vectored to the Initial Approach Fix, you will normally be assigned an altitude to maintain which is close to the published IAF altitude. At some point prior to reaching the IAF, Approach Control will either issue holding instructions or an approach clearance.

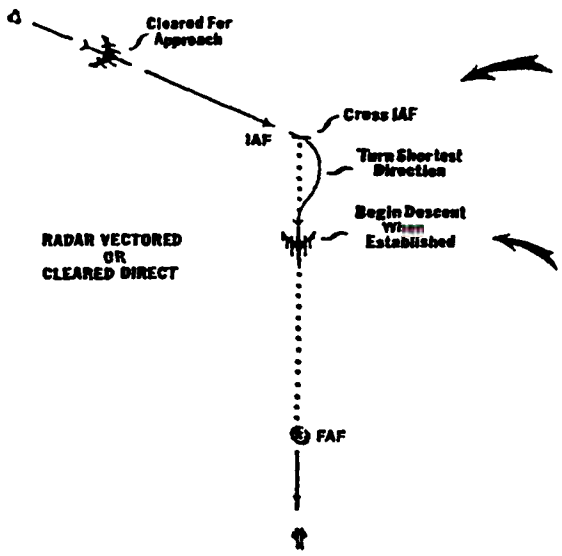
EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE CLEARED FOR THE HIGH TACAN RUNWAY THREE FIVE RIGHT APPROACH TO NAVY KINGSVILL AIRPORT."

"NAVY ONE ALFA NINER ZERO ONE, ROGER."

Once cleared for an approach procedure, you are expected to follow the profile restrictions on the Approach Procedure Chart; therefore, ATC requires a report when you leave assigned altitude at the IAF (the NATOPS Instrument Flight Manual, not ATC, requires you also report the IAF). You cannot, however, leave assigned altitude until established on a segment of the Instrument Approach Procedure. If approaching the IAF at an adverse angle, you can always request an off-set entry or a turn in holding for alignment; otherwise, cross the IAF and turn in the shortest direction toward the Approach Procedure.

EXAMPLE:



"KINGSVILLE APPROACH CONTROL, NAVY ONE ALFA NINER ZERO ONE RIVIERA, COMMENCING APPROACH."

"KINGSVILLE APPROACH CONTROL, NAVY ONE ALFA NINER ZERO ONE LEAVING ONE SEVEN THOUSAND."

Weather permitting, 1500 and 5 or better, Approach Control may turn you over to the Control Tower for landing clearance; otherwise, you will remain on Approach Control frequency and it will relay landing clearance. The controller will remind you that wheels should be down. OPNAV, not ATC, requires a "down and locked" reply.

EXAMPLE:

"NAVY ONE ALFA NINER ZERO ONE REPORT FINAL APPROACH FIX."

"NAVY ONE ALFA NINER ZERO ONE, WILCO."

"KINGSVILLE APPROACH CONTROL, NAVY ONE ALFA NINER ZERO ONE, FINAL APPROACH FIX, GEAR DOWN AND LOCKED."

"NAVY ONE ALFA NINER ZERO ONE CLEARED TO LAND RUNWAY THREE FIVE RIGHT, WIND CALM."

"NAVY ONE ALFA NINER ZERO ONE ROGER, RUNWAY THREE FIVE RIGHT."

It is considered good headwork to repeat back the landing runway, especially where there are parallel runways, to prevent an inadvertent misinterpretation of instructions.

To ensure a proper arrival report will be transmitted and your aircraft accounted, you must verbally confirm closing your flight plan on the ground. You would normally do this through Groound Control.

EXAMPLE:

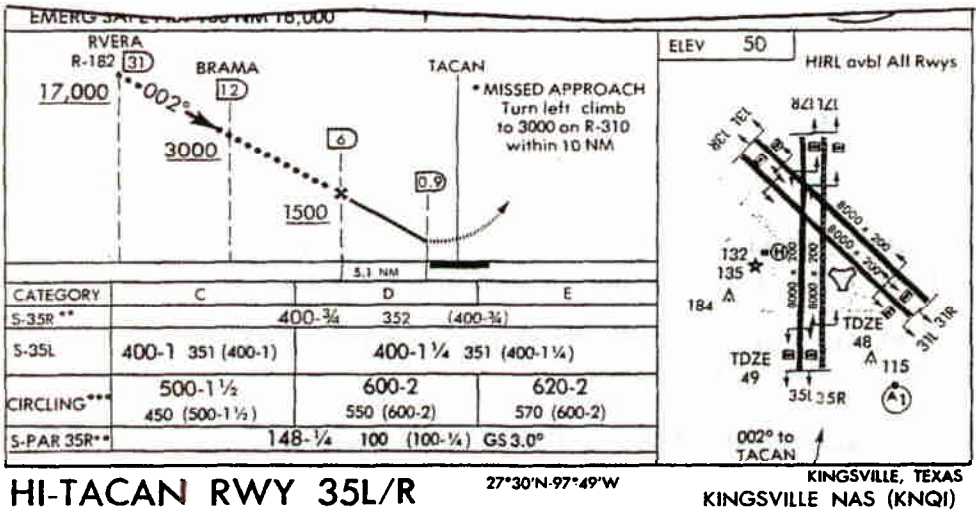
"KINGSVILLE GROUND CONTROL, NAVY ONE ALFA NINER ZERO ONE FOR TAXI TO THE TRANSIENT LINE, AND REQUEST YOU CLOSE MY FLIGHT PLAN."

If convenient, you are encouraged to visit the Weather Office after your flight and give the forecaster a synopsis of your flight, that is, altitude, route, and weather conditions you encountered and observed inflight. This information is used to give a more complete briefing to other pilots.

CONSIDERATION

This problem has been an example of a short, simple, and trouble free flight. You should always conduct a thorough preflight planning, anticipate possible changes in weather conditions inflight, know your emergency procedures, and be prepared to exercise good judgment in all situations.

SINGLE-PILOTED AIRCRAFT MINIMA REVIEW



CATEGORY	C	D	E
S-35R **	400-¾ 352 (400-¾)		
S-35L	400-1 351 (400-1)	400-1¼ 351 (400-1¼)	
CIRCLING***	500-1½ 450 (500-1½)	600-2 550 (600-2)	620-2 570 (600-2)
S-PAR 35R**	148-¼ 100 (100-¼) GS 3.0°		

HI-TACAN RWY 35L/R 27°30'N-97°49'W KINGSVILLE, TEXAS
KINGSVILLE NAS (KNQI)

CLEARANCE:

"HI-TACAN RUNWAY 35 RIGHT APPROACH"

Wx to commence 400 - 3/4
MDA 400' MSL
HAT 352' AGL
TDZE 48' MSL

"HI-TACAN RUNWAY 35 RIGHT APPROACH, CIRCLE TO LAND RUNWAY 17 LEFT"

Wx to commence 500 - 1 1/2
MDA 500' MSL
HAA 450' AGL
Airport Elevation 50' MSL

"EXPECT A PRECISION RADAR RUNWAY 35 RIGHT APPROACH"

Wx to commence 200 - 1/2
DH 248' MSL
HAT 200' AGL
TDZE 48' MSL

REMINDER

Where available at an airport, Runway Visual Range (RVR) takes precedence over Prevailing Visibility (PV) for a straight-in approach.

15-210 PLANNING PROBLEM ONE

COMPLETED JET FLIGHT LOG
AND
MILITARY FLIGHT PLAN

NOTE

For this problem, times have been rounded to the nearest minute and fuels have been rounded to the next highest ten pound increment. Your answers should be approximately the same.

REMINDER

There is no one correct method to complete a Jet Flight Log. Use a method which best suits your needs; however, you should be able to fly any assigned mission by reference only to the Log and be able to make all necessary decisions without any inflight computations.

SINGLE-ENGINE JET FLIGHT LOG
CHATRA-GEN 3760/1 (REV. 7-7815/N0197LLCF19462

DEP ELEV	CLNC DELIV	GND CONT	TOWER
317'	301.0	336.4	340.2L/360.2R
ALT CORR	**TIME OFF**	**TAS**	**LBS PH/PMIN**
N/A	1305Z	328	1348

CLEARANCE

DEPARTURE

DEST ELEV 50'	APC CONT 300.4	TOWER 346.0	GND CONT 352.4

ROUTE / TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	NOTES
START TAXI & TAKEOFF						375	4325	4700 lbs
-D→ MEI	MEI / 117	225	16	4		–		
J22 LEVEL OFF	MEI / 117	225	31	5		615	3710	
J22 MCB	MCB / 114	226 / 242	67	13		300	3410	
J22 LCH	LCH / 81	237 / 238	163	32		720	2690	
J22 PSX	PSX / 120	235 / 222	187	37		840	1850	
J22 CRP	CRP / 102	220 / 196	79	15		340	1510	
-D→ RVERA (NQI182031)	NQI / 125		60	11		250	1260	
TOTALS			603	1+57		3440	1260	ATIS 276.2
(PENETRATION & APPROACH)						300	960	FRCST ALT 29.98"

ALTERNATE	ROUTE	ALTITUDE	TIME	FUEL
NGP	-D→	310	0+11	0+56
ALT ELEV	**APC CONT**	**TOWER**	**GND CONT**	
19'	363.1	340.2	348.0	

-D→ NGP113022	NGP / 87	048	62	11		250	1010	
(PENETRATION & APPROACH)						300	710	ATIS 268.4 FCST ALT 29.99"

(Over)

FUEL PLAN

1. CLIMB/ROUTE DEST IAF	3065	4. START/TAXI	375
2. ROUTE ALT IAF (If required)	250	7. TOTAL REQUIRED (4, 5 & 6)	4590
3. APPROACHES	300	8. TOTAL ABOARD	4700
4. TOTAL (1, 2 & 3)	3615	9. SPARE FUEL (8–7)	110
5. RES 10% of 4 (Min 20 mins)	600		

EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT	250	+	300	+	600	=	1150
17K INITIAL APP ALT	350	+	300	+	600	=	1250
EMER SAFE ALT	(USE SQUADRON DIRECTIVES)					=	

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH			
LIGHTING			ID
FUEL/JASU/LOX			CH
UHF/ADF			PAGE NO.
UHF/DF	(CHECK		
RAPCON	CURRENT		
PAR MINS	IFR		
TAC MINS	SUPPLEMENT		
ARR GEAR	FOR		
PUBS	STATUS)		
NOTAMS			
FUEL PACKET			
FLASHLIGHT, WALLET, ETC.			

CNATRA–GEN 3760/1 (REV. 7–78) S/N0197LLCF19482(BACK)

PRIVACY ACT STATEMENT

AUTHORITY: 10 USC 8013 and EO 9397
PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the filed flight.
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan. Voluntary. However, failure to provide the SSN could result in denial of flight plan processing.
DISCLOSURE:

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
6 JAN 97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	328	NMM	1300	310	MEI J22 CRP RVERA	NQI	1+57

REMARKS
REQUEST RADAR DEPARTURE NQI S

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
2+53	NGP	0+11	✓	01-067	N/A	152443/VT-19/NMM

SIGNATURE OF [illegible] AUTHORITY: J. J. Doe
CREW/PASSENGER LIST: ATTACHED / SEE PSGR MANIFEST
ACTUAL DEP TIME (Z):
BASE OPERATIONS USE:

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	DOE, J.J.	LT	326-77-1126	VT-19/NMM

DD Form 175, MAY 86 [illegible] MILITARY FLIGHT PLAN

There is a specific method for computing Reserve Fuel, but there is no specific method for computing Fuel-On-Board. This will vary according to squadron procedures and type of aircraft.

FOR GROUND SCHOOL PUIRPOSES ONLY

Use cruise fuel flow to determine the time to burn the fuel remaining at destination IAF and add that time to the ETE to destination IAF. In this problem, it would be (1+57) + (0+56) = 2+53

FLIGHT PLANNING PROBLEM TWO

ENABLING OBJECTIVE: Demonstrate the ability to apply knowledge learned from the Instrument Ground Training Course in planning an IFR cross-country flight.

SPECIFIC OBJECTIVES:

16.1 Demonstrate ability to plan an IFR flight by:

a. Completing a workable Jet Flight Log based on a practical problem in air navigation.

b. Accurately completing a Military Flight Plan (DD Form 175) based on a practical problem in air navigation.

16.2 Realize the necessity and importance of having a working knowledge of instrument flight rules and procedures and of FLIP Publications for the successful planning and completion of an IFR flight.

INTRODUCTION

This is the second of two flight planning problems provided for this course. As with Planning Problem One, it will aid you in applying the material you have learned to the actual planning of a flight. You should expend a reasonable amount of time toward working this problem. The problem is a vital part of the course and a working knowledge of flight planning is essential for the remainder of your flight training syllabus.

PROBLEM

Plan a one-leg IFR flight from NAS KINGSVILLE, TX to NAS MERIDIAN, MS using the information provided.

ETD:	**0700 CST 7 JANUARY**	**ROUTE:**	**REQUEST A SID TO PALACIOS** **J22 MERIDIAN** **DIRECT NAS MERIDIAN IAF**
AIRCRAFT:	**T2C, BUNO 152443** **TD CODE "P"** **CALL SIGN 1A901** **ASSIGNED VT-19/NMM**		
PIC:	**YOURSELF** **ASSIGNED VT-19/NMM**		

WEATHER BRIEFING INFORMATION

ALTITUDE: The most favorable winds and weather enroute are at FLIGHT LEVEL 330.

CLIMB WINDS: The training squadrons do not use climb winds in tactical jet type aircraft. Refer to the NATOPS data chart provided in this chapter and read distance, time, and fuel required for climb to leveloff directly from the data chart for the appropriate altitude. Interpolate on the chart for intermediate altitudes.

WINDS ALOFT:

KINGSVILLE	to	PALACIOS	290 Degrees/30 Knots
PALACIOS	to	LAKE CHARLES	290 Degrees/30 Knots
LAKE CHARLES	to	McCOMB	290 Degrees/35 Knots
McCOMB	to	MERIDIAN	300 Degrees/40 Knots
MERIDIAN	to	COLUMBUS	310 Degrees/35 Knots

NAS MERIDIAN IAF to COLUMBUS AFB IAF
at NAS MERIDIAN IAF altitude of 14,000' 300 Degrees/15 Knots

TERMINAL FORECAST:

NAS MERIDIAN		COLUMBUS AFB	
Ceiling	1000'	Ceiling	1500'
Visibility	3 Miles	Visibility	4 Miles
Wind	010 Degrees/5 Knots	Wind	340 Degrees/10 Knots
Altimeter	30.10" ^	Altimeter	30.15" ^

PLANNING

Obtain the following materials:

* FLIP Enroute High Altitude Chart H-5
* FLIP (Enroute) IFR Supplement
* FLIP (Enroute) Flight Information Handbook
* Circular Flight Computer

Use the following materials which are provided in this chapter:

* Blank Jet Flight Logs (Front and Back)
* Blank Military Flight Plan (DD Form 175)
* PSX3 Standard Instrument Departure NAS KINGSVILLE
* NAS MERIDIAN HI-TACAN RWY 1L Approach Procedure Chart
* COLUMBUS AFB HI-TACAN RWY 31C Approach Procedure Chart
* T2C Flight Planning NATOPS Data Chart

T2C NATOPS FLIGHT PLANNING DATA

Flight planning is reproduced from the T2C Flight Training Instructions (FTIs) and NATOPS Fllight Manual. It is to be used in completing your Jet Flight Log and Military Flight Plan (DD Form 175). NATOPS Climb Data has been adjusted to reflect a maximum climb IAS of 250 knots below 10,000' in the United States.

NOTE

As in Planning Problem One, T2C Planning Data for this problem is based on the use of JP5 fuel and Standard Day conditions.

FULL FUEL LOAD JP5	4699 lbs
FULL FUEL LOAD JP4	4492 lbs
START/TAXI/TAKEOFF	375 lbs
PENETRATION/APPROACH	300 lbs
RESERVE (20 min at max endurance for 10,000'	600 lbs

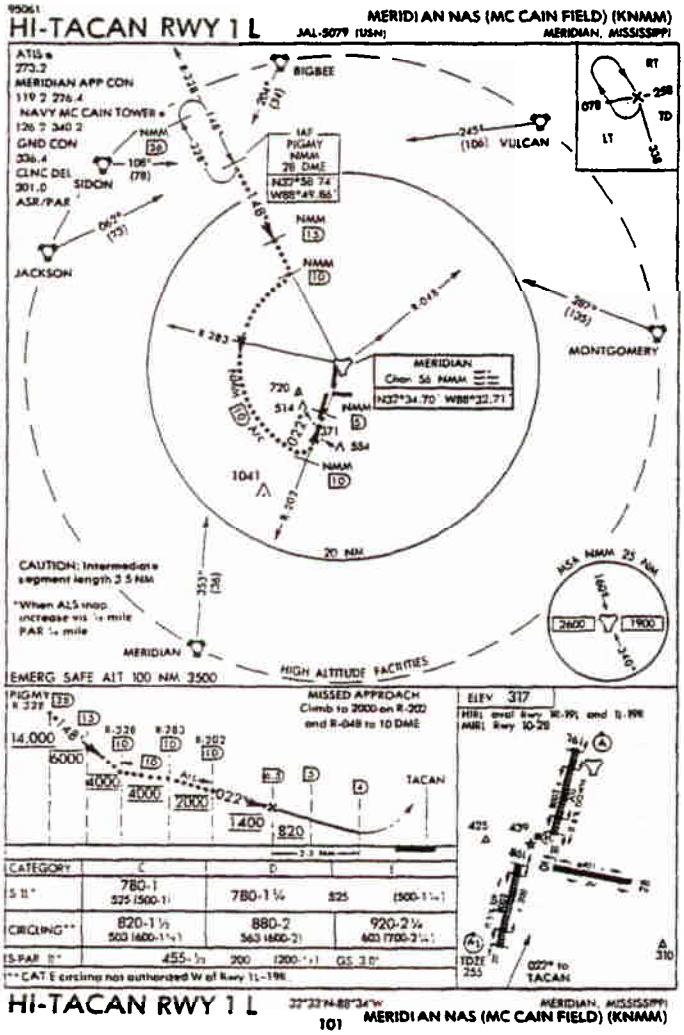
NO-WIND CLIMB DATA

*ALTITUDE	DISTANCE	TIME	FUEL
10,000'	10 nm	3.0 min	275 lbs
15,000'	16 nm	3.5 min	375 lbs
20,000'	23 nm	4.0 min	450 lbs
25,000'	33 nm	6.0 min	525 lbs
30,000'	44 nm	8.0 min	600 lbs
35,000'	61 nm	11.0 min	675 lbs
37,000'	68 nm	14.0 min	725 lbs

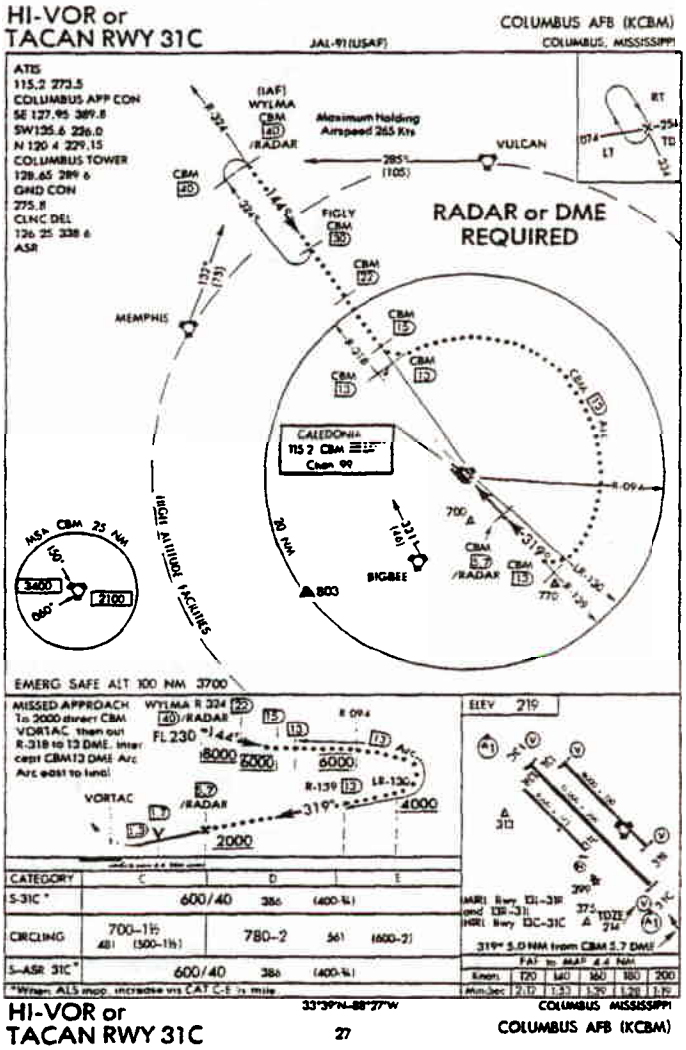
CRUISE DATA

*ALTITUDE	TAS	FUEL FLOW
10,000'	280 K	2000 PPH
15,000'	290 K	1800 PPH
20,000'	295 K	1625 PPH
25,000'	312 K	1425 PPH
30,000'	324 K	1360 PPH
35,000'	345 K	1300 PPH
37,000'	350 K	1300 PPH

*Interpolate for other altitudes



NAS MERIDIAN
HI-TACAN RWY 1L



COLUMBUS AFB
HI-TACAN RWY 31C

16-218 PLANNING PROBLEM TWO

97282

PALACIOS-THREE DEPARTURE (PSX 3•PSX)

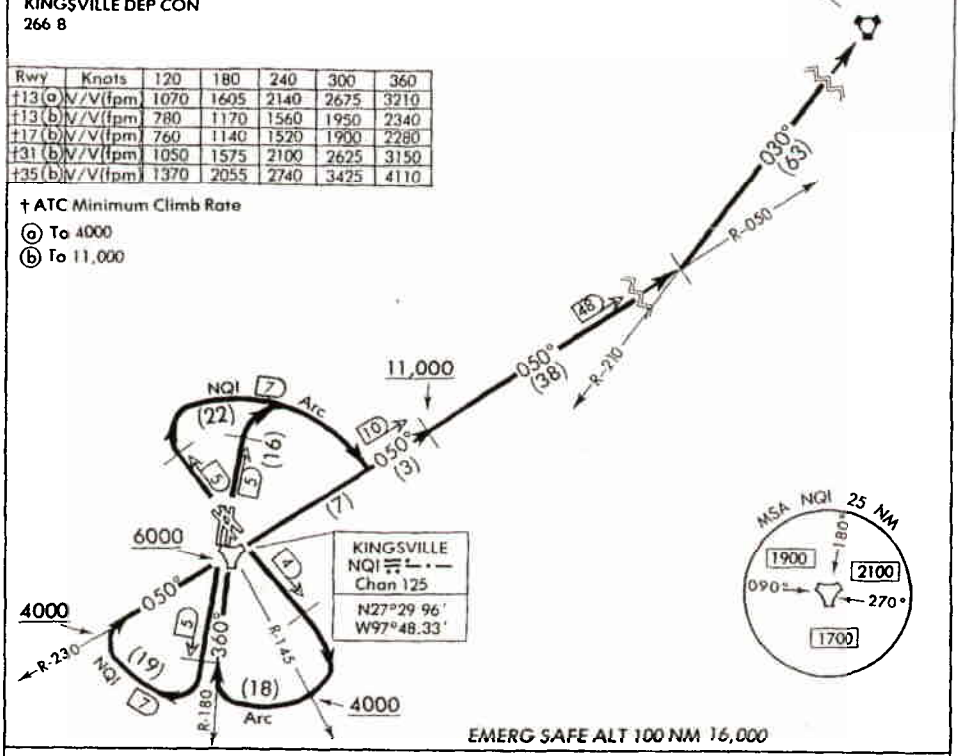
KINGSVILLE NAS
KINGSVILLE, TEXAS

SH-918 (USN)

ATIS ★
276.2
CLNC DEL
328 4
GND CON
352 4
KINGSVILLE TOWER ★
124 1 346 0
KINGSVILLE DEP CON
266 8

Rwy	Knots	120	180	240	300	360
†13 (a)	V/V(fpm)	1070	1605	2140	2675	3210
†13 (b)	V/V(fpm)	780	1170	1560	1950	2340
†17 (b)	V/V(fpm)	760	1140	1520	1900	2280
†31 (b)	V/V(fpm)	1050	1575	2100	2625	3150
†35 (b)	V/V(fpm)	1370	2055	2740	3425	4110

† ATC Minimum Climb Rate
(a) To 4000
(b) To 11,000



DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RWYS 13L/R: Fly runway heading to NQI 4 DME., turn right to join and arc S on the 7 mile arc to join and fly NQI R-180 to NQI. Cross NQI R-145 at 4000 min cross NQI at 6000 min, then.....

TAKE-OFF RWYS 17L/R: Fly runway heading to NQI 5 DME, turn right to join and arc SW on the 7 mile arc to join and fly NQI R-230 to NQI. Join NQI R-230 at 4000 min, cross NQI at 6000 min, then.....

TAKE-OFF RWYS 31L/R and 35L/R: Fly runway heading to NQI 5 DME, turn right to join and arc NE on the 7 mile arc to join NQI R-050, then.....

Fly NQI R-050 to 48 DME and PSX R-210 to PSX. Cross NQI R-050/10 DME at 11,000 min.

PALACIOS-THREE DEPARTURE (PSX 3• PSX)

KINGSVILLE, TEXAS
KINGSVILLE NAS

123

Departure runway in use is Runway 35 Right

The total distance traveled from takeoff to the 050R 10 DME is 16 miles.

SINGLE-ENGINE JET FLIGHT LOG
CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482

DEP ELEV	CLNC DELIV	GND CONT	TOWER
ALT CORR	TIME OFF	TAS	LBS PH/PMIN

CLEARANCE

DEPARTURE

DEST ELEV		APC CONT			TOWER			GND CONT
ROUTE TO	IDENT CHAN	CUS	DIST	ETE	ETA ATA	LEG FUEL	EFR AFR	NOTES
								FRCST ALT

ALTERNATE	ROUTE	ALTITUDE	TIME	FUEL
ALT ELEV	APC CONT	TOWER	GND CONT	

(Over)

FUEL PLAN

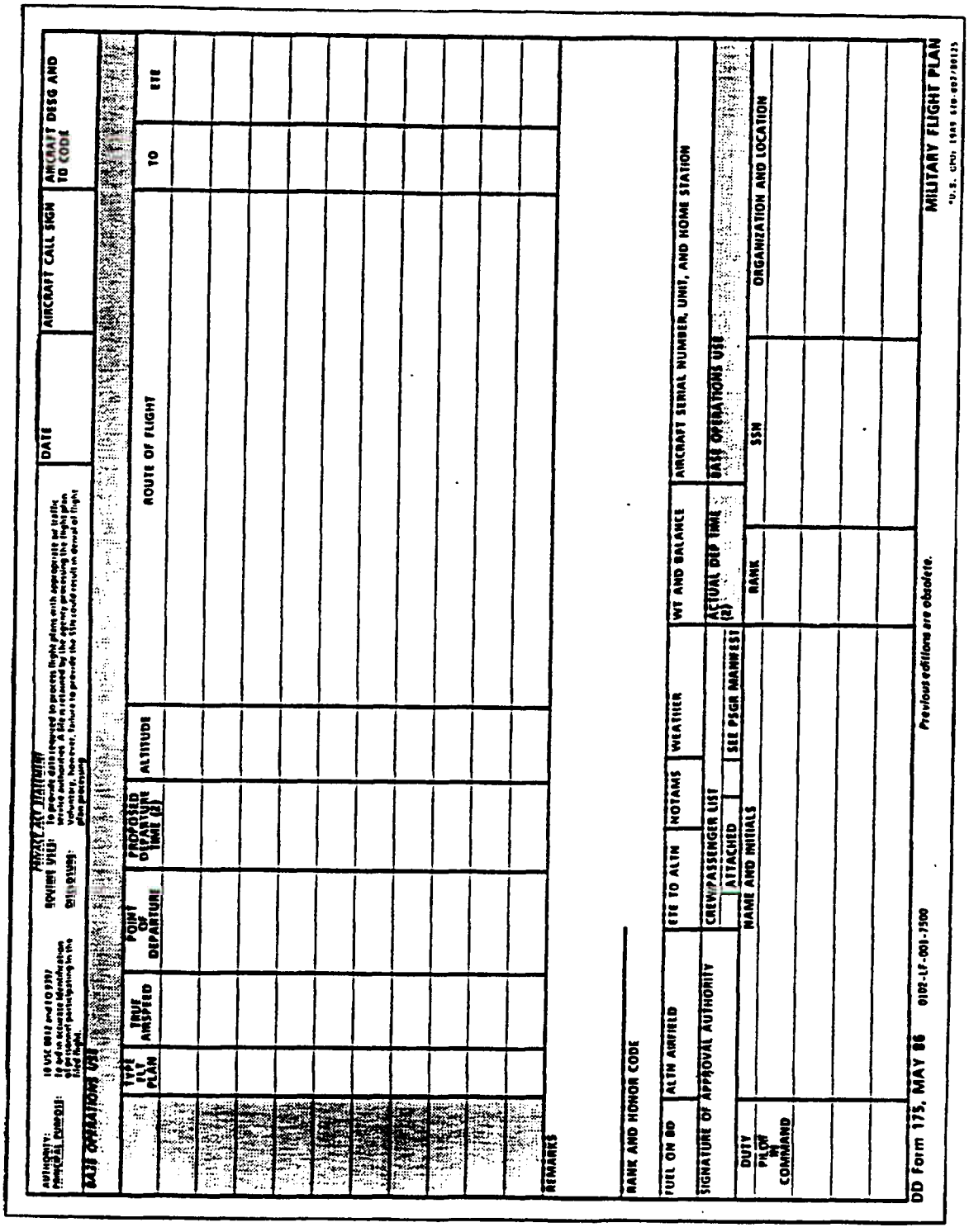
1. CLIMB/ROUTE DEST IAF		6. START/TAXI	
2. ROUTE ALT IAF (If required)		7. TOTAL REQUIRED (4, 5 & 6)	
3. APPROACHES		8. TOTAL ABOARD	
4. TOTAL (1, 2 & 3)		9. SPARE FUEL (8–7)	
5. RES 10% of 4 (Min 20 mins)			

EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT		+		+		=	
INITIAL APP ALT		+		+		=	
EMER SAFE ALT		+		+		=	

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH			
LIGHTING			ID
FUEL/JASU/LOX			CH
UHF/ADF			PAGE NO.
UHF/DF			
RAPCON			
PAR MINS			
TAC MINS			
ARR GEAR			
PUBS			
NOTAMS			
FUEL PACKET			
FLASHLIGHT, WALLET, ETC.			

CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482(BACK)


PRIVACY STATEMENT
AUTHORITY:
PRINCIPAL PURPOSE:
ROUTINE USES:
DISCLOSURE:
DATE
AIRCRAFT CALL SIGN
AIRCRAFT DESG AND TO CODE
DATA OPERATIONS USE
TYPE FLT PLAN
TRUE AIRSPEED
POINT OF DEPARTURE
PROPOSED DEPARTURE TIME (Z)
ALTITUDE
ROUTE OF FLIGHT
TO
ETE
REMARKS
RANK AND HONOR CODE
FUEL ON BD
ALTN AIRFIELD
ETE TO ALTN
NOTAMS
WEATHER
WT AND BALANCE
AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
SIGNATURE OF APPROVAL AUTHORITY
CREW/PASSENGER LIST
ATTACHED
SEE PSGR MANIFEST
ACTUAL DEP TIME (Z)
BASE OPERATIONS USE
DUTY
PILOT IN COMMAND
NAME AND INITIALS
RANK
SSN
ORGANIZATION AND LOCATION
DD Form 175, MAY 86
0102-LF-001-7500
Previous editions are obsolete.
MILITARY FLIGHT PLAN

COMPLETED JET FLIGHT LOG
AND
MILITARY FLIGHT PLAN

NOTE

For this problem, times have been rounded to the nearest minute and fuels have been rounded to the next highest ten pound increment. Your answers should be approximately the same.

REMINDER

There is no one correct method to complete a Jet Flight Log. Use a method which best suits your needs; however, you should be able to fly any assigned mission by reference only to the Log and be able to make all necessary decisions without any inflight computations.

SINGLE-ENGINE JET FLIGHT LOG
CNATRA-GEN 3760/1 (REV. 7-78) S/N0197LLCF19482

DEP ELEV	CLNC DELIV	GND CONT	TOWER
50′	328.4	352.4	346.0
ALT CORR	**TIME OFF**	**TAS**	**LBS PH/PMIN**
N/A		337	1324

CLEARANCE

DEPARTURE

DEST ELEV 317′	APC CONT 276.4	TOWER 340.2	GND CONT 336.4

ROUTE / TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	NOTES
START TAXI & TAKEOFF						375	4325	4700lbs
SID LEVEL OFF	NQI 125	SID	54	10		645	3680	
SID	NQI 125	050	1	–		–	–	
SID PSX	PSX 120	030 055	63	11		250	3430	
J22 LCH	LCH 81	058 057	187	32		710	2720	
J22 MCB	MCB 114	062 046	163	27		600	2120	
J22 MEI	MEI 117	045 353	98	17		380	1740	
-D→ PIGMY (NMM328028)	NMM 56		36	7		160	1580	
TOTALS			602	1+44		3120	1580	ATIS 273.2
(PENETRATION & APPROACH)						300	1280	FRCST ALT 30.10″

ALTERNATE	ROUTE	ALTITUDE	TIME	FUEL
CBM	-D→	330	0+14	1+12
ALT ELEV	**APC CONT**	**TOWER**	**GND CONT**	
219′	226.0	289.6	275.8	

-D→ WYLMA (CBM 324040)	CBM 99	355	75	14		310	1270	ATIS 273.5
(PENETRATION & APPROACH)						300	970	FRCST ALT 30.15″

(Over)

FUEL PLAN

1. CLIMB/ROUTE DEST IAF	2745	4. START/TAXI	375
2. ROUTE ALT IAF (If required)	310	7. TOTAL REQUIRED (4, 5 & 6)	4330
3. APPROACHES	300	8. TOTAL ABOARD	4700
4. TOTAL (1, 2 & 3)	3355	9. SPARE FUEL (8–7)	370
5. RES 10% of 4 (Min 20 mins)	600		

EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPROACH		RES		TOTAL
LAST CRUSING ALT	310	+	300	+	600	=	1210
14K INITIAL APP ALT	500	+	300	+	600	=	1400
EMER SAFE ALT	(USE SQUADRON DIRECTIVES)					=	

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH			
LIGHTING			ID
FUEL/JASU/LOX			CH
UHF/ADF	(CHECK		PAGE NO.
UHF/DF	CURRENT		
RAPCON	IFR		
PAR MINS	SUPPLEMENT		
TAC MINS	FOR		
ARR GEAR	STATUS)		
PUBS			
NOTAMS			
FUEL PACKET			
FLASHLIGHT, WALLET, ETC.			

CNATRA–GEN 3760/1 (REV. 7–78) S/N0197LLCF19482(BACK)

PRIVACY ACT STATEMENT

AUTHORITY: 10 USC 8012 and EO 9397
PRINCIPAL PURPOSE: To aid in accurate identification of personnel participating in the filed flight
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic service authorities. A file is retained by the agency processing the flight plan
DISCLOSURE: Voluntary, however, failure to provide the SSN could result in denial of flight plan processing

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
7 JAN 97	VV1A901	T2/P

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	337	NQI	1300	330	PSX2·PSX J22 MEI PIGMY	NMM	1+44

REMARKS

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
2+56	CBM	0+14	✓	01-079	N/A	152443/VT-19/NMM

SIGNATURE OF APPROVAL AUTHORITY: J. J. Doe
CREW/PASSENGER LIST: ATTACHED / SEE PSGR MANIFEST
ACTUAL DEP TIME (Z)
BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	DOE, J J	LT	326-77-1126	VT-19/NMM

DD Form 175, MAY 86 0102-LF-001-7500 Previous editions are obsolete. MILITARY FLIGHT PLAN