NAVAL AIR TRAINING COMMAND

NAS CORPUS CHRISTI, TEXAS **CNATRA P-802 (Rev. 10-03)**

WORKBOOK

INSTRUMENTS FLIGHT PLANNING

PRIMARY SNFO/SWSO

T-34C/T-6A

2003

DEPARTMENT OF THE NAVY
CHIEF OF NAVAL AIR TRAINING
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CNATRA P-802
N311

CNATRA P-802 (Rev. 10-03)

03 NOV 2003

Subj: WORKBOOK, INSTRUMENTS FLIGHT PLANNING, PRIMARY SNFO/SWSO, T-34C/T-6A

1. CNATRA P-802 (Rev. 10-03) PAT, "Workbook, Instruments Flight Planning, Primary SNFO/SWSO T-34C/T-6A" is issued for information, standardization of instruction and guidance of all flight instructors and student aviators within the Naval Air Training Command.

2. This publication shall be used as an explanatory aid to the T-34C/T-6A Primary Flight Curriculum. It will be the authority for the execution of all flight procedures and maneuvers therein contained.

3. Recommendations for changes shall be submitted via CNATRA TCR form 1555/19 in accordance with CNATRAINST 1550.6E.

4. CNATRA P-802 (Rev. 11-02) PAT is hereby cancelled and superseded.

R E Bird

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Training and Operations

Distribution:

CNATRA N31	(5) plus original
CNATRA N62	(1)
COMTRAWING SIX	(35)

WORKBOOK

FOR

INSTRUMENTS FLIGHT PLANNING

PRIMARY SNFO/SWSO

T-34C/T-6A

Q-2D-0012

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LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:
Original...0...31 Oct 03 (this will be the date issued)
TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 154 CONSISTING OF THE FOLLOWING:

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8-4 (blank)			
9-1 – 9-2			

INTERIM CHANGE SUMMARY

The following Changes have been previously incorporated in this manual:

CHANGE NUMBER	REMARKS/PURPOSE
1	Changes made per transmittal letter

The following interim Changes have been incorporated in this Change/Revision:

INTERIM CHANGE NUMBER	REMARKS/PURPOSE	ENTERED BY	DATE

SAFETY

For the classroom portion of instruction, no special safety precautions are to be followed. For the 1D23 trainers, safety precautions are detailed in 1D23 Briefing Guide.

FORWARD

Course Objective

To provide the SNFO with a level of instrument navigation flight planning knowledge prerequisite to his/her learning, understanding and performance in flight.

Specific Instructional Objective

Upon completion of this course, the student will demonstrate his/her knowledge of the instrument navigation flight planning by completing the end-of-course examination with a minimum of 80% accuracy and in flights to an accuracy of 100%.

Instructional Procedures

1. Each lesson topic contains the Terminal Objective, Enabling Objectives, description of the subject area and sample questions as well as required amplifying illustrations.

2. The Student Guide is designed to reinforce instructors' lectures and demonstrations.

3. Read sections and complete questions at end of sections before class.

COURSE CALENDAR

DAY 1	* FP-1 Jet Log (Complete Jet Log for TP-6ET prior to Day 1 class) Homework (CH 2-4)
DAY 2	* FP-2 DD 175 * FP-3 Turnpoint Procedures * FP-4 Fuel and Time Analysis TP Voice Call Practice Turnpoint-6 Brief Homework (CH 5 & 6)
DAY 3	Turnpoint-6 Airways Navigation Turnpoint-6 Debrief * FP-5 Situational Awareness * FP-6 Mission Completion Feasibility Turnpoint-7 Brief Homework (CH 7)
DAY 4	Turnpoint-7 Dead Reckoning Trainer Turnpoint-7 Debrief * FP-7 In-Flight Weather Analysis Turnpoint-8 Brief
DAY 5	Turnpoint-8 Point-to-Point Navigation Turnpoint-8 Debrief Course Review
DAY 6	Final Exam

*** LECTURES LABELED FP ARE DERIVED FROM CORRESPONDING CHAPTERS IN TEXT *INSTRUMENTS FLIGHT PLANNING* AND ARE READ BEFORE ATTENDING CLASS.**

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CHAPTER ONE

JET LOGS

100. INTRODUCTION

The primary purpose of the jet log is fuel management. Although it is not intended to replace FLIP, the jet log can be a ready reference for the entire flight to assist you with required enroute voice communications, navigational computations, NAVAID identification, and selected emergency data when filled out properly.

Figure 1-1 shows the front and back of the Single Engine (SE) Jet Flight Log which is more often referred to as simply a "jet log." You can use this card in the preflight planning of your T-34C and T-39N flights. In this text, the jet log is broken into sections with instructions for filling out each section of the log.

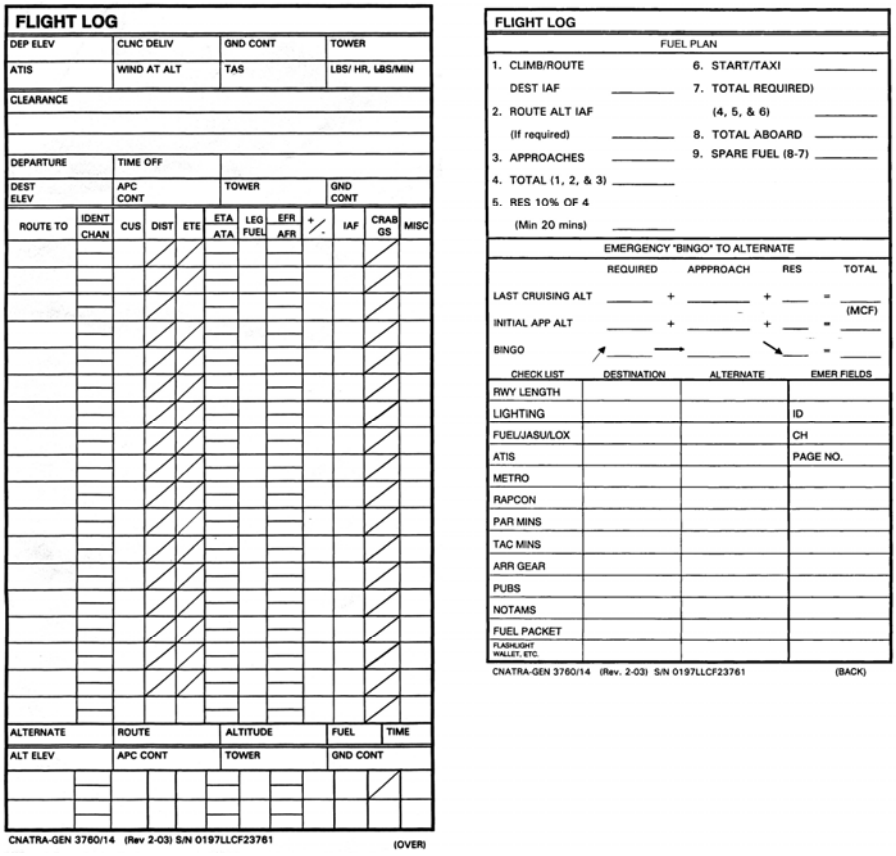


Figure 1-1 SE Jet Flight Log

101. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

Use FLIP, NOTAMS and other applicable flight information to plan and fly in the Federal Aviation Administration's ATC system.

ENABLING OBJECTIVES

F.9 Complete a jet log given a mission, FLIP, NATOPS and OPNAVINST 3710.7 in accordance with appropriate PAT pub.

- F.9.1 State the purpose of a jet log.
- F.9.2 Determine the departure field data.
- F.9.3 Determine the destination field data.
- F.9.4 Interpret T-34C/T-6A planning chart for climb fuel.
- F.9.5 Determine the route.
- F.9.6 List appropriate navigation aid data.
- F.9.7 Determine leg courses.
- F.9.8 Determine leg distances.
- F.9.9 Determine leg times.
- F.9.10 Determine leg fuels.
- F.9.11 Determine total distance.
- F.9.12 Determine total estimated time enroute.
- F.9.13 Determine total fuel required.
- F.9.14 Determine alternate field data.
- F.9.15 Compute a first alternate profile fuel plan.
- F.9.16 Compute a second alternate profile fuel plan.
- F.9.17 Compute a Bingo fuel plan.
- F.9.18 Interpret T-34C/T-6A planning charts for Bingo fuel.
- F.9.19 Compute the total required OPNAV minimum fuel.
- F.9.20 Complete the destination/alternate checklist section.
- F.9.21 Select emergency fields.

102. DEPARTURE SECTION

The top part of the jet log is specifically designed as a place to copy information regarding your departure airfield, preflight airspeeds, and fuel data. It is completed as follows:

FLIGHT LOG			
DEP ELEV NPA 30'	CLNC DELIV 268.7	GND CONT 336.4	TOWER 340.2
ATIS 267.6	WIND AT ALT 240/20	TAS	LBS/ HR, LBS/MIN

Figure 1-2 SE Jet Flight Log Top

DEP ELEV – Elevation of the Departure Airfield.
CLNC DELIV - Clearance Delivery Frequency.
GND CONT – Frequencies listed in IFR Enroute Supplement or Approach Plate.
TOWER – Frequencies listed in IFR Enroute Supplement or Approach Plate.
ATIS – Used for ATIS frequency.
WIND AT ALT - Forecast winds at flight planned altitude.
***TAS –** Your preflight TAS.
***LBS/HR, LBS/MIN -** Your predicted fuel flow per hour/per minute.
TAS and **LBS/HR, LBS/MIN** are intentionally left blank and are discussed later.

NOTE

While in the training command, unless otherwise noted, you will always plan your events (i.e., TPs, OFTs, and Flights) based on 210 KIAS TAS for the T-34C and 240 KIAS for the T-6. Use the fuel flow based on your cruise altitude.

103. CLEARANCE SECTION

The next four lines consist of space in which to copy your ATC clearance. You should develop a shorthand method of quickly and accurately copying the clearance because of space/time limitations.

All valid ATC clearances consist of the following items:

Aircraft identification

Clearance limit

Departure procedures or SID

Route of flight

Altitude data

Departure instructions, frequency, and IFF information

In addition to the aforementioned items, you may receive holding instructions or special information following altitude data. A typical clearance might read as follows:

> "1F120 is cleared to Navy Cecil airport via direct Crestview, flight plan route. Climb and maintain one zero thousand, expect one five thousand ten minutes after departure. Departure instructions: Maintain runway heading and 500 feet for two DME, departure control frequency two seven zero point eight. Squawk zero seven zero zero." You might write it down as follows:

CLEARANCE	1F27 CL VAD Ⓓ CEW FPR		
	10K 15K + 10 270.8 0700		
DEPARTURE RH 500/2	TIME OFF		
DEST ELEV	APC CONT	TOWER	GND CONT

Figure 1-3 SE Jet Flight Log Clear

NOTE

> This is only an example of how a clearance may be copied on the jet log. Each student will develop his/her own shorthand for copying clearances. It is necessary to be able to copy correctly, read back correctly in the proper sequence, and understand the clearance. If you do not understand any part of your clearance, then do not accept it until the questionable parts are clarified.

Next on the jet log, you will find spaces to use for destination airport information. Information for these blocks is found in the IFR Enroute Supplement and/or the Approach Plates.

DEST ELEV	233'	APC CONT	285.6	TOWER	289.6	GND CONT	275.8

Figure 1-4 Destination Airport Information

DEST ELEV - Destination elevation, in feet above MSL.

APC CONT - Appropriate UHF approach control frequency.

TOWER - Appropriate UHF tower frequency.

GND CONT - Appropriate UHF ground control frequency.

1-4 JET LOGS

104. ENROUTE NAVIGATION SECTION

For a simulated flight to Moody AFB, in a T-34C, our route information will be:

1. NAS Pensacola direct to Crestview VORTAC, V198 to Marianna, V198 to Tallahassee, V198 to Greenville, and direct to the TACAN IAF at Moody AFB (VAD 006010). Our alternate airfield is NAS CECIL.
2. Preflight winds: 240/20 (at cruise altitude)
3. Preflight winds at 5000 feet: 220/10

Based on your preflight altitude you must determine climb and cruise data from the flight planning data charts below before completing the body of a jet log. The information required is:

1. Climb time
2. Climb fuel
3. Climb distance
4. Cruise fuel flow
5. Cruise TAS – (While in the Training Command, we always plan for 210 TAS for the T-34C and 240 TAS for the T-6A. However, for this example, we will be using the TAS obtained from your cruise charts.)

Since we climb to 15,000 feet, we can read the time, distance, and fuel from the appropriate flight planning data charts in the appendices. The following example is how to interpolate if needed, and uses T-34C data. For a climb to 15,000 feet, we do a direct interpolation of the climb fuels listed between 14,000 and 16,000 feet. The time and distance could also be interpolated from the Flight Planning Data Tables in Appendices B (T-6A) and D (T-34C):

16,000 – 14,000 = 2,000 $\frac{1{,}000}{2{,}000} = \frac{1}{2}$
15,000 – 14,000 = 1,000

53 - 46 = 7 7 X ½ = 3.5

Therefore, we burn 46 + 3.5 = 49.5. All fuel estimates are rounded up to the nearest five pounds. Hence, we burn up 50 lbs in climbing to 15,000 feet.

Now interpolating for time we get: 12 – 11 = 1 1 X ½ = .5

Therefore, our time to climb to 15,000 feet is 11 + .5 = 11.5

Finally, interpolating for distance, we get: 27 - 23 = 4 4 X ½ = 2 NM

Therefore, our distance covered in the climb is 23 + 2, or 25 NM.

We are now ready to figure out cruise data. To determine which fuel flow to use, we interpolate in the CRUISE chart and find that 15,000 feet nets a fuel flow of 255 PPH. This yields a constant TAS of 212 knots.

You can now fill in the TAS and LBS PH/PMIN blocks of the DEPARTURE section. Divide 255 by 60 to obtain 4.25 pounds per minute.

DEP ELEV NPA 30'	CLNC DELIV 268.7	GND CONT 336.4	TOWER 340.2
ATIS 267.6	WIND AT ALT 240/20	TAS 212	LBS/ HR, LBS/MIN 255/4.25

Figure 1-5 SE Jet Flight Log Dep Elev

We are now ready to enter the body of the jet log. The most efficient method for doing this is:

1. Determine when L/O occurs.
2. Complete the L/O line.
3. Complete the ROUTE TO, IDENT/CHAN, CUS, and DIST blocks.
4. Compute ETEs.
5. Compute LEG FUELS.

It is now necessary to determine the course from NPA to CEW. You may use a plotter, however, another accurate method is to connect the two points with the edge of your jet log and read the course off the CEW compass rose. Additionally, you can calculate distance using the edge of the jet log by placing tick marks along the edge corresponding to the positions of NPA and CEW and reading off the distance using the mileage scale on the bottom of your chart. Using this method, we get a course of 045º and a distance of 40 NM. Note how it is done in Figure 1-6:

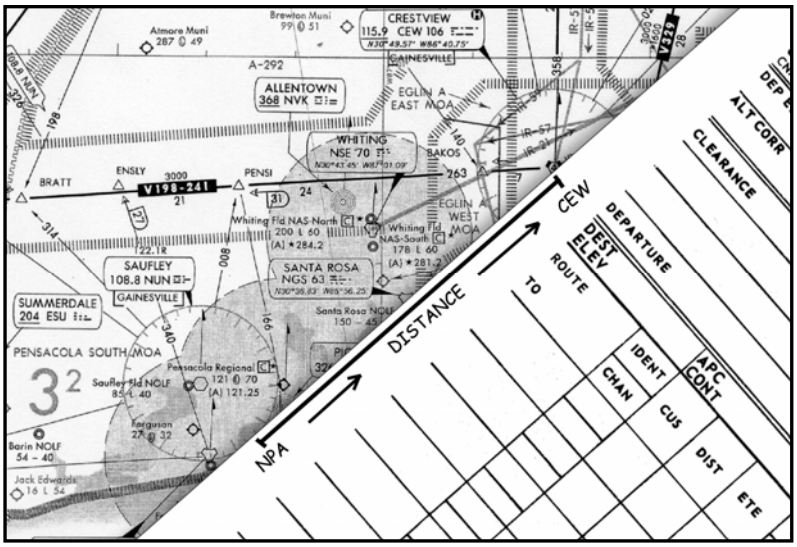


Figure 1-6 NPA to CEW

1-6 JET LOGS

In instances where you fly direct, (i.e., if your desired route of flight is between two NAVAIDs not connected by an airway) you can utilize the method just illustrated to determine your preflight course.

In our example, CEW is 40 NM away, but L/O occurs at 28 NM. When this situation occurs, list the L/O first, followed by the first navigational checkpoint. The " ⊸▸ " is a shorthand symbol for direct.

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB GS	MISC
⊸▸ L/O	106										
⊸▸ CEW	106										

Figure 1-7 SE Jet Fuel Log L-002

NOTE

The DIST and ETE blocks are split. This is explained later. Also, note the manner in which the CEW TACAN channel is written and the position of the Morse code identifier applying to Crestview.

There is only one instance when L/O is not your first entry that is when L/O occurs after the first navigational checkpoint. In this case, L/O is preceded by the navigational checkpoint. ETEs, LEG FUELS, and EFRs are not entered for navigational checkpoints that occur before L/O. It is not practical or necessary to estimate times and fuels to a point before L/O, because these computations occur at a non-linear rate.

We can now complete and analyze the L/O line.

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB GS	MISC
⊸▸ L/O	106	045	25	11		50	725				↗ 15K
⊸▸ CEW	106	045	15								

Figure 1-8 SE Jet Flight Log L-O

From our T/O point (NPA), we intend to fly directly to Crestview, hence ⊸▸ CEW. We use TACAN channel 106 and its accompanying Morse code identifier is: – • – • • • – –. On a course of 045° (to CEW), it takes us 25 NM and 11 minutes to L/O at 15,000 feet. We use 50 lbs of fuel. The remaining fuel at L/O is 725 lbs. We always assume the T-34C has 815 lbs of fuel aboard minus 40 lbs for start, taxi, and T/O. The distance from the L/O point to CEW 045015 remains.

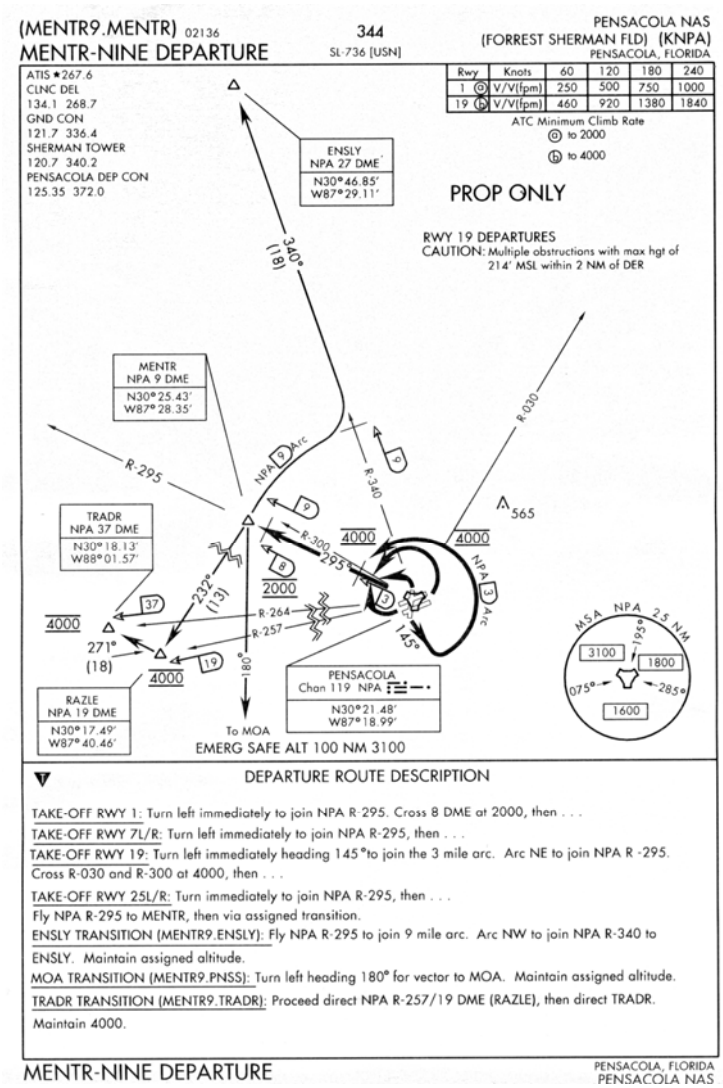


Figure 1-9 MENTR-NINE Departure

Let us digress a moment and consider Departure Procedures (DPs) SIDs in relation to jet logs.

If you flew a MENTR NINE departure from T/O on RWY 19 at NPA, your total mileage to ENSLY is approximately 45 NM. See Figure 1-9 to compute the number.

From T/O to the 3 DME arc is 3 NM. To compute mileage on an arc, you use the formula for distance between radials. Radials 3 miles from the TACAN are spaced 3/60 miles apart. Arcing from the 145º radial to 295º radial covers (210 X 3/60) 10.5 NM, which we round to 11 NM.

1-8 JET LOGS

The remaining mileage to MENTR (after exiting the arc) is 6 NM. Arcing NE on the 9 mile arc from the 295 radial to the 340 radial covers (45 X 9/60) = 6.75 NM, which we round to 7 NM. After exiting the 9 mile arc, the remaining distance to ENSLY is 18 miles. Adding the components together yields 45 NM (3 + 11 + 6 + 7 + 18).

Look at Figure 1-10. To climb to 15,000 feet would take 25NM. You L/O 20 NM before ENSLY. When flying DP/SIDs, the termination point of the DP/SID is treated as a navigational checkpoint and is included on your jet log.

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB GS	MISC
L/O	119	DP	25	11		50	725				15K
ENSLY	119	DP	20								
CEW	106	083									

Figure 1-10 SE 01 Jet Flight Log Route To

The jet log is primarily a fuel planning document. Points on a DP/SID other than the termination point have little significance with regard to fuel planning. Departures are not flown from the jet log; they are flown from the DP/SID. Transferring DP/SID information to the jet log is redundant.

NOTE

For preflight planning, when using a DP/SID, always compute distance on a DP/SID with the runway providing the **longest distance** possible.

Returning to our original example, we can now complete the ROUTE TO; IDENT/CHAN; CUS and DIST blocks for the body of the jet log. The next line covers our flight from Crestview (CEW) to Marianna (MAI). Since our initial cruising altitude is below the jet route structure (18,000 MSL), we utilize the victor airways of the low-altitude structure. Since our route of flight takes us through Marianna (MAI), we utilize V198. The TACAN channel for MAI is 87, but remember in order to do radial tracking on V198, continue to utilize channel 106 until the TACAN changeover point. Our initial course to maintain V198 is 088º, however, after we switch NAVAIDs at the TACAN changeover point, we fly a course of 092º to maintain V198 inbound to MAI. This is due to differences in magnetic variation at CEW and MAI. Now complete the rest of this portion of the jet log in a similar manner.

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
D L/O	106	045	25 / 212	11		50	725				15K
D CEW	106	045	15 / 197								
V198 MAI	87	088/ 092	80 / 117								
V198 SZW	122	109/ 108	41 / 76								
V198 GEF	106	088/ 090	31 / 45								
D VAD005010	106	037	45 / 0								

Figure 1-11 SE 02 Jet Flight Log Route To

To calculate ETEs we must consider the wind. All preflighted ETEs and fuels calculated at cruise altitude must take preflighted wind into account. For this example, our wind is 240/20.

We plot the wind on the CR-2 and find our course of 045º is affected by an 18 knot tailwind and a 5 knot left crosswind (which at our TAS equates to a crab angle of 2º left).

Our ETE and fuel figures are based on preflight groundspeed (GS). Since our preflight TAS is 212 and our predicted wind gives us an 18 knot tailwind, then our predicted GS is 230 knots.

A GS of 230 knots for 15 NM equals approximately 3 minutes 54 seconds. We round all fraction of minutes to the nearest half-minute. Therefore, enter "4" in our ETE column. Calculate the rest of your ETEs in a similar manner.

ROUTE TO	IDENT / CHAN	CUS	DIST 237	ETE 1+07	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
D L/O	106	045	25 / 212	11 / 56		50	725				15K
D CEW	106	045	15 / 197	4 / 52						220 / 2L	
V198 MAI	87	088/ 092	80 / 117	21 / 31						228 / 3R	
V198 SZW	122	109/ 108	41 / 76	11 / 20						223 / 4R	
V198 GEF	106	088/ 090	31 / 45	8 / 12						226 / 3R	
D VAD005010	106	037	45 / 0	12 / 0						228 / 2L	

Figure 1-12 SE 03 Jet Flight Log Route To

Now complete the leg fuels and EFRs for your jet log. The number in our LEG FUEL column is the product of ETE times our preflight fuel flow in pounds per minute (3 X 4.32 = 12.96). We

round 12.6 up and enter 15 in our LEG FUEL column. The EFR is simply the previous EFR minus our current leg fuel.

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
D▶ L/O	106	045	25 / 212	11 / 56		50	725				↗ 15K
D▶ CEW	106	045	15 / 197	4 / 52		20	705			220 / 2L	
V198 MAI	87	088/ 092	80 / 117	21 / 31		95	610			228 / 3R	
V198 SZW	122	109/ 108	41 / 76	11 / 20		50	560			223 / 4R	
V198 GEF	106	088/ 090	31 / 45	8 / 12		35	525			226 / 3R	
D▶ VAD005010	106	037	45 / 0	12 / 0		55	470			228 / 2L	
						305					

Figure 1-13 Jet Flight Log Leg Fuel

In Figure 1-13, the top part of the jet log is complete. Note the purpose of the split DIST and ETE blocks is now apparent. They give the mileage and time remaining to the IAF in the flight from any one of the enroute navigational checkpoints.

At the IAF of our destination, we have zero miles and zero minutes to go, thus time remaining starts here and works backwards. When the totals are computed, enter them in the manner shown in the example. These numbers have more significance in later sessions.

In the NOTES column, you may write whatever you feel is helpful. It is recommended, at a minimum, you list your predicted GS and crab angle for that particular leg of flight.

When completing your jet log remember:

1. Route description in the ROUTE TO column not only includes the aforementioned points (i.e., L/O, DP/SID TERMINATION POINT), but also:

   a. DP/SID TRANSITION POINT where specified enroute phase begins.

   b. ALL NAVAIDs (VOR/TACAN/NDB) you MARK-ON-TOP of on your route of flight.

   c. Any named or unnamed fix defining your route of flight.

   d. All points where a course change of 7º or more is required.

2. Ensure all fixes are annotated with radial and DME defining that fix (i.e., ENSLY – NPA 340027).

3. The last line of this section contains information for the leg from your last navigation checkpoint to the IAF. If the NAVAID is a feeder facility on the approach plate, use that course and distance. If no feeder facility is provided, you plot the IAF on your enroute chart. (Figures 1-14 and 1-15).

4. Ensure airways are utilized if available. Airways are the preferred routing over direct navigation.

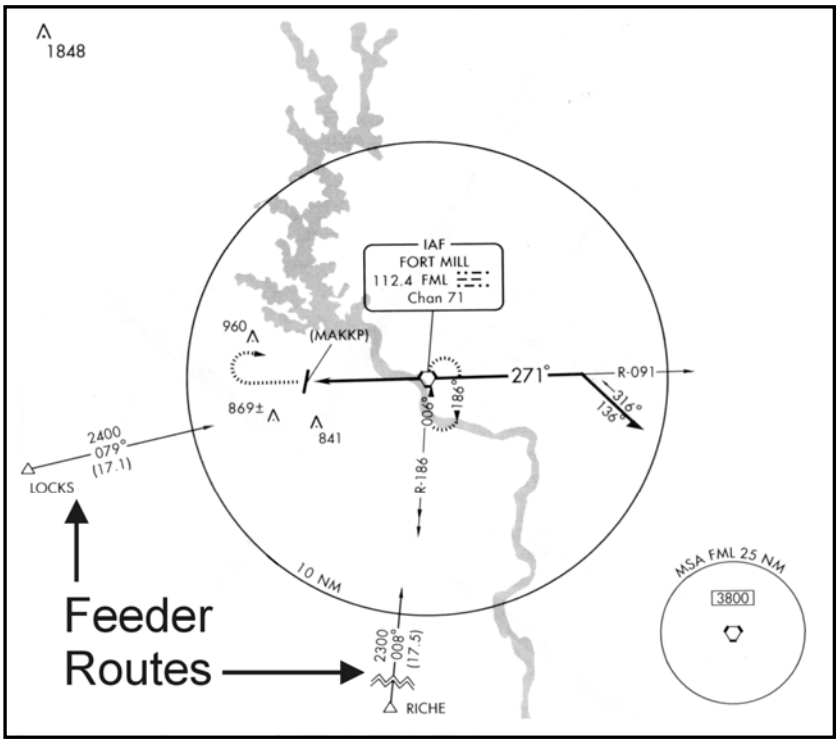


Figure 1-14 Feeder Routes

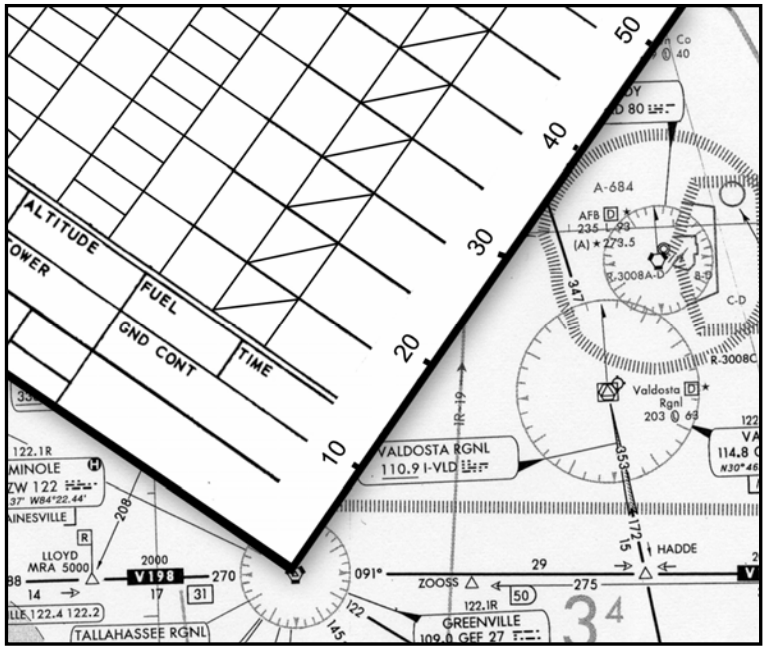


Figure 1-15 Card on Chart

105. ALTERNATE SECTION

In all of your flights in VT-10/4 for which a jet log is required, you plan for an alternate airfield.

Figure 1-16 is the bottom portion of the front of the jet log. This is where you enter your alternate data.

ALTERNATE		ROUTE			ALTITUDE			FUEL		TIME	
ALT ELEV		APC CONT			TOWER			GND CONT			

Figure 1-16 Alternate Information

ALTERNATE - Your alternate airfield's name and its three-letter identifier.

ROUTE - The route you fly to your alternate.

ALTITUDE - Selected altitude to alternate. Leave blank.

FUEL - Leg fuel to your alternate. Leave blank.

TIME - The ETE to your alternate. Leave blank.

ALT ELEV - Alternate airfield elevation.

APC CONT - Approach control frequency serving the alternate airfield.

TOWER - Tower frequency.

GND CONT - Ground control frequency.

In the T-34C/T-6A, you plan three separate profiles to your alternate: cruising altitude, 5000 feet, and Bingo. The following example is for a T-34C profile.

The cruising profile is planned from destination IAF to alternate IAF at cruising airspeed and altitude. Enter this information on the line above the word 'Alternate' on the jet log as seen in Figure 1-17. Writing across, you start with the direct symbol followed by the radial/DME of the IAF. Our alternate airfield is NAS CECIL FIELD and its IAF is NZC 355011. Cecil's TACAN channel is 88. The course from the VAD 005010 to the NZC 355011 is 122°. Plot each of these points on your enroute chart and measure the distance and magnetic course between them. The distance is measured in a similar manner.

Finally, in the NOTES section, disregard the printed FRCST ALT, and list parameters under which you would fly to your alternate (i.e., your TAS, Fuel Flow, and Altitude).

NOTE

Split line entries are not necessary in the ALTERNATE section. The ETE and leg fuel are calculated in the same manner that they were in the ROUTE OF FLIGHT section.

D▶ 15K NZC355011	88	122	81	22		100				222 / 3R	
ALTERNATE NAS CECIL (NZC)		ROUTE D▶			ALTITUDE				FUEL		TIME
ALT ELEV 80'		APC CONT 379.6			TOWER 360.6				GND CONT 384.4		

Figure 1-17 Alternate Section

The second alternate profile is planned at 5000 feet MSL from destination IAF to alternate IAF.

At 5000 feet, the associated airspeed remains at 190 KTAS. This altitude has a fuel flow of 283 pounds per hour. Remember that the winds at 5000 feet are 220/20.

	⊕→										200	TAS–190
5K	NZC355011	88	122	81	24		115				2R	FF–283

Figure 1-18 Same as Cruising Profile

In Figure 1-18, you utilize the same two IAFs as you did in the cruising profile; therefore, all of this block up to and including the distance is identical to the preceding profile. Your ETE is now based on conditions predicted at 5000 feet (i.e., 190 KTAS, wind of 220/10, fuel flow of 283 PPH).

NOTE

The ETE changes to 24 minutes.

The third alternate profile is titled Bingo. The word Bingo is a Navy originated term referring to a "go" or "no go" decision based on your fuel state. When you compute a Bingo fuel number, it represents the minimum amount of fuel you must have in order to fly to an alternate/divert airfield and land safely with a certain amount of reserve fuel aboard. Bingo fuel therefore represents a decision point. Never go below your Bingo fuel. If you do, you lose your option of going to an alternate/divert field.

Bingo fuels are computed for both IFR and VFR circumstances. The IFR option guarantees more reserve fuel than the VFR. Bingo fuels are based on aircraft characteristics and differ with each type of aircraft. Here in VT-10/4, you compute your Bingo fuel utilizing IFR Bingo information only.

The Bingo profile represents the scenario of your aircraft flying an approach down to minimums and not being able to land. Therefore, your position is very close to overhead the field. Our flight path is measured from our destination airfield (where we executed a missed approach) directly to our alternate airfield, because a “Bingo” can be such a critical evolution.

To get the proper course and distance, simply connect the two aerodromes depicted on your enroute chart and take the measurements in the same manner as you did with all previous legs of flight.

The course/distance in our example is 122º/82 NM. Enter the Bingo chart below between 50/100 NM and interpolate for the IFR Bingo fuel. Additionally, interpolate for the best altitude, indicated airspeed and descent point.

T-34C BINGO				
DISTANCE TO BASE NM	FUEL REQUIRED LBS	CRUISE ALTITUDE FT	CRUISE IAS KTS	DESCENT DISTANCE NM
50	184	10,000	136	21
100	239	18,000	132	39
150	287	20,000	131	43
200	336	20,000	131	43
250	384	20,000	131	43
300	431	20,000	131	42
350	479	20,000	131	42
400	527	20,000	131	42
450	575	20,000	131	41
500	622	20,000	131	41

Figure 1-19 T-34C Bingo Chart

Note in line four in Figure 1-20 how the data is entered. Your route of flight is direct to the airfield NZC. The course and distance from destination aerodrome to alternate aerodrome is 122°/82 NM. Interpolating for 82 NM, an IFR Bingo fuel of 220 lbs is calculated. Altitude, IAS, and descent point information are listed in the notes. The front of the jet log is now complete.

15K NZC355011	88	122	81	22		100				222 / 3R	
ALTERNATE NAS CECIL (NZC)		ROUTE			ALTITUDE			FUEL		TIME	
ALT ELEV 80'		APC CONT 379.6			TOWER 360.6			GND CONT 384.4			
5K NZC355011	88	122	81	24		115				200 / 2R	TAS- 190 FF- 283
BINGO NZC	88	122	83			220					

Figure 1-20 T-34C Bingo Fuels

NOTE

T-34C Bingo fuels provide you with 113 lbs of reserve fuel on deck at your alternate. For planning purposes, all Bingo distances less than 50 NM use profile data for a 50 NM distance.

The back of the jet log provides you with spaces for a summary of your fuel calculations. Additionally, spaces are provided for information concerning facilities at your destination, alternate, and enroute emergency airfields.

106. FUEL PLAN SECTION

The backside of the jet log has a fuel plan, which is completed during preflight planning in order to simplify the process of making decisions during the course of the flight. Figure 1-21 depicts a breakdown of a fuel plan for this flight:

FLIGHT LOG

FUEL PLAN

1. CLIMB/ROUTE DEST IAF	305	6. START/TAXI	40
2. ROUTE ALT IAF (If required)	100	7. TOTAL REQUIRED) (4, 5, & 6)	545
3. APPROACHES	40	8. TOTAL ABOARD	815
4. TOTAL (1, 2, & 3)	445	9. SPARE FUEL (8-7)	270
5. RES 10% OF 4 (Min 20 mins)	60		

Figure 1-21 Fuel Plan

CLIMB/ROUTE DEST IAF – This figure is your total fuel burned from start to arrival at the IAF. This number is taken directly from the front of the jet log.

ROUTE ALT IAF – This figure is the fuel required to go from your destination IAF to your alternate IAF at cruising altitude. (ALTERNATE PROFILE #1)

APPROACHES – For preflight planning, use 40 lbs of fuel for each planned approach.

TOTAL (1, 2, & 3) – The sum of lines 1, 2, and 3.

RESERVE 10% OF LINE 4 (Min 20 mins) – This is your required reserve fuel. It is either 10% of the sum listed in line 4, or pre-computed reserve fuel (60 lbs for T-34C, 125 lbs for the T-6A). Choose the higher of the two.

START/TAXI – 40 lbs

TOTAL REQUIRED (4, 5, & 6) – The sum of lines 4, 5, and 6.

TOTAL ABOARD – 815 lbs.

SPARE FUEL (8-7) – The difference between lines 8 and 7. This figure is the final determinant for your "go" or "no go" decision. If you have at least zero spare fuel, you can legally fly your route under the conditions expected in preflight planning. If your spare fuel is less than ZERO, your flight, as planned, is not feasible. You should revise your planning using more favorable parameters.

107. EMERGENCY "BINGO" TO ALTERNATE SECTION

The EMERGENCY BINGO section summarizes the flight profiles to your alternate airfield. Figure 1-22 is the completed EMERGENCY BINGO section for this flight.

	REQUIRED		APPPROACH		RES		TOTAL
LAST CRUISING ALT	100	+	40	+	60	=	200 (MCF)
INITIAL APP ALT	115	+	40	+	60	=	215
BINGO	↗ 15K	→	133KIAS	↘	32NM	=	220

Figure 1-22 Emergency "Bingo" to Alternate

LAST CRUISING ALT - These numbers relate to your first alternate profile (i.e., cruising at 15,000 feet from destination IAF to alternate IAF). The 100 lbs is taken directly from the front of the jet log, and the approach and reserve fuels are from the FUEL PLAN section.

INITIAL APP ALT - Your second alternate profile (i.e., at 5000 feet from destination IAF to alternate IAF). The 110 lbs is taken from the front of the jet log. The approach and reserve fuels are from the FUEL PLAN section. This alternate profile is planned at 5000 feet. In addition, the round numbers it provides lessens the need for interpolation. For practical purposes, this is a useful set of data, because frequently, your need to divert to an alternate is not known until you are near the IAF, ready to commence an approach.

BINGO - In the REQUIRED column, write the altitude to which you are climbing. In the APPROACH column, enter the IAS for the BINGO profile. In the RES column, enter the descent point. In the TOTAL column, copy the IFR Bingo fuel you computed from the Bingo chart (220 lbs in this case).

NOTE

The arrows are simply visual cues you may use to remind yourself of the climb (↗) and descent (↘).

108. CHECKLIST/DESTINATION/ALTERNATE SECTION

The final sections of the jet log concern useful information you as an air crewmember should know about your destination, alternate, and enroute emergency fields. It is mostly self-explanatory, however, some useful hints follow:

a. **RWY LENGTH** - List the length and width of the runway on which you predict you will land. Utilize the most precise information available (i.e., IFR Enroute Supplement and/or Approach Plates).

b. **LIGHTING** - Use your IFR Enroute Supplement and Approach Plates to paint an easily discernable picture of the lighting facilities available. Convert codes from your publications into plain English and/or diagrams.

c. **FUEL/JASU/LOX** - Regard these as questions concerning the availability of these items. You may use J-4, J-5, J8 and Jet A fuel for the T-34C and J-4, J-5, J-8, Jet A, A-1 and Jet B for the T-6. The JASU unit for the T-34C and the T-6A is the NC-5 or NC-8A at USN and USMC bases. The T-34C utilizes LPOX or LHOX. The T-6A has its own Onboard Oxygen Generating System (OBOGS).

d. **ATIS** - This refers to whether or not the field has a UHF ADF/NDB. Most USN and USMC Air Stations possess this capability. In this space, the appropriate ATIS frequency is recommended.

e. **METRO** - The appropriate METRO frequency is recommended.

f. **RAPCON** - The approach control frequencies for your destination listed on the front of your jet log, and the approach control frequencies at your alternate.

g. **PAR MINS** - The PAR and associated weather minimums for the predicted runway. These are adjusted, if necessary, to conform to single-piloted absolute minimums.

h. **TAC MINS** - The published TACAN and weather minimums for your predicted runway.

i. **ARR GEAR** - As in the LIGHTING section, use your publications to determine exactly what is available and write it down in clear and understandable terms/diagrams.

j. **PUBS, NOTAMS, FUEL PACKET, FLASHLIGHT, WALLET, ETC.** - Simply place check marks in these blocks if you are satisfied that you have everything you need for your particular flight.

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH	8000' X 150'	12,500' X 200'	NAS WHITING
LIGHTING	VASI/HIRL	HIRL	ID NSE
FUEL/JASU/LOX	J4/MD-3/YES	J4/NC-5/YES	CH 70X
ATIS	270.1	276.2	PAGE NO. 385
METRO	342.5	317.0	MARIANNA MUNI
RAPCON	285.6	379.9	MAI
PAR MINS	431/24 (200-1/2)	360-1/2 (380-1/2)	87X
TAC MINS	580/24 (400-1/2)	280-1/2 (300-1/2)	B-316
ARR GEAR	OVRN/BAK-12	OVRN/BI-DIR	TALLAHASSE COMM
PUBS	✓	✓	TLH
NOTAMS	✓	✓	122X
FUEL PACKET	✓	✓	B-505
FLASHLIGHT WALLET, ETC.	✓	✓	

Figure 1-23 SE Jet Flight Checklist

109. EMERGENCY FIELDS SECTION

Choose emergency divert fields close to your route of flight. They are spread along your route, so there is always one nearby. Do not list your destination or your alternate in this section. If possible, choose military fields with services compatible to your aircraft. If no military fields are nearby, select any field with at least 5000 feet of hard surface runway and compatible approach.

Write out the name of the field.

ID - List its 3-letter identifier and Morse code of its NAVAID.

CH - List its TACAN channel number or VOR FREQ.

PAGE NO. - List the page on which you can find it in the IFR Enroute Supplement.

Figures 1-24 and 1-25 on the following pages depict a completed jet log for this flight.

FLIGHT LOG

DEP ELEV	CLNC DELIV	GND CONT	TOWER
NPA 30'	268.7	336.4	340.2
ATIS	**WIND AT ALT**	**TAS**	**LBS/ HR, LBS/MIN**
267.6	240/20	212	255/4.25

CLEARANCE 1F57 CL VAD ⊅▶ CEW FPR

↗▶ 10K 15K/+10 270.8 0700

DEPARTURE	TIME OFF		
RH 500/2			
DEST ELEV NZC 233'	**APC CONT** 285.6	**TOWER** 289.6	**GND CONT** 275.8

ROUTE TO	IDENT / CHAN	CUS	DIST	ETE	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
			237	1+07							
⊅▶ L/O	106	045	25 / 212	11 / 56		50	725				↗15K
⊅▶ CEW	106	045	15 / 197	4 / 52		20	705			229 / 2L	
V198 MAI	87	088 092	80 / 117	21 / 31		95	610			228 / 3R	
V198 SZW		109 108	41 / 76	11 / 20		50	560			223 / 4R	
V198 GEF		088 090	31 / 45	08 / 12		35	525			226 / 3R	
⊅▶ VAD005010		037	45 / 0	12 / 0		55	470			228 / 2L	
						305					
⊅▶ 15K NZC355011	88	122	81	22		100				222 / 3R	

ALTERNATE	ROUTE	ALTITUDE	FUEL	TIME
NAS CECIL (NZC)	⊅▶			
ALT ELEV 80'	**APC CONT** 379.6	**TOWER** 360.6	**GND CONT** 384.4	

⊅▶ 5K NZC355011	88	122	81	24		115				200 / 2R	TAS-190 FF-283
BINGO NZC	88	122	83			220					

CNATRA-GEN 3760/14 (Rev 2-03) S/N 0197LLCF23761 (OVER)

Figure 1-24 SE Jet Flight Log Front

FLIGHT LOG

FUEL PLAN

1. CLIMB/ROUTE DEST IAF	305	6. START/TAXI	40
2. ROUTE ALT IAF (If required)	100	7. TOTAL REQUIRED) (4, 5, & 6)	545
3. APPROACHES	40	8. TOTAL ABOARD	815
4. TOTAL (1, 2, & 3)	445	9. SPARE FUEL (8-7)	270
5. RES 10% OF 4 (Min 20 mins)	60		

EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPPROACH		RES		TOTAL
LAST CRUISING ALT	100	+	40	+	60	=	200 (MCF)
INITIAL APP ALT	115	+	40	+	60	=	215
BINGO	15K	→	133KIAS	↘	32NM	=	220

CHECK LIST	DESTINATION	ALTERNATE	EMER FIELDS
RWY LENGTH	8000' X 150'	12,500' X 200'	NAS WHITING
LIGHTING	VASI/HIRL	HIRL	ID NSE
FUEL/JASU/LOX	J4/MD-3/YES	J4/NC-5/YES	CH 70X
ATIS	270.1	276.2	PAGE NO. 385
METRO	342.5	317.0	MARIANNA MUNI
RAPCON	285.6	379.9	MAI
PAR MINS	431/24 (200-1/2)	360-1/2 (380-1/2)	87X
TAC MINS	580/24 (400-1/2)	280-1/2 (300-1/2)	B-316
ARR GEAR	OVRN/BAK-12	OVRN/BI-DIR	TALLAHASSE COMM
PUBS	✓	✓	TLH
NOTAMS	✓	✓	122X
FUEL PACKET	✓	✓	B-505
FLASHLIGHT WALLET, ETC.	✓	✓	

CNATRA-GEN 3760/14 (Rev. 2-03) S/N 0197LLCF23761 (BACK)

Figure 1-25 SE Jet Flight Log Back

110. SUMMARY

A jet log is a preflight planning document that helps you in fuel planning and familiarizes you with the route to be flown. A flight seldom progresses as it is planned. However, a jet log used in the proper context aids you in making decisions affecting your fuel, distance, altitude, etc., to allow you to arrive at your destination with minimum problems. Additionally, it is a valuable tool, if properly maintained, for extracting information requested by ATC centers during flight.

111. SECTION REVIEW – JET LOGS

Given the following information, construct a jet log. For this example, use the TAS given in the problem.

Point of Departure: Tyndall AFB, FL

Destination: NAS Pensacola, FL

Alternate: Keesler AFB, MS

A/C: T-34C

Call Sign: 4F477

BUNO: 160275

TAS: 208

Departure Time: 1000 CST

Altitude: 9000 feet

Departure: Radar Departure

Arrivals: (NAS Pensacola) TACAN RWY 7R; (Keesler AFB) TACAN RWY 3

Wind Velocity at Cruise: 340/20

Wind at 5,000 feet: 250/10

Route of Flight: MAI, RRS, CEW, PENSI, NPA, IAF

Flight Planning Data: Use T-34C flight planning charts from Appendix F. Use T-6A flight planning charts from Appendix D.

Flight Planning Data (TP-6 ET)

Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	Keesler AFB, MS
ALTERNATE:	Hattiesburg-Laurel Regional
ROUTE OF FLIGHT:	MENTR9 TRADR BFM AXSIS GCV WIGGO GPT BIX203011
APPROACHES:	TACAN RWY 03 at Keesler AFB, LOCALIZER RWY 18 at Hattiesburg-Laurel Regional
ALTITUDE:	14,000 FT
TAS:	Use altitude charts

Meteorological Data

CLIMB WINDS:	Calm
WINDS AT 14,000:	350/25
WINDS AT 5000:	350/10

CHAPTER TWO

DD 175 FLIGHT PLAN

200. INTRODUCTION

Before undertaking flight out of the local area in any aircraft, a properly filed flight plan is required. The Military Flight Plan used for flights within the North American region is the DD 175. This unit will enable you to fill out the DD 175 correctly. Detailed instructions on procedures for filling out the DD 175 are contained in FLIP General Planning, Chapter 4. Figure 2-1 is a DD 175 Military Flight Plan.

201. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

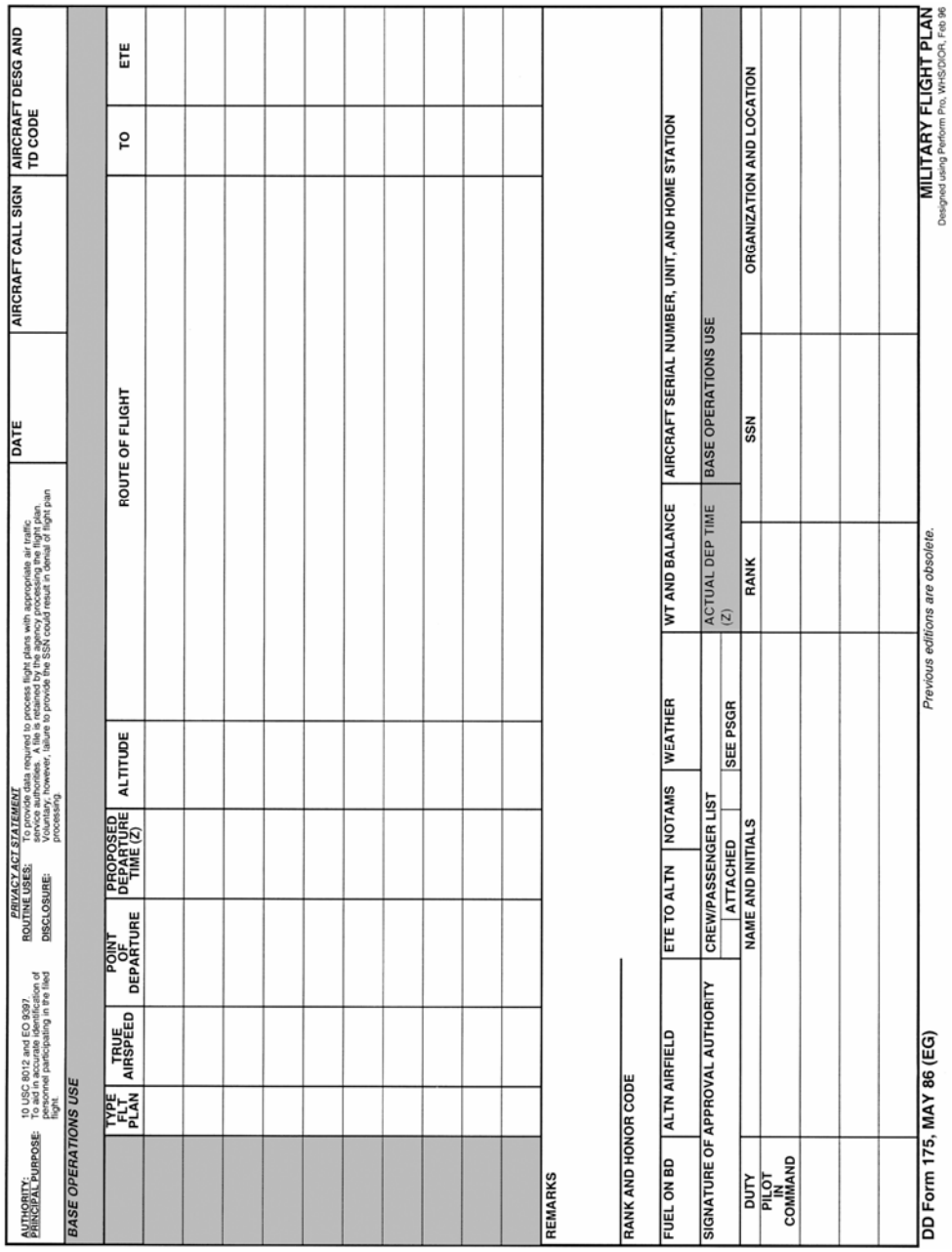
Use Flight Information Publications (FLIP), Notices to Airmen (NOTAMS) and other applicable flight information to plan and fly in the Federal Aviation Administration's Air Traffic (ATC) system.

ENABLING OBJECTIVES

F.10. Complete a DD 175 using FLIP and jet log information, given a mission, in accordance with appropriate PAT pub.

F.10.1 Extract data from FLIP General Planning.

F.10.2 Extract data from a jet log.



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 pan processing.

DATE | AIRCRAFT CALL SIGN | AIRCRAFT DESG AND TD CODE

BASE 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 | ACTUAL DEP TIME (Z) | BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND				

DD Form 175, MAY 86 (EG) *Previous editions are obsolete.* MILITARY FLIGHT PLAN Designed using Perform Pro, WHS/DIOR, Feb 96

Figure 2-1 DD Form 175

2-2 DD 175 FLIGHT PLAN

The purpose of a flight plan is to relay your desires for a selected air route to the ATC center. Generally, your flight plan is approved by the ATC agency exactly the way you planned it. However, realize your route of flight, altitude, etc., may be changed by the controlling agency. It is imperative that you correctly fill out a flight plan to avoid any delay in getting your flight clearance approved.

The DD 175 can take several forms:

1. IFR Flight Plan
2. Stopover Flight Plan
3. VFR Flight Plan
4. Composite Flight Plan

This section covers IFR Flight Plans. You rarely file a pure VFR Flight Plan; however, you may occasionally utilize a Composite Flight Plan. FLIP General Planning, Chapter 4 contains the applicable instructions.

202. DD 175 FLIGHT PLAN

Utilizing an IFR Enroute Supplement, your completed jet log, the applicable enroute low altitude chart, and FLIP, General Planning, Chapter 4 we will fill out a DD 175 IFR Flight Plan step by step.

NOTE

The jet log used is the example constructed in Chapter 1.

Date

The actual **local date** at the time and place you submit your flight plan for transmission.

DATE
15MAY03

Figure 2-2 Date

Aircraft Call Sign

The call sign for all VT-10's T-34C aircraft starts with 1F (i.e., One foxtrot) or 4F for VT-4 and is followed by a three-digit number. On this flight, our call sign is 1F57. This call sign must be preceded by a service code before we enter it in the box.

SERVICE CODES			
A	Air Force	**VM**	Marine Corps
VV	Navy	**R**	Army
C	Coast Guard		

Figure 2-3 Service Codes

Since we are flying in a Navy aircraft, therefore enter VV1F57. However, when we speak our call sign on the radio, we say "Navy 1F157" or simply "1F157" if this will not result in confusion with other aircraft.

DATE	AIRCRAFT CALL SIGN
13 Oct 03	VV1F157

Figure 2-4 Date and Aircraft Call Sign

VT-10's T-34C/T-6A aircraft use a tactical call sign KATT. This call sign coupled with a three-digit number completes the call sign. The service code is not necessary because the word KATT implies "U. S. NAVY, VT-10, T-34C/T-6A Aircraft." The tactical call sign for VT-4 aircraft is BUCK.

AIRCRAFT CALL SIGN
KATT 855

Figure 2-5 Aircraft Call Sign

203. AIRCRAFT DESIGNATION AND TD CODE

This block is completed in the following manner:

The first part is the type of aircraft you are flying, (i.e., T-6, T-2, T-39, F-14) without the model identifier. Therefore, although our aircraft might be T-6A we omit the model identifier A.

TD CODE refers to the transponder/navigation equipment aboard your aircraft and is determined by using the chart (Figure 2-6) found in FLIP, General Planning Chapter 4.

One of the following suffixes will be added to aircraft designation to denote Transponder/Navigational Aids available.	Transponder Only	Area Nav Equipment	TACAN Only	DME
No Transponder		W	M	D
Transponder W/No Mode C	T	C	N	B
Transponder W/Mode C	U	R	P	A

Figure 2-6 Transponder Table

The T-2 translates to a P since it possesses a TACAN only and a Transponder W/Mode C. The T-34 translates to an A, since it has a VOR and a TACAN and the T-6 translates to G since it possesses GPS.

AIRCRAFT DESG AND TD CODE
T-34T/A TEX2/G

Figure 2-7 Aircraft Desg and TD Code

Type Flight Plan

Enter I (IFR) or V (VFR) as appropriate for that segment. Do not combine I and V on the same line.

True Airspeed

Simply copy the cruise TAS you computed and used to plan your flight/jet log.

Point of Departure

The three-letter identifier for your departure airfield.

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE
I	210	NPA

Figure 2-8 Point of Departure

Proposed Departure Time (Z)

Your proposed T/O time converted to ZULU (Greenwich Mean Time). Figure 2-9 displays the time zones in the United States.

NOTE

All times written on a DD 175 are in ZULU.

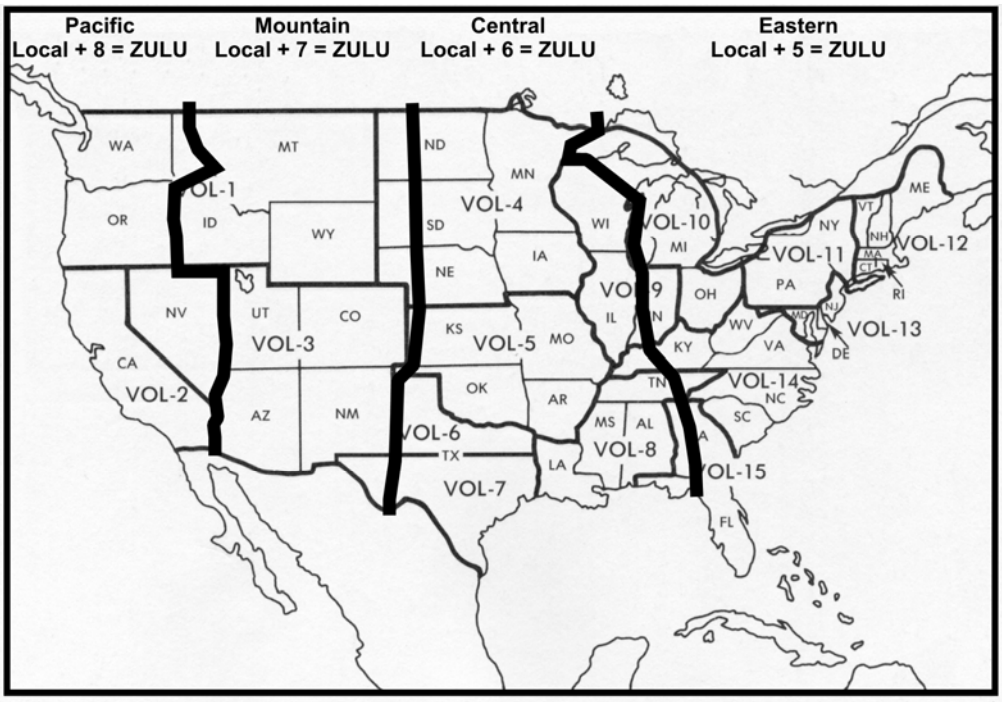


Figure 2-9 Time Zones

The Eastern Time Zone is five hours behind Greenwich and as we proceed west, the differences increase by one hour. The Pacific Time Zone is eight hours earlier than Greenwich; therefore, to convert U. S. time zones to (Z) add the appropriate conversion factor to the U. S. time.

NOTE

During periods of daylight savings time, U. S. clocks are turned ahead by one hour. The conversion factors are one hour less, i.e., EDT = +4, CDT = +5, etc.

The IFR Enroute Supplement contains appropriate ZULU conversion factors in each aerodrome listing. Since (Z) is already printed on the form itself do not repeat it. Leave the ACTUAL DEP TIME block blank. This is filled in by ATC personnel on learning of your T/O time. Our departure time is 0900 CST. The appropriate ZULU correction factor is +6 so our proposed (Z) T/O time is 1500.

PROPOSED DEPARTURE TIME (Z)
1500

Figure 2-10 Proposed Departure Time

Altitude

This block is used to denote your initial cruising altitude. When working with MSL altitudes enter the altitude desired in hundreds of feet, i.e., for 6000 feet enter 60, for 17,000 feet enter 170. When working with flight levels, just drop the FL and enter the three-digit number; i.e., FL 330 becomes 330, FL 180 is 180.

ISED TURE (Z)	ALTITUDE	ALTITUDE
	150	60

Figure 2-11 Initial Cruising Altitude

204. ROUTE OF FLIGHT

Recall Route of Flight from Section 1: NPA Direct CEW, V198 to MAI, V198 to TLH, V198 to GEF Direct VAD 006010.

Recall from Section 1 that this example makes use of a direct leg to CEW from NPA. This can be requested by entering in the REMARKS section "REQUEST RADAR DEPARTURE." This is optional.

REMARKS
REQUEST RADAR DEPARTURE

Figure 2-12 Remarks

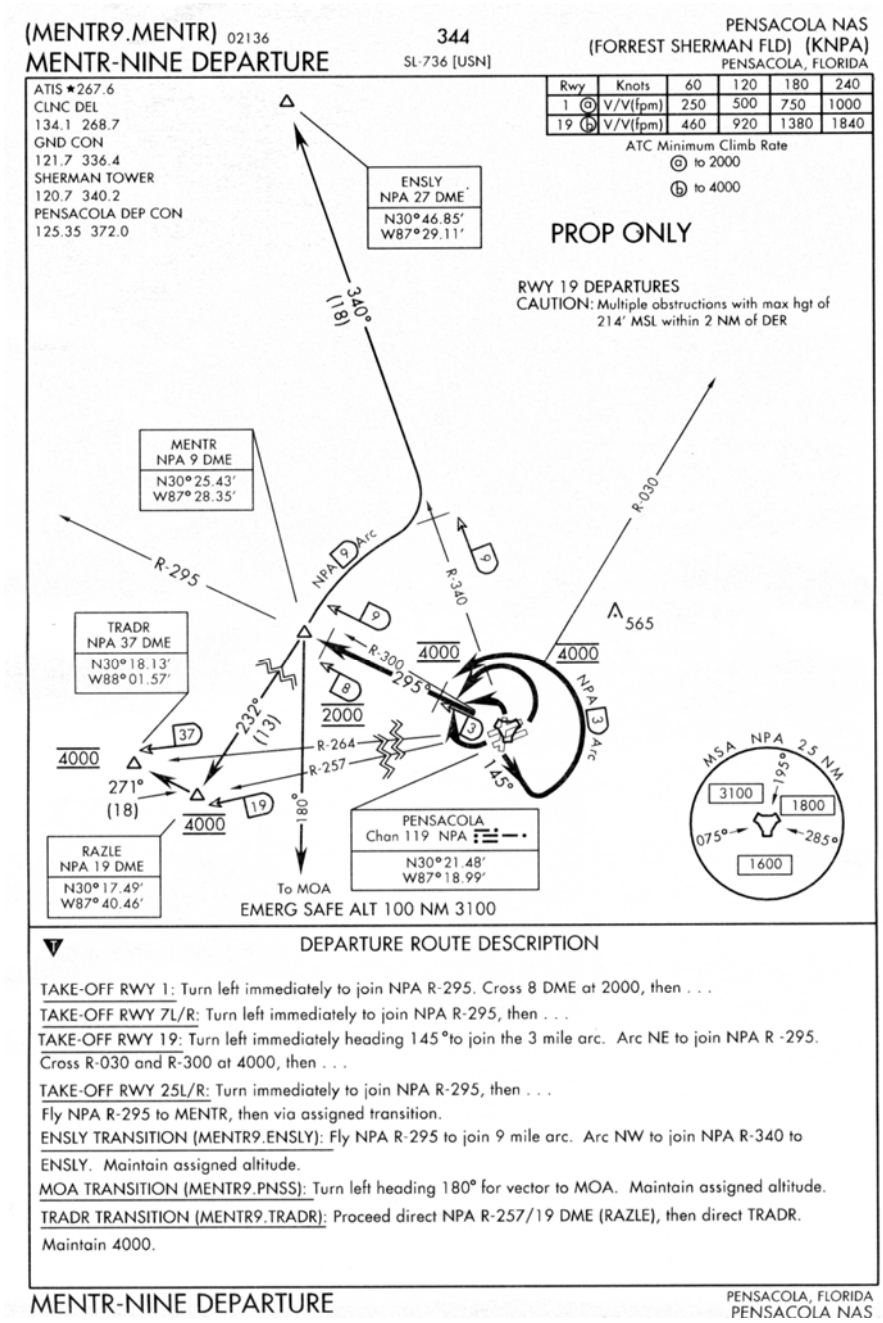


Figure 2-13 MENTR-NINE Departure

2-8 DD 175 FLIGHT PLAN

If a DP/SID is used, enter the coded identifier (if none is available, enter the name and number), followed by either the termination point or the transition fix.

Look at the MENTR-NINE in Figure 2-12. There are three possible choices:

ENSLY Transition

MOA Transition

TRADR Transition

Each is written as follows:

MENTR9.ENSLY

MENTR9.PNSS

MENTR9.TRADR

Therefore, if a DP/SID is used, it is the first entry in the route of flight.

As stated earlier, the example route does not utilize a DP/SID. Therefore, the first point in the route of flight is the planned NAVAID or fix for entering the enroute structure; i.e., VOR, TACAN/DME fix, named intersection etc.

PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
1500	150	CEW V198 GEF VAD006010	VAD	1+06

Figure 2-14 Route of Flight

The route is written without the preposition "TO" connecting the points. In addition, there are no commas or other punctuation marks separating them. If the route spills over to two or three lines, it is all right. Notice that Marianna (MAI) and Tallahassee (TLH) are not listed. Since the segment of V198 we are using starts at CEW and passes through MAI on the way to GEF, there is no need to list MAI (or any other TACAN that lies on an airway between your entry and exit points for that airway).

The symbol Ð► never appears on a DD 175. To indicate direct, list the points or NAVAIDs in correct order without any words or symbols preceding them. For example, if we had a flight from NAS Pensacola to CEW, then J-39 to MGM, J-4 to MEI, direct from MEI to SJI and then direct to the Navy Pensacola IAF we would write:

PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	140	CEW J39 MGM J4 MEI SJI NPA210014	NPA	

Figure 2-15 Route of Flight 2

Named intersections are listed in the ROUTE OF FLIGHT section by name rather than radial/DME. If we were taking a flight from Navy Meridian to Vulcan, through the SALMS intersection, to Memphis, to Navy Memphis IAF, we enter:

PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	140	VUZ J39 SALMS J118 MEM NQA030025	NQA	

Figure 2-16 Route of Flight 3

Notice in both preceding examples that our last point is an IAF. Most IAFs you use are defined by a TACAN radial and DME. When writing that information on a DD 175, the numbers corresponding to the radial/DME are given together as six digits. Note how the following NPA TACAN fixes are written:

015°/5 NM = 015005

125°/100 NM = 125100

001°/1 NM = 001001

NOTE

It is not necessary to file to the IAF as your last point. You may also use any NAVAID nearest the field.

205. TO/ETE BLOCKS

In the TO block, enter the three-letter identifier of the aerodrome of your intended landing opposite the last line entry in the route of flight. In the ETE block, write the time (in hours and minutes) that you computed on your jet log to the IAF. Do not include any time for the instrument approach.

TO	ETE
VAD	1+06

Figure 2-17 TO/ETE

It is imperative that your ETE is accurate. If you lose your radio enroute in IMC conditions and cannot land VMC, you would be expected at the VAD IAF one hour and six minutes after T/O. ATC would clear traffic so your flight path would not be impeded and you could commence an approach from the IAF at that time.

Remarks, Rank/Honor

On an ordinary IFR Flight Plan, with the exception of the previously explained "REQUEST RADAR DEPARTURE," the REMARKS section also includes clarification of your intentions, serving requirements, etc. as pertaining to your flight. The RANK/HONOR block permits you to alert your destination aerodrome that a VIP is aboard. Through the use of codes, you can relay information to the aerodrome officials regarding that person and his/her wishes upon arrival.

The use of these blocks is covered in FLIP General Planning, Chapter 4.

Fuel On Board

The entry varies from aircraft to aircraft and depends on the aircraft mission profile.

A T-34C/T-6A with a full load can last 3+00 hours unless on a low level flight. A T-1 can last 4+10 for INAV and 3+30 for VNAV.

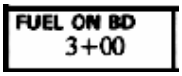


Figure 2-18 Fuel on BD

Alternate Airfield

Enter the three-letter identifier for your alternate airfield.

ETE to Alternate

Enter time required to fly from original destination to alternate at last cruising altitude. For this example, we calculated 22 minutes, therefore enter 0+22.

NOTAMS/Weather

A preflight reminder to check NOTAMS and note weather with DD 175-1 briefing number.

Weight and Balance

Enter ON FILE.

Aircraft Serial Number/Unit/Home Station

Aircraft serial number refers to the BUNO found on every USN/USMC aircraft. It is a six-digit number and is obtained from the Duty Officer or Maintenance Control. If the BUNO is not known when filing the flight plan, enter ON FILE.

Unit and Home Station are the name of the Airwing to which the aircraft is attached, followed by a slash (/) marker and the three-letter identifier of the air station where that squadron is based.

AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
260650/CTW-6/NPA

Figure 2-19 Aircraft Serial Number, Unit, and Home Station

Signature Of Approval Authority

Navy, Marine Corps, and Air Force pilots have the authority to approve their own flight plans. Therefore, they sign the flight plan in this block.

Crew/Passenger List

Your pilot is listed first on the PIC line using last name and initials only. Enter his/her rank, put "On File" for SSN, and his/her organization and location (i.e., his/her squadron and where it is based).

On the next line, list your status (SNFO) followed by the appropriate information.

If members of the crew differ in branch of service, this information is noted in the manner indicated on Figure 2-20. Do not indicate if crewmembers are regular or reserve.

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	GUNGHO, I. M.	CAPT	123-45-6789	VT10/NPA (USMC)
SNFO	LOST, U. R.	ENS	987-65-4321	VT10/NPA

DD FORM 175, MAY 86 0102-LF-001-7500 Previous edition obsolete MILITARY FLIGHT PLAN

Figure 2-20 Different Branch of Service

Figure 2-21 is a completed 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
13 OCT 03	VV1F157	T-34 T/A TEX 2/G

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	210	NPA	1500	150	CEW V198 GEF VAD006010	VAD	1+06

REMARKS
VAD 5

RANK AND HONOR CODE
N/A

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
3 + 00	NZC	0 + 22	✓	7755	ON FILE	260650/CTW-6/NPA

SIGNATURE OF APPROVAL AUTHORITY: I M GUNGHO
CREW/PASSENGER LIST: ATTACHED / SEE PSGR
ACTUAL DEP TIME (Z)
BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	GUNGHO, I. M.	CAPT	123-45-6789	VT10/NPA (USMC)
SNFO	LOST, R. U.	ENS	987-65-4321	VT10/NPA

DD Form 175, MAY 86 (EG) Previous editions are obsolete. MILITARY FLIGHT PLAN
Designed using Perform Pro, WHS/DIOR, Feb 96

Figure 2-21 Completed Flight Plan

Stopover Flight Plan

On this flight, after you have landed at Moody AFB, your flight plan is closed out. To fly elsewhere after getting gas or a Moody Burger, you would have to file another flight plan. A Stopover Flight Plan enables you to avoid re-filing by listing subsequent legs of your flight on the original flight plan.

A Stopover Flight Plan builds upon your previous leg IFR Flight Plan, by insertion of the appropriate second leg data. The top of your flight plan remains the same; however, changes will occur in your ROUTE OF FLIGHT section.

Let us say we plan for a one-hour stopover at Moody. The route is: VAD direct PZD, V159 to EUF, V241 to CEW, direct to NPA213014.

Entries for type flight plan, TAS, point of departure and altitude follow previous procedures. Proposed departure time must be calculated. Remember, our proposed T/O time must be calculated. Recalculate departure time at Moody using ETD and time enroute. Our T/O from NPA was 1500Z. We planned 1+06 enroute (the 1 + 06 refers to our flight time from T/O to the IAF at Moody AFB). However, we did not land 1 + 06 after T/O because we used some time in the approach. Because approaches differ in length, for planning purposes we will consider all approaches to consume 20 minutes.

Therefore:

1500Z	
1+06	ETE
1606Z	
+ 20	APPROACH
1626Z	LAND MOODY
1+00	ON DECK TIME
= 1726Z	PROPOSED T/O TIME FROM MOODY

Enter 1726 in PROPOSED DEPARTURE TIME block.

The successive leg is entered in the same manner as the initial leg with some additional entry considerations.

For jet log planning purposes, measure course and distance from your departure point to your first navigational checkpoint. Because the type of departure is unknown, do not address it in the REMARKS section. All Stopover Flight Plans assume a radar departure when leaving the first destination airfield.

Since we are heading west, an altitude of 14,000 feet is filed for the return leg to NPA, and is entered as follows:

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
1	212	NPA	1500	150	CEW V198 GEP VADOO6010	VAD	1 + 06
1	210	VAD	1726	140	PZD V159 BUP V241 CEW NPA213014	NPA	1 + 19

Figure 2-22 Return Leg to NPA

Following our route we supply fuel and alternate airfield information. The blocks on the original flight plan are already filled so we find another way. Next to our last route of flight entry, in parentheses, we write our amount of fuel (in hours and minutes), alternate airfield, and the ETE. Our alternate is VPS (ELGIN AFB) and it takes 40 minutes to get there.

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT
1	212	NPA	1500	150	CEW V198 GEP VADOO6010
1	210	VAD	1726	140	PZD V159 BUP V241 CEW NPA213014
					(3 + 00 VPS 0 + 40)

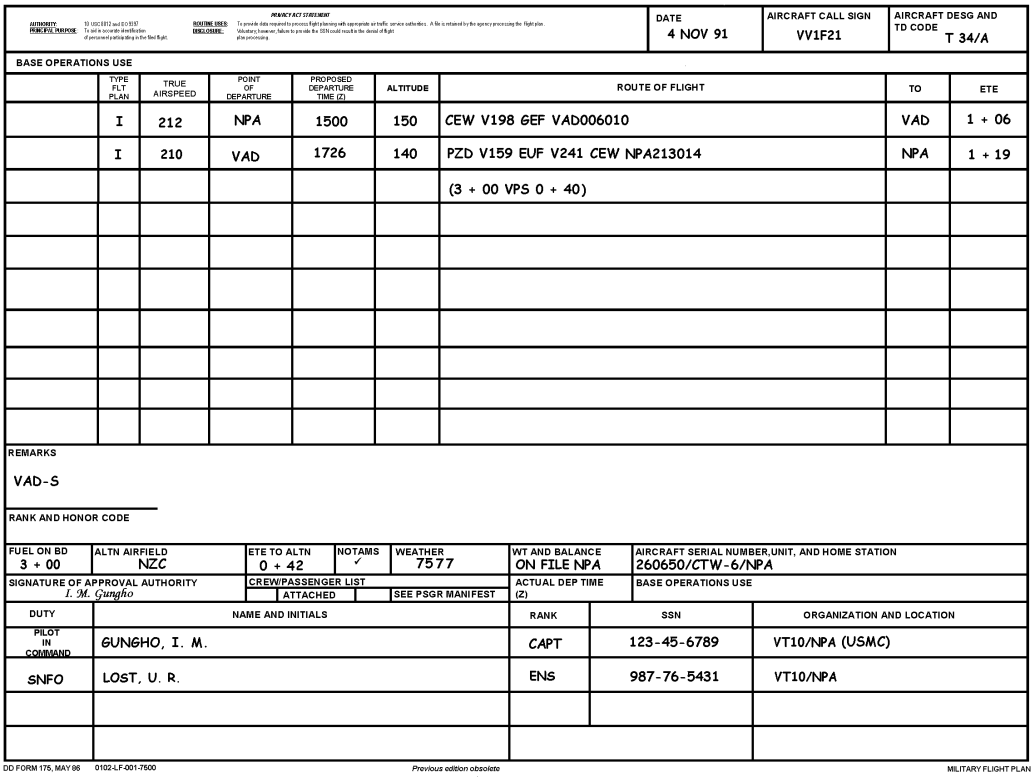
Figure 2-23 Fuel, Alternate, and ETE

Finally, we intend to land at Navy Pensacola, and our flight will take one hour and 19 minutes. We enter them in our TO and ETE blocks. Our ROUTE OF FLIGHT section is now complete.

2-14 DD 175 FLIGHT PLAN

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
1	212	NPA	1500	150	CEW V198 GEP VADOO6010	VAD	1 + 06
1	210	VAD	1726	140	PZD V159 BUP V241 CEW NPA213014	NPA	1 + 19
					(3 + 00 VPS 0 + 40)		

Figure 2-24 TO and ETE Blocks



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 planning 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 the denial of flight plan processing.

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
4 NOV 91	VV1F21	T 34/A

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	212	NPA	1500	150	CEW V198 GEF VAD006010	VAD	1 + 06
	I	210	VAD	1726	140	PZD V159 EUF V241 CEW NPA213014	NPA	1 + 19
						(3 + 00 VPS 0 + 40)		

REMARKS
VAD-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
3 + 00	NZC	0 + 42	✓	7577	ON FILE NPA	260650/CTW-6/NPA

SIGNATURE OF APPROVAL AUTHORITY	CREW/PASSENGER LIST			ACTUAL DEP TIME (Z)	BASE OPERATIONS USE
I. M. Gungho		ATTACHED	SEE PSGR MANIFEST		

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	GUNGHO, I. M.	CAPT	123-45-6789	VT10/NPA (USMC)
SNFO	LOST, U. R.	ENS	987-76-5431	VT10/NPA

DD FORM 175, MAY 86 0102-LF-001-7500 Previous edition obsolete MILITARY FLIGHT PLAN

Figure 2-25 Void Time Calculations

206. TERMINAL AREA DELAYS

Often flight crews desire to practice approaches at airfields other than the departure field or destination. This is accomplished by filing for an enroute delay the procedures are contained in FLIP, General Planning, Chapter 4.

Using the previous example, we will file for an enroute delay on the way to MOODY AFB. You desire to shoot the VOR RWY 35 at Valdosta Regional (VLD). The field is located just west of MOODY and the IAF is the Valdosta VOR (OTK).

The first leg of your flight plan takes you to the IAF at Valdosta Regional and is completed as previously instructed with two exceptions.

The last item in the ROUTE OF FLIGHT section is the delay location identifier (VLD).

Do not make an entry in the TO column.

Following the ROUTE OF FLIGHT is a remark line to explain the delay. R D 0+20 VLD VAD:

R	Circled R indicates remarks to follow
D	Indicates delay
0+20	Indicates length of delay (one approach)
VLD	Delay location identifier
VAD	Destination identifier

You now need another leg to take you from your enroute delay to your destination. (Refer to the figure on the following page).

Do not forget to adjust your proposed departure time from MOODY to NPA to take into account the extra time utilized in shooting an approach at Valdosta Regional.

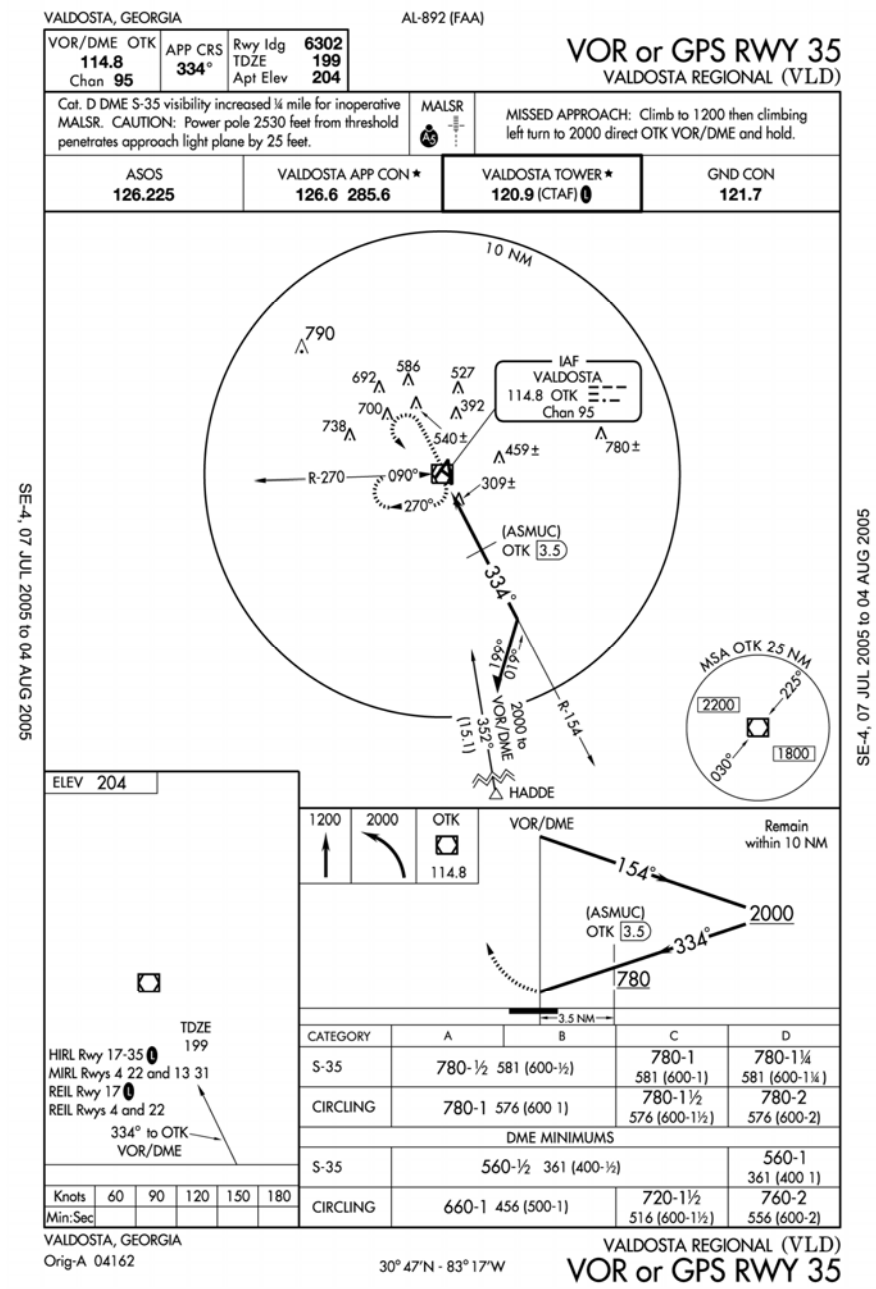


Figure 2-26 Valdosta VOR GPS RWY 35

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
04 NOV 91	KATT121	T-34 T/A

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	212	NPA	1500	150	CEW V198 GEF OTK VLD		1+02
						• D 0+20 VLD VLD		
	I	190	VLD	1622	50	VAD006010	VAD	0+04
	I	210	VAD	1746	140	ABY V159 EUF V241 CEW NPA213014	NPA	1+19
						(3+00 VPS 0+40)		

REMARKS
VAD-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
3+00	NZC	0+42	✓	7577	ON FILE	260650 / CTW-6 / NPA

SIGNATURE OF APPROVAL AUTHORITY | CREW/PASSENGER LIST: ATTACHED / SEE PSGR | ACTUAL DEP TIME (Z) | BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	GUNGHO, I. M.	CAPT	ON FILE	VT-10 / NPA (USMC)
SNFO	LOST, U. R.	ENS	ON FILE	VT-10 / NPA (USN)

DD Form 175, MAY 86 (EG) Previous editions are obsolete. MILITARY FLIGHT PLAN
Designed using Perform Pro, WHS/DIOR, Feb 96

Figure 2-27 DD 175

207. SUMMARY

We have completed a DD-175 IFR and Stopover Flight Plan with a Terminal Area Delay. You will use these extensively in your military flying career. Another type of flight plan you should become familiar with is the IFR/VFR Composite Flight Plan. This flight plan is a DD-175 with IFR legs as well as VFR legs. You will utilize this type of flight plan in VT-4/10 when flying on visual low level navigation routes in the T-6, T-1, and T-39. The exact procedures for completing a Composite Flight Plan are found in FLIP General Planning Chapter 4. Practical application is taught in the Navigation course.

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
13 OCT 03	VV1F157	T-34 T/A TEX 2/G

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	210	NPA	1500	150	CEW V198 GEF VAD006010	VAD	1+06

REMARKS
VAD 5

RANK AND HONOR CODE
N/A

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
3 + 00	NZC	0 + 22	✓	7755	ON FILE	260650/CTW-6/NPA

SIGNATURE OF APPROVAL AUTHORITY: I M GUNGHO
CREW/PASSENGER LIST: ATTACHED / SEE PSGR
ACTUAL DEP TIME (Z)
BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	GUNGHO, I. M.	CAPT	123-45-6789	VT10/NPA (USMC)
SNFO	LOST, R. U.	ENS	987-65-4321	VT10/NPA

DD Form 175, MAY 86 (EG) Previous editions are obsolete. MILITARY FLIGHT PLAN
Designed using Perform Pro, WHS/DIOR, Feb 96

Figure 2-28 IFR/VFR Composite Flight Plan

208. PRACTICE PROBLEM ONE

Completely fill out a DD 175 given the following information:

Enroute Delay Flight Plan:

Aircraft: T-34C

BUNO Number: 166911

Call Sign: 4F451

Departure Base: Pensacola Naval Air Station (NPA)

Departure Time: 1035L

(+6 Hours for ZULU for Winter Months @ Pensacola)

(+5 Hours for ZULU for Summer Months @ Pensacola)

Departure Date: 05 SEP 2002

Altitude Selection: Lowest appropriate above 15,000 Feet

True Air Speed: 210

Destination: Meridian Naval Air Station (NMM). Plan for the HI-TACAN RWY 19 Approach.

Alternate: Maxwell Air Force Base (MXF). Plan for the TACAN RWY 15 Approach.

Enroute Delay At Keesler Air Force Base (BIX). Plan for the TACAN RWY 3 Approach.

Route Of Flight:

1ST Leg, MENTR9 Departure to ENSLY then Brookley, Elsie (Then Practice Approach).

2ND Leg, Mindo to Eaton to Meridian to Navy Meridian.

Weather: VFR Winds Calm, Briefed by T-4105.

Estimated Time Enroute (ETE) For Leg 1: 0 + 41 Delay: 0 + 20 @ Kessler

Estimated Time Enroute (ETE) For Leg 2: 0 + 45

Estimated Time Enroute (ETE) To Alternate: 0 + 49

Crew: Pilot – Ulysses Robert Dupped, Capt, USAF, ON FILE (VT-4)

Student: Use your Name, Rank, SSN and Squadron

AUTHORITY: / PRINCIPAL PURPOSE:	10 USC 8012 and EO 9397. To aid in accurate identification of personnel participating in the filed flight.	PRIVACY ACT STATEMENT ROUTINE USES: / DISCLOSURE:	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.	DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESG AND TD CODE
				5 SEP 02	VV4F451	T-34 T/A

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	210	NPA	1535	160	MENTR9.ENSLY BFM V198 ELSIE BIX203011		0+41
						Ⓡ D 0+20 BIX NMM		
	I	210	BIX	1636	160	MINDO V114 LBY V455 MEI PIGMY	NMM	0+45

REMARKS

REQUEST RADAR DEPT BIX

RANK AND HONOR CODE

FUEL ON BD	ALTN AIRFIELD	ETE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
3+00	MXF	0+49	X	T-4105	ON FILE	166911, CTW-6, NPA

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

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	DUPPED, U.R.	CAPT	ON FILE	VT-4, NPA, (USAF)

DD Form 175, MAY 86 (EG) *Previous editions are obsolete.* MILITARY FLIGHT PLAN

Designed using Perform Pro, WHS/DIOR, Feb 98

Figure 2-29 DD 175 to Complete

209. PRACTICE PROBLEM TWO

Completely fill out a DD 175 given the following information:

Stop Over Flight Plan

Aircraft: T-34C

BUNO Number: 161011

Call Sign: 1F153

Departure Base: Pensacola Naval Air Station (NPA)

Departure Time: 0610L

(+6 Hours for ZULU for Winter Months @ Pensacola)

(+5 Hours for ZULU for Summer Months @ Pensacola)

Departure Date: 10 JUN 2002

Altitude Selection: Lowest appropriate above 15,000 Feet.

True Air Speed: 210

Destination: Meridian Naval Air Station (NMM). Plan for the TACAN Approach.

Route Of Flight:

1st Leg, MENTR9 Departure to ENSLY then Brookley. Elsie then to the Keesler IAF.

Stopover at Keesler Air Force Base (BIX). Plan for the TACAN RWY 3 Approach.

Plan for Radar Departure from BIX.

2nd Leg, Mindo to Eaton to Meridian to Navy Meridian IAF.

Alternate #1: Meridian Naval Air Station (NMM)

Alternate #2: Maxwell Air Force Base (MXF). Plan for the TACAN RWY 15 Approach.

Estimated Time Enroute (ETE) For Leg 1: 0 + 41

Estimated Time Enroute (ETE) For Leg 2: 0 + 45

Stop Over Delay: 1 Hour

Time To 1st Alternate: 0 + 49 Time to 2nd Alternate: 0 + 30

Weather: VFR Winds Calm, Briefed by 01-013

Crew: Pilot – Paul W. Herman, Capt, USMC, ON FILE (VT-10)

Student: Use your Name, Rank, SSN and Squadron.

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 DESIG AND TO CODE
10 JUN 02	VV1F153	T-34 T/A

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
	I	210	NPA	1110	160	MENTR9.ENSLY BFM V198 ELSIE BIX203011	BIX	0+41
	I	210	BIX	1311	160	MINDO V114 LBY V455 MEI PIGMY	NMM	0+45
						(3+00 MXF 0+30)		

REMARKS
REQUEST RADAR DEPT BIX-S

RANK AND HONOR CODE
N/A

FUEL ON BD	ALTN AIRFIELD	STE TO ALTN	NOTAMS	WEATHER	WT AND BALANCE	AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION
3+00	NMM	0+49	X	01-013	ON FILE	166911, CTW-6, NPA

SIGNATURE OF APPROVAL AUTHORITY | CREW/PASSENGER LIST: ATTACHED / SEE PSGR | ACTUAL DEP TIME (Z) | BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND	HERMAN, P.W.	CAPT	ON FILE	VT-10, NPA, (USMC)

DD Form 175, MAY 86 (EG) *Previous editions are obsolete.* MILITARY FLIGHT PLAN
Designed using Perform Pro, WHS/DIOR, Feb 96

Figure 2-30 DD Form 175

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CHAPTER THREE

SITUATIONAL AWARENESS – MAKING USE OF DR PRINCIPLES AND OTHER SKILLS

300. INTRODUCTION

Up to this point in Instruments we dealt with a "perfect" situation. It is assumed that every piece of equipment in the aircraft functions properly (i.e., TACAN #2 needle and DME will always be available). Fortunately, this is the case most of the time; however, there are times when even the best aircraft equipment no longer functions. This may be due to some problem with the aircraft or failure of the local NAVAID.

As the NFO on board, it is up to you and the pilot to keep track of where the airplane is going, where it is, and how it gets to its destination. This requires you to fall back on some fundamentals in order to get to your destination. It may be that the only information you have is heading, airspeed, and time.

This section covers how you can use the wind triangle, a fundamental of Dead Reckoning (DR), and logical thought processes to maintain course in flight and predict aircraft position.

301. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

C. Navigate an aircraft via visual references and navigation instruments with the assistance of a flight instructor.

ENABLING OBJECTIVE

C.11. Derive aircraft heading using dead reckoning techniques, a given course (±5°).

- C.11.1. Given any two components of the wind triangle, derive the third component.
- C.11.2. Predict aircraft position based on speed, distance, and heading.
- C.11.3. Using in-flight derived winds, determine appropriate heading to maintain a desired course while compensating for wind effect.

302. WIND TRIANGLE

If this were an ideal world in which to fly, there would be no wind. Set the aircraft to fly a track and the aircraft would not deviate. The same would be said for airspeed. TAS and GS would be one and the same. This is not the case as you have found out. There is one element that changes all of this – wind.

One of the most important tasks an NFO performs is determining what the wind is, where it is coming from and how fast. If an aircraft flies a constant heading and has any wind acting on it, its actual path over the ground or track is different from the aircraft's heading.

The relationship between wind and aircraft heading/TAS is illustrated by the wind triangle in Figure 3-1.

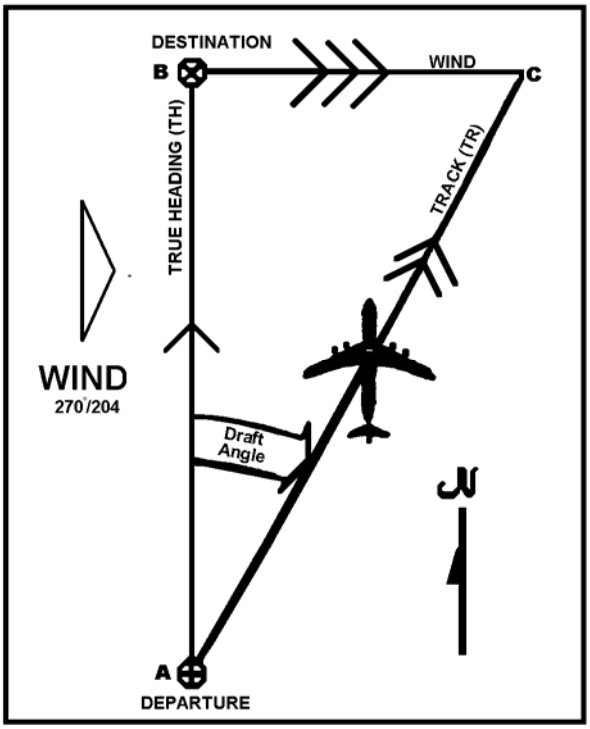

Figure 3-1 Relationship Between Wind and Aircraft Heading

The wind vector causes the aircraft to drift from its intended course. Additionally, the wind vector causes GS to be either less or greater than TAS (Figure 3-2).

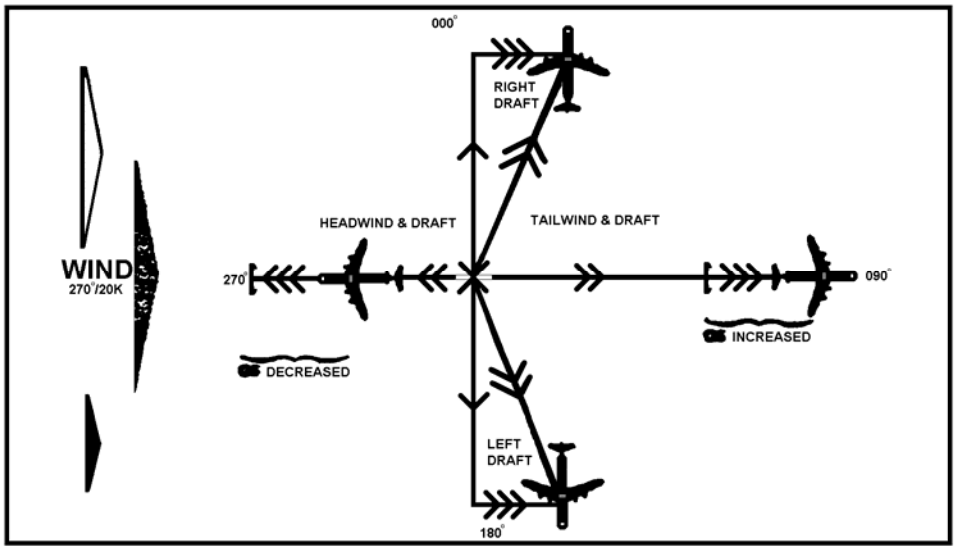

Figure 3-2 Wind Vector

Once wind is determined, maintaining course and predicting aircraft position is accomplished easily. This is basically what DR consists of – determining wind and predicting aircraft position.

303. DETERMINING WIND

Basic Instruments provides a method of determining wind. It is based on conducting a GS check and noting the amount of crab necessary to maintain course. Since this method was reinforced several times in previous exercises, no more time is devoted to an explanation. The importance of determining wind needs to be stressed.

If for some reason a GS check is not completed, the SNFO can estimate the wind by using the best information available: weather forecast winds. Using the wind face of the CR-2 to plot forecast winds and desired course, an SNFO can make an intelligent guess at what the GS is. This is not the best way, but it can work.

304. APPLICATION

As you have noticed the best way to determine wind is to complete a GS check as soon as practicable. Now let us look at what to do when the TACAN goes down! This usually means loss of DME or azimuth or both. In most cases, it is both. After rechanneling without results, you assume the TACAN is down and now you have a real problem: how to remain on course and determine when to turn at the next turnpoint.

Example

AG 701 is flying inbound to Macon (MCN) from Montgomery (MGM) on J40. A GS check was just completed indicating 360 kts. TAS is 300 kts. Aircraft is presently flying a heading of 083° for a course of 078° (Figure 3-3).

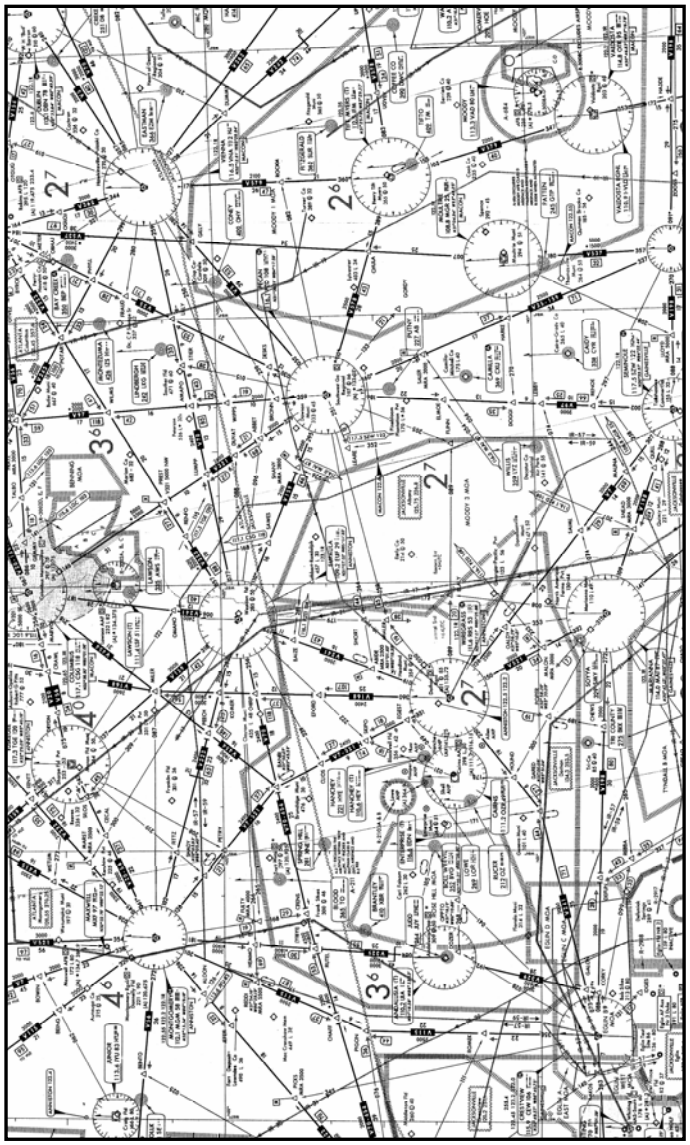

Figure 3-3 Chart Montgomery

3-4 SITUATIONAL AWARENESS

At 0900, you notice during your scan that the No. 2 needle is spinning and the DME is not functioning. There is no station IDENT. The last DME readout you had was 50 DME. Now the pilot wants to know when to turn.

Your action is:

Determine ETA at MCN

GS = 360 kts (6 NM/min)

Distance to turnpoint = 50

Therefore:

ETE = 8 min

ETA = 0908

Heading is maintaining course so no change is necessary.

What you have just done is perform DR. Based on all the information available, you have predicted when the aircraft will mark a turnpoint. There is no physical indication that you are at MCN, only your ETA will provide you an estimate.

As long as you have a GS, you can predict where the aircraft is over any distance.

Continuing the example, your route of flight has the aircraft MARK-ON-TOP MCN, then proceed to Alma (AMG) via J45. The pilot needs to know what heading to fly and what the ETA is to AMG (Figure 3-3).

The simple thing would be turn to 139º, the outbound course from MCN, at 0908. This does not account for any wind; therefore, the aircraft does not maintain course.

It is absolutely critical that the wind is calculated and accounted for, before making the turn at MCN.

Based on:

TAS = 300 kts

GS = 360 kts

CRAB = 5° right (083° for 078°)

Plotting on the CR-2 yields a wind vector of 235°/65 kts.

Your action is:

Plot 235°/65 kts on windface.

Set new course of 139° on TC mark.

Note a RCW = 65 kts and TW = 7 kts.

Based on a guide = number of 5; 65/5 = 13° right crab.

Turn to 152° (139° + 13° R) at 0908.

Estimate GS = 307 kts.

Therefore, ETA to AMG = 0926.

Once the wind (235/65) is determined it is immediately applied to the next leg in order to make an appropriate turn (152°). To continue, an ETA is predicted (0926) based on a wind derived GS.

Once again, we are applying DR principles. We use the best wind information available and predict what happens on the subsequent leg. Use of the CR-2 is encouraged to increase accuracy.

Theoretically, the entire route could be flown in this manner. Of course, winds do change and so, over a long flight, accuracy is degraded. By applying fundamental DR principles such as speed, time, distance, and wind, we can predict with reasonable accuracy our position and the time of arrival.

305. SUMMARY

Do not assume DR is strictly used as a last resort when everything else has gone wrong. You, as the NFO, should be able to predict where the aircraft is at a certain time (ETAs) and constantly update the wind. If you are on a leg that is too short to do an accurate GS check, as long as you have updated wind information, you can use it to predict a GS.

3-6 SITUATIONAL AWARENESS

CHAPTER QUESTIONS

Exercise A — Work the following problems. Strive for accuracy first, then speed. As you gain proficiency, you are able to complete each problem in two minutes or less.

	W/V	TAS	Tr	Drift	TH	GS
1.		175 kts	024°		030°	181 kts
2.		190 kts	085°		084°	215 kts
3.	078/24	200 kts			078°	
4.		122 kts	308°		310°	141 kts
5.		220 kts	338°		345°	232 kts
6.	045/30	182 kts			301°	
7.		450 kts	180°		190°	350 kts
8.	110/60	420 kts			080º	
9.		535 kts	119º		112º	540 kts
10.		350 kts	180º		180º	450 kts

Situation

1. Your W/V is 105/18 and your TAS is 165 kts and your TH is 032°. What is your drift and **GS**, and how long will it take you to go 103 NM?

2. The air vector is 100º, 307 kts. The ground vector is 105º, 280 kts. What is the value of the third vector?

3. From 1833 to 1900, you travel 209 NM. Your TAS has been 415 kts and TH of 225°. Your Tr was 231°. At 1900, you turn to a TH of 281°. If it is 298 NM to Point J (your next checkpoint), what is your ETA to J?

4. Your GS is 440 kts, drift 5° R, TH 050°, TAS 415 kts. If you turn right 45°, what is your new GS and Tr?

5. The distance from A to B is 227 NM and you arrived at Point B after 42 minutes. If the TC from A to B was 135° and the TH was 130°, then how long to return to A if the TAS remains at 400 kts?

_____

_____

6. At 1500, you calculated an ETA to destination to be 1540. To obtain this ETA, you used the following information: TH 089°, TAS 200 kts, W/V 349/40. How far were you from destination?

_____

_____

7. Using Figure 3-3 your route of flight takes you on J37 northeast to MGM J40 east to MCN and J45 southeast to Alma (AMG). Given: ALT FL210, GS on J37 220, TAS 210, Crab on J37 18°L, MOT MGM 1904. 14 minutes after marking on top MGM you are on course and 54 NM from MGM and the TACAN fails.

a. What two pieces of information should you immediately note?

1. _____

2. _____

b. What is your best estimate of the wind? _____

c. What heading will you give the pilot to fly? _____

d. What time will you turn him/her toward Alma? _____

e. What heading will you give? _____

f. Should DR procedures be accomplished with mental math alone? _____

CHAPTER ANSWERS

Exercise A

	W/V	TAS	Tr	Drift	TH	GS
1.	**135/19**	175 kts	024°	**6L**	030°	181 kts
2.	**273/25**	190 kts	085°	**1R**	084°	215 kts
3.	078/24	200 kts	**078º**	**0**	078°	**176 kts**
4.	**117/20**	122 kts	308°	**2L**	310°	141 kts
5.	**095/30**	220 kts	338°	**7L**	345°	232 kts
6.	045/30	182 kts	**292º**	**9L**	301°	**191 kts**
7.	**220/120**	450 kts	180°	**10L**	190°	350 kts
8.	110/60	420 kts	**075º**	**5L**	080º	**368 kts**
9.	**025/68**	535 kts	119º	**7R**	112º	540 kts
10.	**000/100**	350 kts	180º	**0**	180º	450 kts

Situation

1. 6° L, 162 kts, 37 min
2. 060/39
3. 37+00
4. 460 kts, 096°
5. 29 min
6. 141 NM
7. a. 1) Position 2) Time
   b. 308/65
   c. 061°
   d. 38+00
   e. 143
   f. No

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CHAPTER FOUR

TWO-MINUTE PRIOR, MARK-ON-TOP AND WINGS LEVEL CALLS

400. INTRODUCTION

The pilot and NFO must both strive to keep ahead of the aircraft during all phases of flight. It is the NFO's responsibility to cue the pilot at certain times so that he/she may properly anticipate future events. These cues will normally take place near checkpoints and signal changes of course and updates to fuel and time estimates. The three required calls are the TWO-MINUTE PRIOR, MARK-ON-TOP, and WINGS LEVEL Calls.

401. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

C. Navigate an aircraft via visual references and navigation instruments with the assistance of a flight instructor.

ENABLING OBJECTIVE

C.3 Perform the TWO-MINUTE PRIOR, MARK-ON-TOP, and WINGS LEVEL calls at each turnpoint, given a specified route and a 1D23 trainer without error.

C.3.1 Recite TWO-MINUTE PRIOR call.

C.3.2 Recite MARK-ON-TOP call.

C.3.3 Recite WINGS LEVEL call.

402. TWO-MINUTE PRIOR CALL

The TWO-MINUTE PRIOR Call is given two minutes prior to reaching any NAVAID or any specific turnpoint designated by your route of flight. In order to determine the TWO-MINUTE PRIOR point, you must constantly be aware of your position along the route of flight.

To determine when you are two-minutes prior to a NAVAID or turnpoint, simply subtract two minutes from your ETA for the NAVAID or turnpoint.

There are two bits of information that the pilot requires at the TWO-MINUTE PRIOR point:

1. Outbound heading for course.
2. ETA at the next checkpoint.

At the TWO-MINUTE PRIOR point, and in preparation for the MARK-ON-TOP Call, note your fuel on board and fuel flow. These readings are important because at the MARK-ON-TOP, you are required to give the pilot the aircraft's fuel state.

So that you do not have to shift your attention from the MARK-ON-TOP Call, it is recommended that you predict your MARK-ON-TOP fuel in the following manner:

1. Note the fuel on board.
2. Note your fuel flow.
3. Convert fuel flow to pounds per minute.
4. Multiply the pounds per minute fuel flow times two.
5. Subtract the product from the fuel on board.

Let us look at a sample TWO-MINUTE PRIOR Call for the flight from NAS Pensacola to Tyndall AFB shown in Figure 4-2.

Given: 15,000 MSL, Flying from CEW to MAI, **GS** = 210

DME = 35 to MAI

Time: 1250

Crab angle: MAI - BRITS 3L

When is your TWO-MINUTE PRIOR point?

Computations:

GS = 3.5 NM/Min.

ETE to MAI is 10 minutes (35 DME – 3.5 NM/Min).

ETA = actual clock time + ETE to MAI (50+00 plus 10 = 00+00).

The TWO-MINUTE PRIOR point is 00+00 minus 2 = 58+00.

4-2 TWO-MINUTE PRIOR, MARK-ON-TOP AND WINGS LEVEL CALLS

Therefore, at time 58+00, you are at your TWO-MINUTE PRIOR point and you should commence your TWO-MINUTE PRIOR Call. Do not forget to note your fuel and fuel flow. Now proceed with the call:

"We are two minutes prior to Marianna, outbound heading is 138° for a course of 141°."
"I estimate BRITS at 07+00."

DEST ELEV		APC CONT			TOWER				GND CONT		
ROUTE TO	IDENT / CHAN	CUS	DIST 182	ETE 1+01	ETA / ATA	LEG FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
⊅ L/O	/ 106	045	28 / 154	12 / 49	/	100	745 /			/	↗15K
⊅ CEW	/ 106	045	16 / 138	5 / 44	/ 1232	20	725 / 715			200 / 3L	
V198 MAI	/ 87	088 / 092	80 / 58	28 / 16	/ 1300	115	610 / 600			210 / 5L	
V521 BRITS	/ 87	141	26 / 32	7 / 9	1307 /	30	580 /			222 / 3L	
⊅ PAM 038014	/ 124	250	32 / 0	9 / 0	/	35	555 /			218 / 4R	

Figure 4-1 Two Minutes Prior

Now analyze the call. Part one is easy. The outbound course is taken directly from the chart; apply your preflight crab angle from your jet log to get the outbound heading. Part two requires you to use your jet log ETE to BRITS (seven minutes) and apply that time to your ETA to MAI.

Example: 00+00 plus 7min = 07+00 (predicted ETA at BRITS).

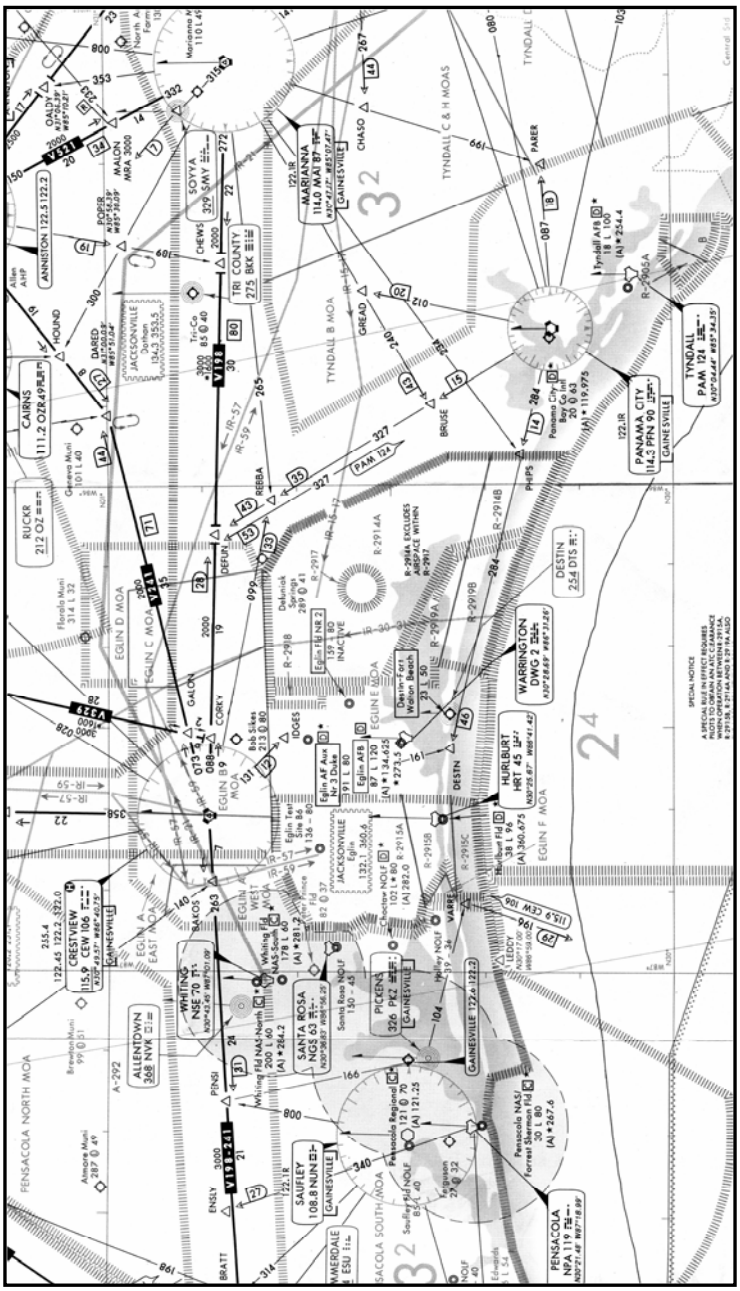

Figure 4-2 Chart Pensacola

4-4 TWO-MINUTE PRIOR, MARK-ON-TOP AND WINGS LEVEL CALLS

If you predicted arrival at MAI at 00+00, then your TWO-MINUTE PRIOR Call commences at 58+00. It is a good idea to keep a scan on your DME and check it at 58+00 to ensure that your call is timely.

403. MARK-ON-TOP CALL

Now that you and the pilot have a two-minute warning, let us look at the MARK-ON-TOP report the pilot requires at each checkpoint or NAVAID. Your MARK-ON-TOP report is required at all NAVAIDs during an IFR flight. When navigating to a TACAN station, MARK-ON-TOP is at minimum DME for direct navigation or when the TACAN needle passes either 90º benchmark when leading turns. Point-to-point navigation uses the closest point of approach.

There are five bits of information the pilot requires at the MARK-ON-TOP point:

1. Turn right/left to a heading
2. Time
3. Place
4. Fuel quantity
5. NAVAID

Analysis:

Item (1) requires you to tell the pilot to turn left or right to a heading. That heading is the heading to get the aircraft on the outbound course. In choosing a heading, you must take turn radius, winds, and navigational procedures into account.

Item (2) is simply the actual clock time you pass on top.

Item (3) requires you to name the point you are passing.

Item (4) is the fuel quantity you predicted for the MARK-ON-TOP from your TWO-MINUTE PRIOR figures.

Item (5) is the NAVAID you use for your next leg. If turning onto an airway, the NAVAID remains the same, if flying direct the NAVAID changes.

A typical MARK-ON-TOP Call sounds like this:

"Turn right 138°, time 00+00, Marianna, fuel quantity 600 lbs, NAVAID remains the same."

Note that we turned the aircraft to 138º to fly a course of 141º. A turn of 51° is involved requiring a lead point to roll wings-level on course. The formula for a 90º turn is ½ of 1% of the aircraft's GS plus minimum DME. However, since the turn is only 51º we must adjust the lead point by some amount in an attempt to roll wings-level on course. One-half of 1% of 210 kts = 1.0 DME, but we adjust this to .5 DME (as 51° is roughly one-half of 90°). Now .5 DME + 2.5

(min DME) = 3.0 DME lead point at this turnpoint. An in-flight analysis (or preflight information in the absence of current in-flight information) confirmed a wind of 360/15 kts requiring a left crab of 3º; so, at 3.0 DME we turned the aircraft right to a heading of 138º for a course of 141°.

Station passage is best determined by minimum DME. Minimum DME is determined by dividing aircraft altitude by 6000 feet per NM. At 15,000 feet, your point closest to the station is at 2.5 DME. If you led the turn at 3.0 DME, wait until 2.5 DME to record your actual time of arrival and continue with the MARK-ON-TOP Call. For turns with earlier lead points, it is possible to never reach 2.5 DME. In these cases, when DME starts increasing, station passage has occurred.

At VT-10/4 you lead all turns greater than 30º, whether flying direct or on airways (this is to comply with FAR-91). You do not have to adjust your time estimate.

As you make the MARK-ON-TOP Call, you enter your actual fuel remaining and actual time of arrival in the appropriate spaces of your jet log.

NOTE

After the aircraft rolls WINGS LEVEL, check course control and make a correction if necessary before commencing the WINGS LEVEL Call.

404. WINGS LEVEL CALL

This call follows the MARK-ON-TOP Call. When the pilot rolls out of the turn, you:

a. Report the difference between MARK-ON-TOP fuel and preflight fuel.

b. Report EFR at the IAF.

Throughout the turning of your aircraft, you should scan both inside and outside the cockpit as part of your copilot duties. When the aircraft is on recommended heading, the narrative is:

a. "We had 600 lbs, I preflighted 610 lbs, we are 10 lbs below preflight."

b. "I estimate 535 lbs at the IAF."

The WINGS LEVEL Call is a fuel analysis. In conducting your fuel analysis, your jet log is of great assistance. Look at Figure 4-3 and note the predicted fuel at MAI. It is 610 lbs, yet your actual fuel was 600 lbs. You have 10 lbs less than predicted. This constitutes Item 1.

DEST ELEV		APC CONT			TOWER			GND CONT			Notes		
ROUTE TO	IDENT / CHAN	CUS	DIST 182	ETE 1+01	ETA / ATA	LEG FUEL	845 EFR / AFR	+ / -	IAF	CRAB GS	Fuel + -	FF	IAF
L/O	106	045	28 / 154	12 / 49		100	745 / 735						
CEW	106	045	16 / 138	5 / 44	1232	20	725 / 715			200 / 3L	-18	240 / 4	610 / 535
V198 MAI	87	088 / 092	80 / 58	28 / 16	1300	115	610 / 600			210 / 5L			
V521 BRITS	87	141	26 / 32	7 / 9	1307	30	580			222 / 3L			
PAM 038014	124	250	32 / 0	9 / 0		35	555			218 / 4R			

Figure 4-3 Fuel Analysis

To estimate fuel to the IAF, read across the MAI line and find the time remaining to the IAF. Sixteen minutes at a fuel flow of 240 PPH = 64 lbs. We can estimate that our fuel at the IAF is 600 minus 65 lbs (64 lbs rounded up to the nearest 5 lbs) or 535 lbs.

NOTE

This method is preferred when TAS remains constant and your route includes major course changes that normally invalidate GSs computed in flight. Here are two cases when you should not use this method:

a. When TAS has changed; or

b. When the calculated GS remains constant for subsequent legs of the flight (e.g., cross county flights).

In both cases, new ETEs are calculated based on distance divided by GS. Use these ETEs for fuel and time estimates.

Your jet log is segmented into columns, which may aid you in your calls. This is merely a suggested system. It may be easier for you to tabulate the numbers on another sheet of paper. In any case, the one presented in Figure 4-3 has space for fuel (+ or – preflight), fuel flow estimates to the IAF, and a MISC column which you can use for any notes.

The three separate calls are summarized below:

TWO-MINUTE PRIOR Call

Outbound heading for course

ETA to next checkpoint

MARK-ON-TOP Call

Turn right/left _____ (heading)

Time

Place

Fuel quantity

NAVAID

WINGS LEVEL Call

± Preflight fuel

Estimated fuel at IAF

Although these are separate calls, they are all tied to each other and in narrative form sound something like this:

> "We're two minutes prior to Marianna. Outbound heading is 138 for a course of 141°. I estimate BRITS at time 07+00." You navigate for the final few miles and say:
>
> "Turn right to138º, time 00+00, Marianna, fuel quantity 600 lbs, NAVAID remains the same."

You **clear the turn** in your copilot capacity and when WINGS LEVEL, you check navigation and continue with your fuel analysis, saying:

> "We had 600 lbs, I preflighted 610 lbs, so we are 10 lbs below preflight. My estimated fuel at the IAF is 535 lbs."

As you are reciting your fuel figures, you may interrupt yourself to make heading/course corrections.

After these calls, continue along V7W and take GS checks, and revise your time estimates to BRITS and fuel to the IAF.

At the appropriate time (05+00), you would give a TWO-MINUTE PRIOR Call to BRITS and the whole sequence starts over again.

405. SUMMARY

The reports introduced in this section will help you gain proficiency in your copilot skills and in your navigational capabilities when in demanding phases of flight. Your ability to quickly calculate fuels, times and headings in the preparation of these calls greatly aids your pilot and provides the important periodic "how-goes-it" that is essential to any flight.

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CHAPTER QUESTIONS

1. What two items are required at the TWO-MINUTE PRIOR Call?

2. Write the MARK-ON-TOP Call procedures in order.

3. Write the WINGS LEVEL Call.

Using Figures 4-4 and 4-5, give a TWO-MINUTE PRIOR, MARK-ON-TOP and WINGS LEVEL Call for TGE.

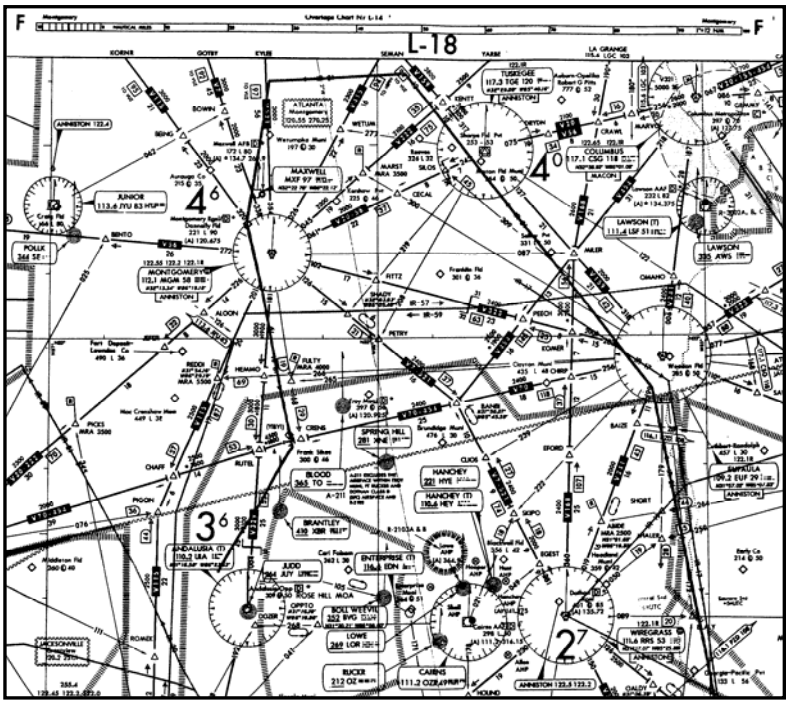

Figure 4-4 Polk/Wiregrass

4-10 TWO-MINUTE PRIOR, MARK-ON-TOP AND WINGS LEVEL CALLS

V20 TGE	120	256 / 250	34 / 207	11 / 1+11			530	100/5L
V20 MGM	58	243 / 241	37 / 170	12 / +59			490	180/5L

Figure 4-5 Call Information

Route of Flight: East of TGE, proceeding southwest on V20 through TGE and MGM.

Distance from MGM to IAF = 180 NM

TAS = 210 kts

Fuel flow = 240 PPH

Fuel noted at TWO-MINUTE PRIOR point = 550 lbs.

GS check taken before TGE = 3.5 NM/MIN

Wind = 140º/15

Time at TWO-MINUTE PRIOR Call = 48+00

Preflight fuel at TGE = 530 lbs.

Heading = 255º

Altitude = 14,000 MSL

4. **TWO-MINUTE PRIOR Call**

a. _____

b. _____

5. **MARK-ON-TOP Call**

a.. _____

b. _____

c. _____

d. _____

e. _____

6. **WINGS LEVEL Call**

a. _____

b. _____

7. When do you record your fuel quantity and fuel flow?

_____

_____

CHAPTER ANSWERS

1. a. Outbound course
   b. ETA checkpoint

2. a. Turn to heading
   b. Time
   c. Place
   d. Fuel quantity
   e. NAVAID

3. a. Fuel (± preflight)
   b. EFR IAF

4. **TWO-MINUTE PRIOR Call**
   a. "We are two minutes prior to TUSKEGEE, outbound heading is 239º for a course of 243º."
   b. "I estimate Montgomery at 02+00."

5. **MARK-ON-TOP Call**
   a. Turn left to 239º
   b. Time: 50+00
   c. Place is TUSKEGEE
   d. Fuel is 540 lbs
   e. NAVAID remains the same

6. **WINGS LEVEL Call**
   a. "We had 540 lbs, I preflight 530 lbs, so we're 10 lbs ahead."
   b. "I estimate the IAF with 255 lbs."

7. **TWO-MINUTE PRIOR point**

CHAPTER FIVE

IN-FLIGHT FUEL AND TIME ANALYSIS

500. INTRODUCTION

During the enroute phase of flight, it is essential that you are constantly aware of how the actual flight is progressing as compared to the preflight planning. It should be quite plain that, in-flight, fuel figures and ETEs will change from your preflight figures for many reasons, including change of winds, on deck delay time, enroute delays, unplanned altitude changes, route of flight changes, weather, etc. It is imperative that you are able to compute and update fuel and time estimates anywhere along the route of flight. Failure to update estimated fuel and time enroute could result in an unplanned landing short of your original destination.

501. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

C. Navigate an aircraft via visual references and navigation instruments with the assistance of a flight instructor.

ENABLING OBJECTIVE

C.8. Determine mission completion feasibility based on requirements at each navigational checkpoint, given a jet log and single enroute chart during simulator navigation trainer mission or navigation training mission, in accordance with OPNAVINST 3710.7s.

C.8.1. Calculate EFR at destination IAF, during 2B47 navigation trainer mission $\pm$ 30 pounds.

C.9. Calculate ETA at each navigational checkpoint, during 2B47 navigation trainer mission $\pm$30 seconds.

C.9.1. Determine GS during 2B47 navigation trainer mission $\pm$ 6 knots.

502. DME/GS RESTRICTIONS

Your fuels and times are always a function of your GS; therefore, it is important to know when DME/GS is reliable and when it is not.

In previous sections, we discussed the unreliability (for purposes of GS checks) of DME when within a radius of the TACAN station equal to your altitude in thousands of feet. That restriction still holds true. Other restrictions are:

1. **Level Flight** – To accurately accomplish a GS check, you cannot be in a climb or a descent because part of your airspeed has a vertical component. In addition, as you climb or descend, your IAS/TAS varies according to temperature and pressure altitude.

2. **Steady Airspeed** – Do not start a GS check until leveled off and stabilized at a cruising airspeed. Additionally, if you are taking a GS check and the pilot accelerates or decelerates, the GS check is invalid. Airspeed must be steady throughout the check.

3. **Radial Tracking** – You must be on or close to a radial, tracking inbound or outbound to a station. If you managed to get off course and are correcting laterally back to course, be wary of performing a GS check. For corrections of a few degrees it may be permissible; however, the greater your degree of lateral movement, the more in error your GS check will be.

4. **Correct TAS** – It is important to always know your TAS. TAS is a function of IAS or Indicated Mach Number combined with temperature and pressure altitude. If your IAS is in error, your TAS is wrong. Since GS equals TAS $\pm$ wind, taking a GS without being at your correct TAS will not aid wind or course control computations.

5. **Time** – The time required for DME/GS checks is a minimum of one minute. If any of the aforementioned conditions restrain your ability to do this however, any GS check is acceptable. If a 36 second or one minute GS check is not feasible, there is one other accurate method. **You must attempt at least one GS check per leg**.

Figure 5-1 is a short segment of V35E between Gainesville and Cross City. If you were transiting at 16,000 feet MSL and a TAS of 210 kts, you might have trouble getting a GS check. To overcome this problem, you could employ the lessons learned in earlier sections. Since you are responsible for logging your MARK-ON-TOP times at Gainesville and Cross City, you can come out with an accurate GS check.

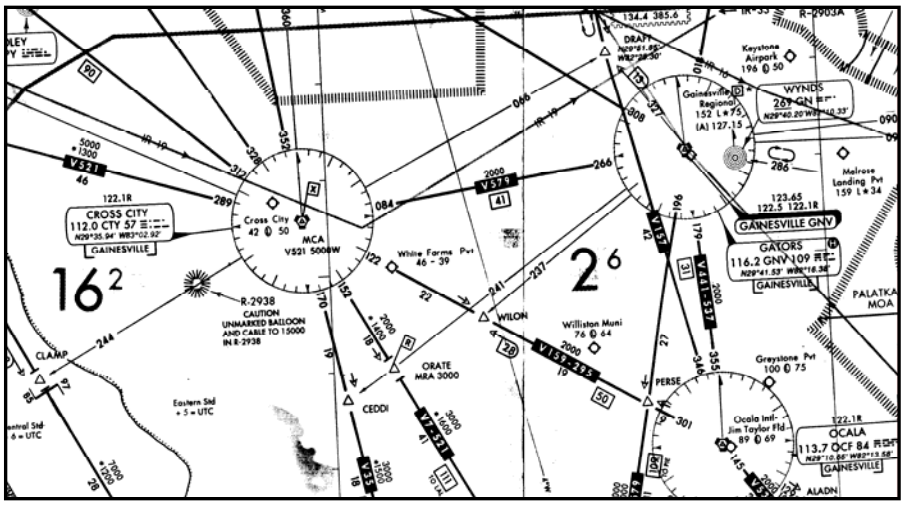

Figure 5-1 Cross City/Gainsville

Example

MARK-ON-TOP Gainesville .....Time 30+00 (Remember minutes and seconds only)

MARK-ON-TOP Cross City.....Time 40+00

You have transited 36 NM in 10 minutes, therefore:

36/10 = 3.6 NM/Min = 216 kts GS

Since your TAS is 210, you have a 6 kt tailwind component.

503. REVISING ETA

On your instrument flights, you are to inform your instructor of your new ETA for the following checkpoint if your previous ETA is in error by more than 30 seconds.

504. REVISING EFR

To calculate EFR at the IAF multiply the time remaining from your jet log by your current fuel flow. Subtract this figure from the present fuel quantity to get the EFR at the destination IAF. These revisions are required whenever your previous estimate is in error by more than 30 lbs of fuel in the T-34C/T-6A, and 100 lbs in the T-39N.

The following is a comprehensive example of how ETA and EFR are revised in flight. Use your jet log and enroute chart (Figures 5-2 and 5-3).

DEST ELEV		APC CONT			TOWER					GND CONT	
ROUTE TO	IDENT / CHAN	CUS	DIST 182	ETE 1+01	ETA / ATA	LEG / FUEL	EFR / AFR	+ / -	IAF	CRAB / GS	MISC
▷ L/O	/ 106	045	28 / 154	12 / 49	/	100	745 / 735			/	↗15K
▷ CEW	/ 106	045	16 / 138	5 / 44	/ 1232	20	725 / 715			200 / 3L	
V198 MAI	/ 87	088 / 092	80 / 58	28 / 16	/ 1300	115	610 / 600			210 / 5L	
V7W BRITS	/ 87	141	26 / 32	7 / 9	1307 /	30	580 /			222 / 3L	
▷ PAM 038014	/ 124	250	32 / 0	9 / 0	/	35	555 /			218 / 4R	

Figure 5-2 Comprehensive Example

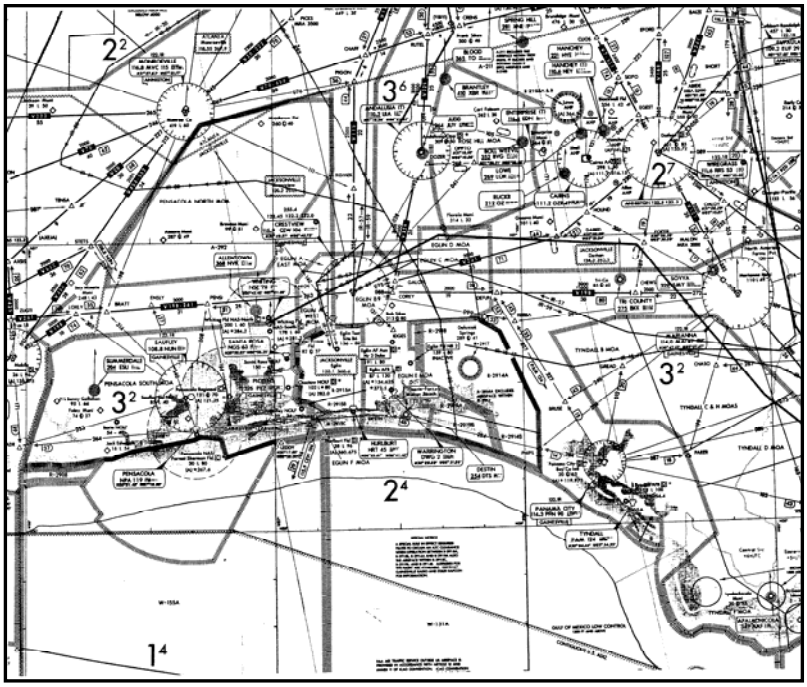

Figure 5-3 Andulisia/Marianna

5-4 IN-FLIGHT FUEL AND TIME ANALYSIS

In order to accurately revise ETAs and EFRs, the following method is suggested:

Take a GS check.

Sometime after completion of the GS check, "freeze" the following items in your cockpit (done simultaneously):

a. DME
b. Fuel on board
c. Fuel flow
d. Actual clock time

Armed with these figures you can accurately revise your ETAs and EFRs.

Here is a practice example:

DME = MAI 272/35

Fuel on board = 670 lbs

Fuel flow = 240 PPH or 4 lbs/Min

GS = 210

Time: 50+00

At 50+00 we are 35 NM from MAI. With a GS of 210 kts, we are at MAI in 10 minutes (00+00). To calculate EFR at the IAF we add our ETE to MAI (10 min) to our ETE from MAI to the IAF (16 min) for a total of 26 min remaining to the IAF. Since our fuel flow is 4 PPM, we burn an additional 105 lbs to the IAF. Our on-board fuel is 670 lbs – 105 lbs = 565 lbs EFR at the IAF.

This example is an oversimplified case of using the freeze technique. In a real world situation, your numbers are not likely to be as round as these were, so you must learn to work quickly with these calculations, since you must simultaneously navigate and communicate.

The procedure described above in which preflight ETEs are combined with actual fuel flow to predict future fuel states is considered the most practical method for such calculations here in the training environment. It is assumed that your preflight ETEs are accurate.

If your route of flight (Figure 5-4) was from Pensacola through Crestview, Montgomery, Meridian, New Orleans, Semmes to the Navy Pensacola IAF, you can see that a GS check obtained between Crestview and Montgomery would not hold true for the rest of the flight. If your flight is in a relatively straight line, it is correct to apply GS checks to future legs of flight to recalculate your ETEs. Whenever possible, the latter technique is employed.

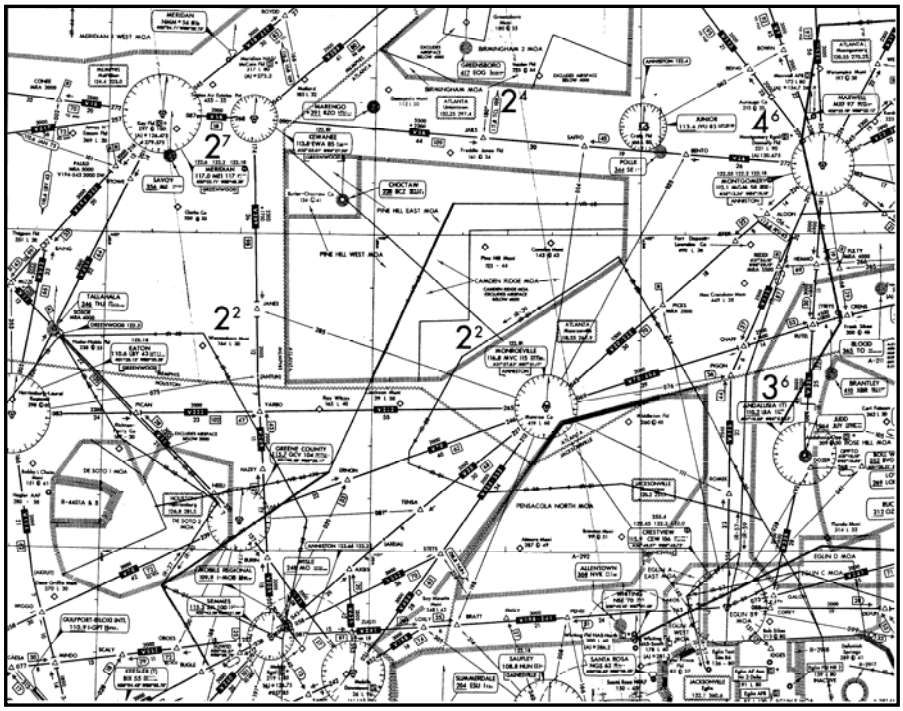

Figure 5-4 Choctaw/Crestview

505. SUMMARY

In this section, you learned when and how to update your fuel estimates. You know that to update your fuel estimates, you must first determine GS and calculate the remaining time enroute. You should perform a GS check whenever possible for each leg of your instrument navigation route. You know a GS check is at least one minute long and does not begin until your DME is equal to or greater than your altitude in thousands of feet. Additionally, you must update your ETA for each checkpoint/NAVAID and EFR at the IAF if your time is in error by more than 30 seconds or fuel is in error by more than 30 lbs.

CHAPTER QUESTIONS

1. How often must you take a GS check?

2. What is the minimum recommended time for a GS check?

3. After completing a GS check, what two items are you to update?

4. Your GS is 3.5 NM/minute, FF 240 PPH, fuel quantity 600 lbs, 16 minutes remaining on present leg to MGM, 1+18 remaining from MGM to the IAF. What is your EFR at destination IAF?

5. Your GS is 2.5 NM/minute, FF 210 PPH, fuel quantity 550 lbs, 25 minutes remaining in present leg to MVC, 1+07 remaining from MVC to the IAF. What is your EFR at destination IAF?

CHAPTER ANSWERS

1. Once each leg
2. One minute
3. (1) ETA to your next checkpoint (2) EFR at the IAF
4. 220 lbs
5. 225 lbs

CHAPTER SIX

MISSION COMPLETION FEASIBILITY

600. INTRODUCTION

As you previously learned, the last item given in the WINGS-LEVEL Call is the EFR at the destination initial final approach.

You must be able to accurately compute this figure early in the flight to ensure that you will not run out of fuel before your destination, or place yourself in a precarious situation involving fuel. Mission completion feasibility, simply put, is to determine if you can complete a mission and land at your destination/alternate with the proper amount of fuel.

601. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

C. Navigate an aircraft via visual references and navigational instruments with the assistance of a flight instructor.

ENABLING OBJECTIVES

C.8 Determine mission completion feasibility based on fuel requirements at each navigational checkpoint, given a jet log and single enroute chart during simulator navigation trainer mission in accordance with OPNAVINST 3710.7.

- C.8.1 Calculate EFR at destination IAF, during 2B47 navigation trainer mission $\pm$ 30 pounds.
- C.8.2 State mission completion feasibility.

602. FIGURING FUEL MINIMUMS

OPNAVINST 3710.7 states that all flights in Naval aircraft shall comply with certain minimum fuel requirements. The specific requirement depends on whether an alternate airfield is required or not.

The jet log is a preflight tool which determines, before your mission, the minimum fuel required for that particular flight. There are two examples that we will discuss:

1. Instrument flights with an alternate required.
2. Instrument flights with no alternate required.

Because of the unforeseen elements of aviation, headwork dictates considering an alternate regardless of prevailing weather conditions.

The preflight mission completion fuel computation for instrument navigation flight is relatively simple. It is the sum of the fuel required to fly from the destination IAF to the alternate IAF, plus the amount of fuel for one approach, plus OPNAVINST 3710.7 reserve fuel requirements.

With an alternate required, OPNAVINST 3710.7 dictates that your fuel total is at least equal to the sum of the following:

1. Flight from T/O to destination IAF.
2. Flight from destination IAF to alternate airfield.
3. OPNAV reserve fuel.

With no alternate is required, the fuel becomes the total of:

1. Flight from T/O to destination airfield.
2. OPNAVINST 3710.7 reserve fuel.

Now to analyze the various parts of the OPNAVINST 3710.7 fuel requirements:

1. Flight from T/O to destination IAF includes all planned fuel requirements from T/O, including climb and cruise to destination IAF.
2. Flight from destination IAF to alternate airfield is your planned fuel requirements from alternate profile #1 of your jet log.

Fuel for OPNAVINST 3710.7 reserve is calculated as follows:

1. 10% of planned total fuel requirements, or

2. Twenty minutes of flight at 10,000 feet, maximum endurance profile (T-34C = 60 lbs, T-39N = 540 lbs).

3. You must choose the greater of these two amounts.

NOTE

In all of your planned flights thus far you have complied with the VT-10/4 requirements and planned for your alternate profiles from destination IAF to alternate IAF. OPNAVINST 3710.7 dictates that you must plan from your destination IAF to alternate airfield. This is not a discrepancy. In your planning at VT-10, the alternate IAF is simply an intermediate point and is followed by an instrument approach to the alternate airfield, thus complying with the 3710.

PAM 038014	124	250	32 / 0	9 / 0		35	545			218 / 4R	
						300					
VPS 130012	35	270	51	51		60				210 / 5R	TAS 210 PF 240 15K

Figure 6-1 Concept of Mission Completion Feasibility

Using the example of a flight from NAS Pensacola to Tyndall AFB, we will demonstrate the concept of Mission Completion Feasibility.

In Figure 6-1, you have computed 545 lbs remaining at the destination initial approach. Additionally, you planned for an alternate; therefore, fuel planning for the alternate is going to determine your mission completion fuel.

The EMERGENCY "BINGO" TO ALTERNATE section on the reverse side of the jet log (Figure 6-2) determines your mission completion fuel, specifically the LAST CRUISING ALT line. This line meets your OPNAV fuel requirements in it comprises fuel to your alternate IAF, the fuel for one approach, and the fuel required for reserve. If it becomes necessary, due to weather conditions or problems at your destination airfield, to proceed to your alternate, this TOTAL fuel figure is the minimum fuel required to safely and legally do so. In this example, we have a mission completion fuel of 160 lbs.

1. CLIMB/ROUTE		6. START/TAXI	40
DEST IAF	230	7. TOTAL REQUIRED)	
2. ROUTE ALT IAF		(4, 5, & 6)	430
(If required)	60	8. TOTAL ABOARD	815
3. APPROACHES	40	9. SPARE FUEL (8-7)	385
4. TOTAL (1, 2, & 3)	330		
5. RES 10% OF 4			
(Min 20 mins)	60		

EMERGENCY "BINGO" TO ALTERNATE

	REQUIRED		APPPROACH		RES		TOTAL
LAST CRUISING ALT	60	+	40	+	60	=	160

Figure 6-2 Reverse Side of Jet Log (Based on T-34)

According to your preflight fuel planning, you have 545 lbs at your destination IAF-much more than the 160 lbs required. If all goes according to plan, you have 385 lbs (545 – 160) spare fuel. Note in your Fuel Plan (Item 9) that this number has already been calculated.

All of this leads to the final determinant: if, in your FUEL PLAN or EMERGENCY "BINGO" TO ALTERNATE section you compute arrival at your alternate airfield with at least zero spare fuel, (as opposed to a negative number) your flight is legal and completion of the mission, at the time of its planning, is feasible.

603. IN-FLIGHT ANALYSIS

Flights seldom proceed as planned and fuel figures always change. Therefore, it is of utmost importance to accurately compute, while in flight, the EFR at your destination.

Remember from previous sections, that when analyzing fuel enroute you give an estimate of fuel remaining at the destination IAF. From the example on the preceding pages, if you arrive at the IAF with less than 160 lbs you would be unable to proceed to your alternate, execute an approach and land with OPNAVINST 3710.7 minimum fuel.

If at any time during the flight, you estimate your fuel to be less than mission completion fuel, you must take measures to alter the situation: land short of original destination, change route of flight, climb, descend, etc.

604. SUMMARY

In this section, you learned when and how to update your EFR. Additionally, you learned how to compare new EFR calculations with OPNAVINST 3710.7 requirements. If your new EFR does not comply with these requirements, you must be prepared to alter your flight plan.

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6-6 MISSION COMPLETION FEASIBILITY

CHAPTER QUESTIONS

1. Explain mission completion fuel.

2. In flight, if you determined your EFR at the destination IAF is less than the minimum fuel required, what are some viable alternatives?

3. Explain how OPNAV minimum fuel requirements are computed.

   a. Alternate required:

   b. Alternate not required:

CHAPTER ANSWERS

1. Mission completion fuel is a predetermined fuel figure that allows you to complete your mission and arrive at your destination complying with OPNAVINST 3710.7 minimum fuel requirements.

2. Change route of flight. Stop at intermediate airfield and refuel. Decrease fuel flow if feasible. Climb to a higher altitude if feasible, etc.

3.

a. Alternate required:

Flight from T/O to destination IAF

Flight from destination IAF to alternate airfield

OPNAV reserve fuel

b. Alternate not required:

Flight from T/O to destination airfield

OPNAV reserve fuel

CHAPTER SEVEN
IN-FLIGHT WEATHER ANALYSIS

700. INTRODUCTION

Some weather conditions are hazardous to flight. It is essential that you know what these hazardous conditions are, where to find out about them and how to report them. Unfortunately, there is nothing we can do to prevent the hazardous weather conditions from developing, but we can avoid them and let others know about them. This section is designed mainly as a discussion on weather analysis during instrument flight. Most of this information is taken from the NATOPS Instrument Flight Manual.

701. LESSON TOPIC LEARNING OBJECTIVES

TERMINAL OBJECTIVE

C. Navigate an aircraft via visual references and navigational instruments with the assistance of a flight instructor.

ENABLING OBJECTIVE

C.10 Evaluate observed and forecast meteorological conditions to avoid weather hazards and enhance mission accomplishment, during simulator navigation trainer mission in accordance with OPNAVINST 3710.7.

- C.10.1 Interpret flight weather advisories and ATIS information.
- C.10.2 Employ pilot-to-metro services (PMSV) when appropriate.
- C.10.3 Recall OPNAVINST 3710.7 weather minimums for destination and alternates.

702. PREFLIGHT ANALYSIS

In preparing for a flight, you always conduct your own analysis of the weather. You are negligent in the performance of your duties if you accept an analysis or forecast which you do not completely understand. The object of this analysis is to give you a complete picture of the weather conditions and developments affecting flight along your route. It also enables you to intelligently discuss any apparent discrepancies in the forecasts. Once in the air, you cannot always consult the forecaster or the weather charts to understand the reasons for unexpected changes. You must be able to determine the corrective action to be taken. At these times, you rely on your knowledge, experience, and the information obtained before departure.

Before going into a weather office, know exactly what information you want. You need to know the local weather at the time of T/O and during climb to altitude, enroute and its effect on aircraft performance, and at your destination and alternate(s). The type of information needed varies considerably depending upon whether you are flying a jet aircraft, turboprop, a piston-driven propeller aircraft or a helicopter. The following is a general guide for your preflight weather analysis.

First, check the overall synoptic pattern or general weather picture, both at the surface and aloft. Look for the location, movement, and intensity of weather areas and their effect on your proposed route and destination. Select the best area for an alternate airfield.

Check the Weather Depiction Chart for the location of IFR and VFR areas along your proposed route and near your destination. It is issued every three hours, and shows, at a glance, the distribution of weather and cloud coverage for the United States and Canada. Additionally, it gives the ceiling and visibility for airports in this area.

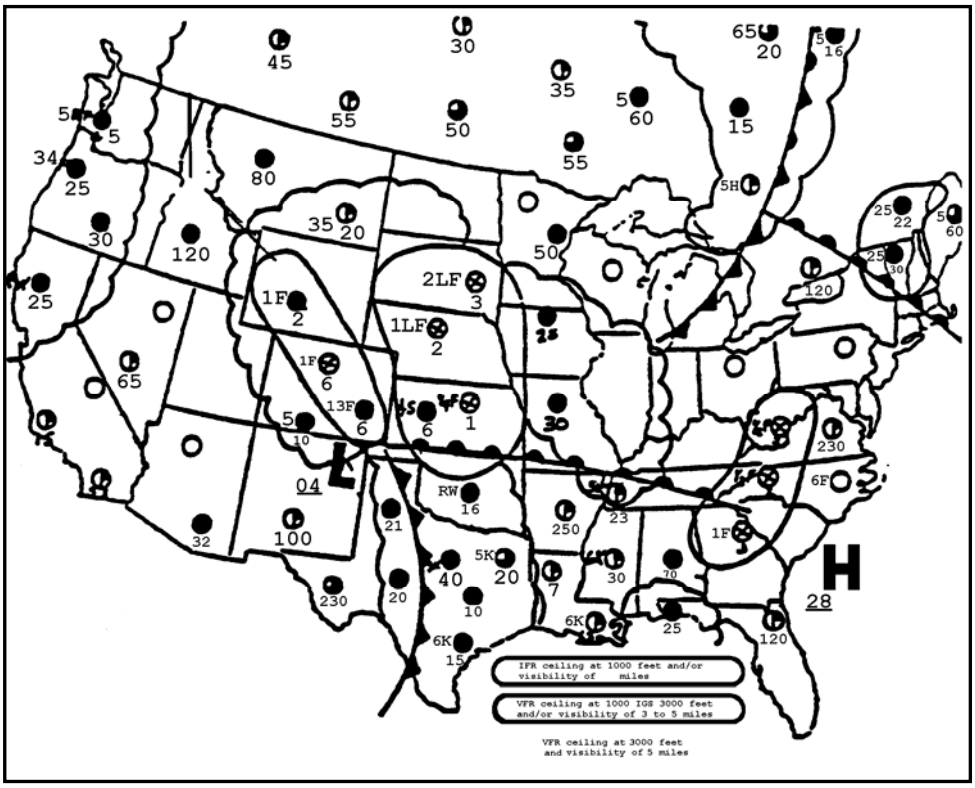


Figure 7-1 Weather Depiction Chart

Two sets of lines are drawn on the chart. The area enclosed by the solid line, colored red by the weather office, contains IRF airports (i.e., have ceilings of less than 1000 feet, visibility of less than 3 miles, or both). The area enclosed by the scalloped line, colored blue by the weather office, contains MVFR airports, but have ceilings of between 1000 and 3000 feet. The area outside the scalloped line is VFR with ceilings greater than 3000 feet. Thus, the Weather Depiction Chart readily delineates the location of IFR and VFR areas and provides ceiling, visibility, and cloud cover information for individual stations.

7-2 IN-FLIGHT WEATHER ANALYSIS

Next, check both the existing and forecast local weather for your estimated time of departure. Check the bases and tops of cloud layers, freezing level, crosswind, and runway temperature or pressure (density) altitude, when required. Do not neglect T/O weather in flight planning. If the local weather dictates, plan for the measures that must be taken to prepare the aircraft for entry into freezing clouds, such as pitot heat, engine inlet anti-ice, etc. On days when the weather is below available approach minimums, discretion requires a plan for a suitable T/O alternate airport where you can land safely should an emergency occur after T/O. A minute of planning for this possibility may pay rich dividends later.

Enroute

Check the winds along the route of flight through a considerable range of altitudes. This allows the selection of the best altitude for aircraft performance, and gives you a feel for the change in aircraft performance you can expect if you are given a change in altitude enroute. Look specifically for the extent of clouds that may be present along the proposed route. Check the altitude of the tops and bottoms of the clouds. When clouds are present and flight is conducted on instruments along the route, keep in mind the location of the nearest area that is VFR for letdown and landing in the event of complete radio failure or other emergency.

You must carefully ascertain the possibility of any hazards to flight along your proposed route. Know the altitude of the freezing level and the likelihood of icing. Do not plan a flight for extended periods in clouds with a temperature just below freezing for this is the level of maximum icing. Check for the likelihood of thunderstorms and turbulence and avoid them whenever possible. If avoidance is not possible, plan to minimize their effect. The presence of fog, low ceiling, and low visibility areas along the route are additional hazards. Know the location of these areas before leaving the weather office. A look at the Weather Depiction Chart or the sequence reports discloses areas that are near or below IFR minimums.

Destination

You must know, in detail, the weather to be expected at your destination. If the weather is forecast to be IFR, analyze it closely, then carefully choose the alternate(s). Look for ceiling and visibility, precipitation; amount of snow, if present; RCR or equivalent runway braking action; forecast wind and the likelihood of crosswinds to the runway; the effect of surrounding topography on weather conditions at the field, etc. Check on the possibility of a delay in landing due to the presence of heavy showers or squalls at the destination. Always try to choose an alternate with better weather than the destination.

703. WEATHER BRIEFINGS

Before obtaining a flight clearance, you must receive a verbal weather briefing in person, by telephone or by weather vision. Additionally, a DD 175-1 (Flight Weather Briefing Form) is completed for all IFR flights. The verbal briefing contains a detailed analysis of present and forecast weather in the immediate vicinity of the departure point, along the flight route, and at the destination and alternate airfield(s). All potential hazards to flight are included.

The briefing void time for the DD 175-1 is normally one-half hour after the planned departure time, not to exceed 2 ½ hours after the time of weather briefing. This may be extended if, in the opinion of the meteorologist, the extension does not affect the quality of the forecast. The forecast is considered to be valid for the period one hour before until one hour after the planned arrival time at the destination or alternate.

In the event you are departing from an airfield with no weather briefing facility, telephone briefings are available from both military and civilian facilities. Telephone numbers for military briefing facilities are listed in the FLIP Flight Information Handbook and may be called collect.

The four categories of information available for preflight planning in the weather briefing office are:

1. Information received via teletype.
2. Information received via facsimile and/or automatic computer link.
3. Information prepared by local weather personnel.
4. Information which may be read from weather instruments.

Aviation Severe Weather Watch Bulletin (WW)

The National Weather Service issues unscheduled Weather Watch (WW) ("Willy-Willy") whenever there is a high probability of severe weather development. These WWs are used to forecast hazardous flying conditions for a designated area for a specified time period. The Air Force issues scheduled Military Weather Warning Advisories. These graphical advisories are an estimate of the weather producing potential of the existing air masses. These advisories are given to all aviators filing from U. S. Air Force bases and are used for flight planning when National Weather Service (WW) information is unavailable. Valid WW and MWA bulletins are graphically displayed in all Navy and Marine Corp weather briefing offices. Air Force advisories do not constitute a National Weather Service Aviation Severe Weather Watch Bulletin. Except for operational necessity, emergencies, and flights involving all-weather research projects or weather reconnaissance, pilots shall not fly into or through areas for which the National Weather Service has issued an Aviation Severe Weather Watch Bulletin unless one of the following exceptions apply:

1. Storm development has not progressed as forecast for the planned route. In such situations:

    a. VFR filing is permitted if existing and forecast weather for the planned route permits such flights.

    b. IFR flight may be permitted if aircraft radar is installed and operative, thus permitting detection and avoidance of isolated thunderstorms.

    c. IFR flight is permissible in positive controlled areas if VMC can be maintained, thus enabling aircraft to detect and avoid isolated thunderstorms.

7-4 IN-FLIGHT WEATHER ANALYSIS

2. Performance characteristics of the aircraft permit an enroute flight altitude above existing or developing severe storms.

NOTE

It is not the intent to restrict flight within areas encompassed by or adjacent to a WW unless storms have actually developed as forecast.

Training Command Weather Warning

A CNATRA Aviation Weather Warning is similar to a WW and MWA. However, this weather warning pertains only to Navy Aviation Training Command bases. While at VT-10/4, you may never file into a CAWW for any reason. It is issued, generally, in the absence of a National Weather Service Weather Warning. These warnings apply to training command aircraft and generally cover the same weather conditions as a WW or MWA. Needless to say, when a CAWW is issued, you should examine all aspects of your route of flight before T/O, just as you would for a WW or MWA.

If you file a flight plan at a base other than a CNATRA field, a CAWW forecast may not be available or briefed. If there is any chance of severe weather on your flight, check with NAS Pensacola via Defense Switched Network (DSN) to determine if a CAWW is in effect.

704. IN-FLIGHT WEATHER INFORMATION

AIRMET

In-flight weather advisories consist of two types: the AIRMET (WA) and the SIGMET (WS or WST). Since AIRMETs apply to lighter aircraft, they are issued to cover moderate, potentially hazardous weather. This includes the following:

1. Moderate icing.
2. Moderate turbulence over an extensive area.
3. Extensive areas where visibilities are less than 3 miles and/or ceilings are less than 1000 feet, including mountain passes.

SIGMET (Convective and Nonconvective)

SIGMETs apply to all types of aircraft and are issued to cover the more severe types of weather. Convective SIGMETs cover the following:

1. Tornadoes
2. Line of thunderstorms
3. Hail of ¾ inch or more in diameter

4. Embedded thunderstorms
5. Area of thunderstorms cover 40% or more

NOTE

Icing, turbulence and low-level wind shear are implied with and convective SIGMET.

Since in-flight weather advisories are designed for in-flight planning, they must be transmitted to aircraft enroute. FAA Flight Service Stations broadcast in-flight weather advisories when they pertain to an area within 150 NM of the Flight Service Station. In-flight weather advisories are transmitted at 15 and 45 minutes past the hour during the first hour of their valid time. In addition, convective SIGMETs are transmitted on the hour and at 30 minutes past the hour. After the first hour, only an altering broadcast is transmitted at 15 and 45 minutes past the hour.

Example: "Washington SIGMET (or AIRMET) BRAVO 3 is current." Refer to the Flight Information Handbook for more information on SIGMETs and AIRMETs.

Frequencies available for receiving in-flight weather advisories are found in the IFR or VFR Enroute Supplement. Flight Service Stations are responsible for transmitting in-flight weather advisories. Flight Service Stations are indicated in the Enroute Supplement by the word RADIO. In-flight weather advisories are transmitted over all frequencies that are listed after the word RADIO with the exception of those frequencies that are followed by the letter R.

Example: 122.3R. The R indicates the Flight Service Station is equipped to receive only on that particular frequency.

Flight Service Stations

Direct pilot-to-weather briefer service is available by making radio contact with any FAA Flight Service Station. Flight Service Specialists may not make original weather forecasts, however, they have the latest weather reports and terminal forecasts (PLATES or TAFORS) available for relay and are authorized to interpret weather reports and describe the weather conditions you can expect to encounter. Similar pilot-to-weather briefer service can usually be obtained from the ARTCC controller. Remember, Flight Service Stations are not weather forecasters.

Scheduled Weather Broadcasts

NAVAIDs providing scheduled weather broadcasts are indicated by radio class B. For example, if the RADIO/NAV REMARKS section of the IFR Enroute Supplement listed a NAVAID as a BVORTAC, then it is a VORTAC providing scheduled weather broadcasts. These stations broadcast weather information at 15 minutes past the hour. An ABVORTAC provides continuous automatic transcribed weather broadcasts. Exceptions to these times are listed in the RADIO/NAV REMARKS.

7-6 IN-FLIGHT WEATHER ANALYSIS

NOTE

Remember voice reception is only possible over VOR frequencies.

Pilot-To-Metro Service

Direct PMSV is available at most major Air Force bases and certain Naval and Marine Air Stations. Consult the IFR Enroute Supplement for the location and UHF frequencies of these stations. Communications are established by calling "(Base name) Metro" for example, "Oceana Metro." When utilizing PMSV, you are talking directly to a military weather forecaster who can assist you with any meteorological service available in his/her office. He/she is authorized to update forecasts or to issue new forecasts. Maximum use of METRO briefing service when airborne is encouraged. Their hours of operation can be found in the Flight Information Handbook.

Pilot Reports

When ceilings are at or below 5000 feet and visibility is below 5 miles, or thunderstorms are reported (or forecast), FAA agencies are required to solicit PIREPs. Air crewmembers are urged to furnish cloud tops, cloud layers, location of thunderstorms, icing, and turbulence. Information received is used to expedite traffic, to advise other aircraft and to aid in forecasting.

Additionally, PIREPS are usually requested by and given to a Metro facilities.

NOTE

In accordance with OPNAVINST 3140.32, PIREPs are given under the following conditions:

1. When requested.
2. When any unusual weather conditions exist.
3. When IFR approach and actual weather differs from that which was reported.
4. When missed approach is due to weather below minimums.
5. When wind shear is encountered on approach or departure.

It should be noted that PIREPs do not have to deal specifically with weather. A PIREP is essentially a report that is given on any radio frequency that informs others of any hazards to aviation in general. This may be a simple report to the control tower that a runway has standing water, or the braking action on a certain runway is good, poor, etc. Another PIREP may be given to ground control informing them and all other aircraft that loose gear, FOD, etc. is obstructing the taxi way. Remember PIREPs are informative. If you experience an unusual phenomena, or note any situations that may be hazardous to any aircraft, tell somebody!

705. WEATHER AVOIDANCE SERVICES

As a result of radar advisory service information, the pilot may decide to alter his/her flight to avoid severe weather areas. Before doing so, however, he/she must first obtain a clearance from ATC to deviate from his/her present clearance if on an IFR Flight Plan. There are two methods of receiving radar vectors to avoid thunderstorms and other severe weather while proceeding on an IFR Flight Plan.

First, request permission from the controlling ATC to switch to PMSV for radar weather advisories. If you desire to deviate around the weather, permission must be obtained from ARTCC to fly off the airway in a specified direction and distance. In low density traffic areas, ARTCC may approve flight off the airway for this purpose. The aircrew must return to the ARTCC frequency immediately upon completion of the diversion.

In the second method, radar vectors around areas of severe weather may be obtained in some situations directly from the ARTCC. This is the more common method. However, the primary purpose of the center's radar is aircraft separation, and the controller normally uses reduced video gain to eliminate weather from the scope. Upon request, severe weather can sometimes be painted on the radar receiver, and the controller may give vectors to direct aircraft around it or through the less severe sections of the storm. It should be noted that vectoring service can only be offered when it does not interfere with the controller's primary duty of maintaining flight separation.

706. WEATHER CRITERIA FOR FILING

Flight plans are filed, based on:

1. The enroute, destination and alternate weather forecasts for a period of one hour prior until one hour after ETA at your destination and the actual weather at the point of departure at the time of clearance.

2. Meteorological conditions notwithstanding, IFR Flight Plans are filed and flown whenever practicable as a means to reduce midair collision potential. In any case, forecast meteorological conditions must meet the weather minima criteria (Figure 7-2) for filing IFR Flight Plans and are based on the pilot's best judgment as to the runway that will be in use upon arrival.

3. IFR Flight Plans are filed for destinations at which the weather is forecast below the appropriate minimums if a suitable alternate airfield, forecast to have at least 3000 feet ceiling and 3 statute miles visibility, is available during the period one hour before and one hour after the ETA.

4. A suitable alternate must include a published approach compatible with installed aircraft navigational equipment, or forecast ceiling and visibility which permit descent from the minimum enroute altitude, approach, and landing under VMC.

7-8 IN-FLIGHT WEATHER ANALYSIS

5. When filing flight plans to a destination lacking a published approach that is compatible with operable aircraft navigation equipment, pilots shall ensure an alternate is selected that will permit execution of a published approach and landing in the event of lost radio communications.

6. An alternate airfield is not required when the weather at the destination is forecast to be equal to or better than 3000 feet ceiling and 3 statute miles visibility during the period one hour before or one hour after ETA. Otherwise, an alternate field is required. The weather minima in parenthesis at the bottom of the approach plate are used for the filing of flight plans and the commencement of instrument approaches. In the case of single-piloted aircraft, absolute minimum weather is 200 feet ceiling and ½ statute mile visibility. They must be adjusted so that ceiling is at least 200 feet and visibility is ½ mile. In Figure 7-2, we add 100 feet to the PAR ceiling and ¼ mile to the PAR visibility to ensure that they meet single-piloted minimums of 200 feet – ½ mile.

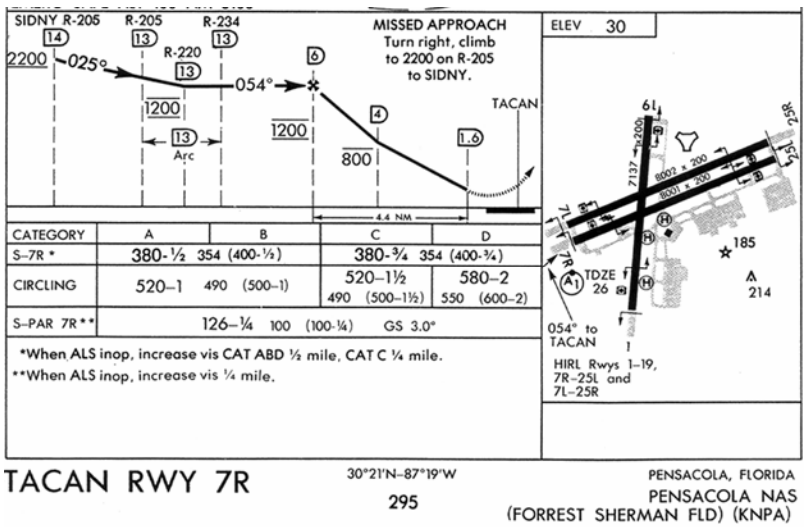


Figure 7-2 TACAN RWY 7R

7. Utilizing the following reference chart (Figure 7-3), we can easily determine the weather needed when choosing an alternate airfield. We can see that in the case where our destination has a 3000 foot ceiling and 3 miles visibility, or better, within one hour before and one hour after our ETA, we do not need an alternate airfield. However, at VT-10/4, we have an alternate airfield every time we fly a mission. If our destination weather is 0 – 0, up to, but not including published weather minimums, our alternate has to have a 3000 foot ceiling and a minimum of 3 miles visibility. If the weather at our destination is above the minimums for the runway in use (this includes PAR minimums adjusted for single-piloted aircraft), but below a 3000 foot ceiling and/or 3 miles visibility, we determine our alternate by adding 300 feet and 1 mile to that airfield's lowest non-precision (LOC/VOR/TACAN) weather minimums. We now compare this adjusted weather minimum to our alternate airfield's forecast weather. If the forecast weather is at or above these adjusted minima plus or minus one hour of our alternate ETA, we can use it as an alternate.

8. To clarify the use of PAR minimums when determining destination and alternate weather requirements, remember:

a. Look at the weather forecast for your destination.

b. Look at the minimums for the runway in use including PAR minimums.

c. Compare the two and enter the chart in Figure 7-3 with destination weather.

Remember that PAR minimums are taken into account for the destination weather side of the chart, but not for the alternate weather side of the chart. Also note that if the PAR is NOTAM'd down for the runway in use then you will not be not able to use PAR minimums to determine your alternate weather. You would then use LOC/VOR/TAC/ASR or circling minima.

Example: In Figure 7-2 our destination is NAS Pensacola and we are planning an approach to RWY 7R. Our forecast weather is 200 – ¼. Our possible minima for this RWY are S-7R (400 – ¾), circling (500 – 1½) and S-PAR 7R (100 – ¼). Adjusted for single-piloted minima, the PAR weather mins become (200 – ½). Our lowest possible minima after ensuring that the PAR is not NOTAM'd down at NAS Pensacola are for the S-PAR 7R of (200 – ½). We enter the destination weather side of the Figure 7-3 chart. Look at the first row: 0 – 0 up to, but not including published minimums. Our destination weather of 200 – ¼ falls into this first category, thus requiring alternate weather of 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	3000 – 3 or better		
Published minimums up to but not including 3000 – 3 (single-piloted absolute minimums 200 – ½)	NON-PRECISION	PRECISION	
		ILS	PAR
	*Published minimums plus 300 – 1	Published minimums plus 200 – ½	*Published minimums plus 200 – ½
3000 – 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.			

Figure 7-3 Weather

VT-10/4 aircraft are always considered single-piloted and PAR/ASR minima may not be used to choose an alternate. The PRECISION section is reserved for aircraft equipped with ILS or for aircraft intending to use PAR if they are dual-piloted and have at least two radios.

T/O Minima

If a pilot possesses a special instrument rating, no T/O ceiling or visibility minima apply. T/O depends on the judgment of the pilot and the urgency of flight.

If a pilot possesses a standard instrument rating, T/O minimums must be published minimums for the available non-precision approach, but not less than 300 foot ceiling and 1 statute mile visibility. When a precision approach compatible with installed and operable aircraft equipment is available, with published minimums less than 300/1, T/O is authorized provided the weather is at least equal to the precision approach minimums for the landing runway in use, but in no case when the weather is less than 200 foot ceiling and ½ statute mile visibility (2400 feet Runway Visual Range (RVR)).

Section T/O/Approach

A section is defined as two aircraft. Special minima exist for a section (formation) T/O/approach. If the airfield publishes circling minima, then those minima are the lowest ceiling and visibility permitted for section T/O/approach. These conditions shall apply at actual time of T/O or landing, not filing time. If the airfield does not possess circling minima, then basic VFR (1000 – 3) shall apply.

Approach Criteria for Single-Piloted Aircraft

Do not commence an instrument approach **with intent to land** if the reported weather is below published minima for the type of approach conducted. During a turbojet enroute descent, the approach is considered to commence when the aircraft descends below the highest initial penetration altitude established for the high altitude instrument approach procedures for the destination airport. Once an approach commences, a pilot may, at his/her discretion, continue the approach to the approved published landing minima as shown in the appropriate Flight Information Publication for the type approach being conducted. However, absolute minima for a single-piloted aircraft executing a precision approach are 200 feet ceiling/Height Above Touchdown (HAT) and visibility ½ statue mile/2400 feet RVR or published minima, whichever is higher.

Approach Criteria for Multi-Piloted Aircraft

If reported weather is below published landing minima for the approach to be conducted, an approach shall not be commenced in multi-piloted aircraft unless the aircraft has the capability to proceed to a suitable alternate in the event of a missed approach. If both pilots of a multi-piloted aircraft are NATOPS qualified in model, the approach may be executed to published minima. If both pilots are not NATOPS qualified in model, the absolute precision approach minima are 200 feet HAT and a visibility ½ statute mile/2400 feet RVR, or published minima, whichever is higher. Note in Figure 7-3 that a multi-piloted aircraft with only one radio may not use PAR minima as a basis for choosing an alternate.

Single-piloted aircraft with side-by-side seating occupied by the PIC and an assisting NFO, which are configured for and assigned all-weather missions, may operate within the same clearance and approach criteria specified above for multi-piloted aircraft provided that:

1. The assisting NFO is instrument and NATOPS qualified for the model aircraft in which NFO duties are being performed.

2. Cockpit configuration is such that the assisting NFO can:

   a. Monitor the pilot's flight instruments.

   b. Monitor and control communications.

   c. Assist the pilot in acquiring the runway visually.

707. SUMMARY

The aviator filing a flight plan must ensure that all essential weather elements are included in his/her briefing. He/she shall request clarification or additional information when doubt exists. The ease with which all-weather flights are successfully completed is directly proportional to the aircrew's preparation and their understanding of the environment in which they operate.

CHAPTER QUESTIONS

1. You are planning to fly a low-level. You look outside and the ceiling and visibility look clear and unlimited. In these circumstances, do you need to file a DD 175-1?
(Yes/No)

2. Where can you find information regarding the whereabouts of military weather briefing facilities?

_____

_____

3. What is the significance of the letter B when it precedes the word VOR or VORTAC in the IFR Supplement?

_____

_____

4. Name two ways of obtaining in-flight weather information.
   a. _____
   b. _____

5. When is the FAA required to solicit PIREPS?

_____

_____

6. PIREPS deal exclusively with weather phenomena.
   a. True
   b. False

7. It is normally a task of center (ARTCC) to give you heading information around severe weather.
   a. True
   b. False

8. Under what circumstances may a Naval aircraft file into a WW?

_____

_____

9. Why are IFR Flight Plans utilized even during conditions of VMC?

_____

_____

10. Your lowest acceptable approach minima here at VT-10/4 are:

_____

_____

In questions 11 – 15, determine whether or not an alternate airfield is required. If it is required, state the minimum weather acceptable at that alternate, and using your knowledge of filing criteria, state if alternate airfield is acceptable for your use based on T-34C/T-6A aircraft (category B) and VT-10/4 standards. Utilize Figures 7-4 – 7-9.

11.
Destination: Keesler AFB – WX 600 – ¾ **Alternate**: Pensacola NAS – WX 500 – 1½

12.
Destination: Redstone AAF – WX 200 – 1 **Alternate:** Allen C. Thompson (Jackson) – WX 3000 – 2

13.
Destination: Pensacola NAS – WX 100 – ¾ **Alternate:** Cecil Field NAS – WX 800 – 2

14.
Destination: Fort Rucker – WX 2000 – 2 **Alternate:** Redstone AAF – WX 1000 – 2½

15.
Destination: Cecil Field NAS – WX 300 – 1 **Alternate:** Fort Rucker – WX 1000 – 1½

16. Select the correct alternates.

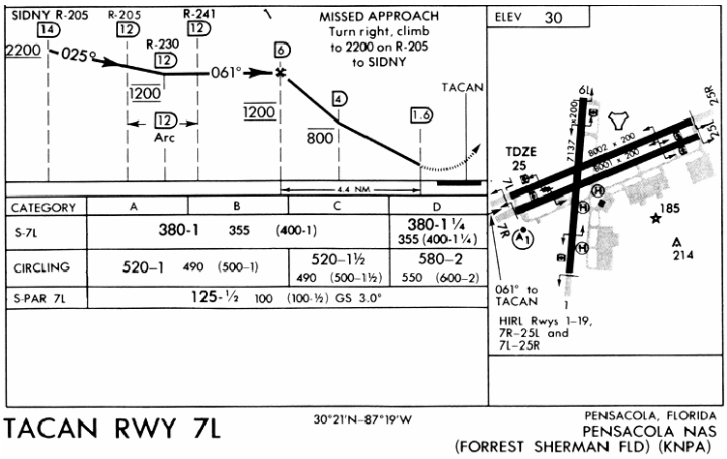
Destination: Pensacola NAS – WX 500 – 1½

Possible Alternates:

a. Kessler AFB – WX 700 – ¾
b. Fort Rucker – WX 500 – 2
c. Cecil Field – WX 800 – 2
d. Redstone AAF – WX 800 – 2
e. Allen C. Thompson – WX700 – 2

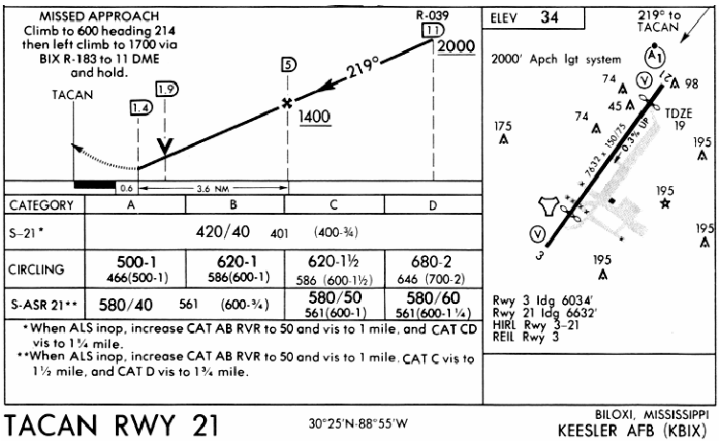
17. With all approaches available for RWY 35 at Redstone AAF, what are the T/O minimums for a standard instrument rated pilot?

7-14 IN-FLIGHT WEATHER ANALYSIS



TACAN RWY 7L 30°21'N-87°19'W PENSACOLA, FLORIDA PENSACOLA NAS (FORREST SHERMAN FLD) (KNPA)

Figure 7-4 TACAN RWY 7L



TACAN RWY 21 30°25'N-88°55'W BILOXI, MISSISSIPPI KEESLER AFB (KBIX)

Figure 7-5 TACAN RWY 21

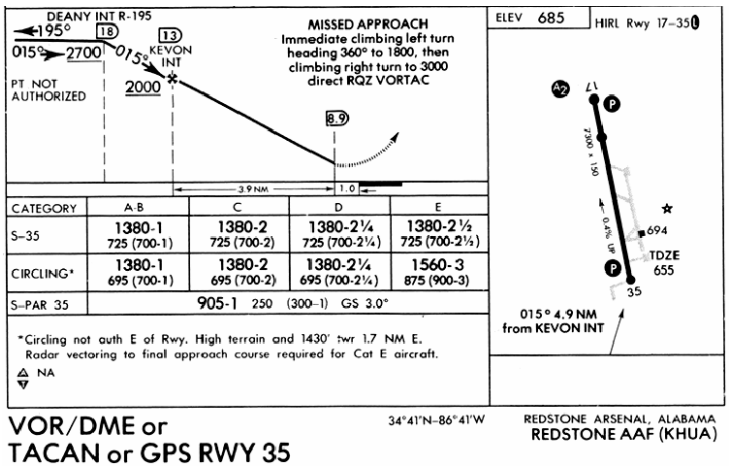


Figure 7-6 VOR/DME or TACAN or GPS RWY 35

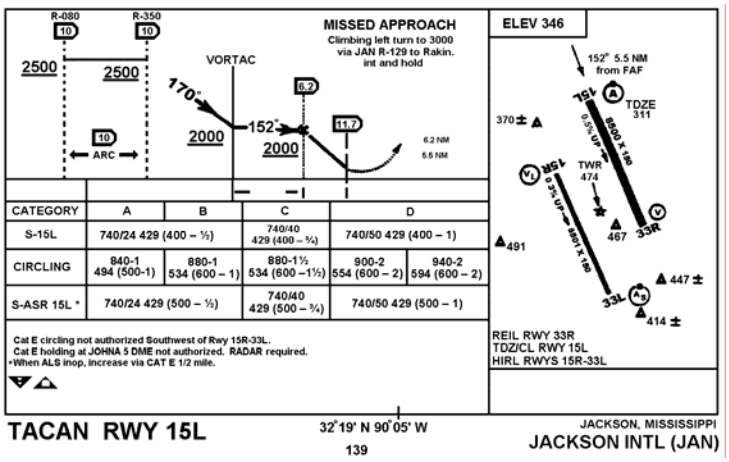


Figure 7-7 TACAN RWY 15L

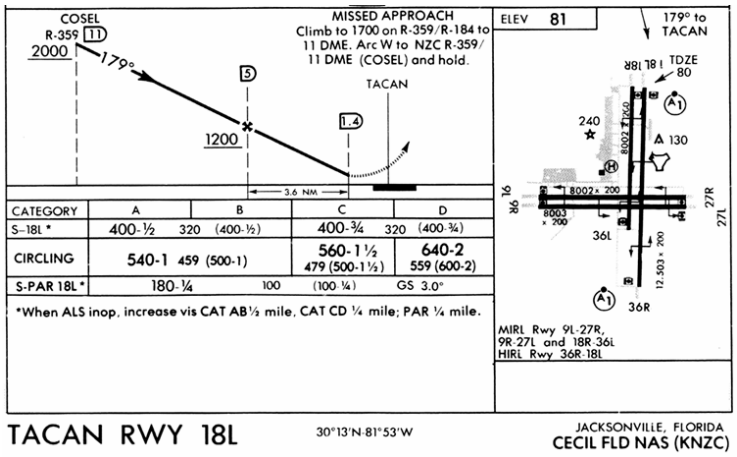


Figure 7-8 TACAN RWY 18L

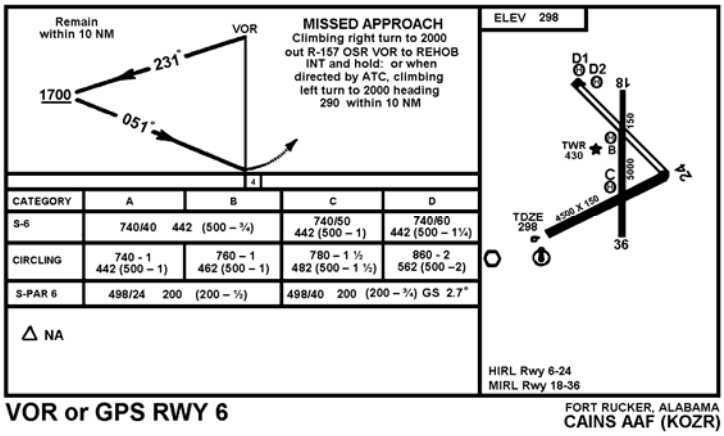


Figure 7-9 VOR or GPS RWY 6

CHAPTER ANSWERS

1. Yes

2. Flight Information Handbook

3. Weather Broadcasts

4. Any two of the following:

   – BVORTAC
   – Flight Service Stations
   – ABVORTAC
   – PMSV

5. When ceilings are below 5000 feet and visibility below 5 miles. When thunderstorms are forecast.

6. b. False

7. b. False

8. If the storm has not developed as forecast and (1) aircraft has radar to avoid thunderstorms or (2) VMC can be maintained. Alternatively, if aircraft can fly above existing or developing weather.

9. Reduce midair collision potential; greater control of aircraft.

10. 200 – ½

	Alternate Required	Min Weather at Alternate	Can Alternate Be Used
11.	Yes	700 – 2	No
12.	Yes	3000 – 3	No
13.	Yes	3000 – 3	No
14.	Yes	1000 – 2	Yes
15.	Yes	800 – 1¾	No

16. C & E

17. 300 – 1

7-18 IN-FLIGHT WEATHER ANALYSIS

CHAPTER EIGHT
COURSE REVIEW

800. INTRODUCTION

The purpose of the Instruments and Flight Planning course review is to provide experience through actual involvement with course materials, lessen the abstract aspects of learning and provide for an atmosphere of informal open discussion for the students.

801. DESCRIPTION

A comprehensive step-by-step overview of Chapters 1-7 is conducted. Specific emphasis is placed on addressing those concepts that are basic and germane to every NFO. All course-learning objectives are reviewed for understanding and clarity. An atmosphere of open discussion serves as the review session format throughout the question and answer period.

802. REQUIREMENTS

Two hours are allotted for the review. During the review, students are encouraged to use reference materials and training devices as each deems necessary.

803. DEBRIEF

Upon completion of the question and answer period, the instructor makes subjective comments regarding overall class performance with emphasis placed on observed areas of weakness.

804. FLIGHT PLANNING REVIEW QUESTIONS

Preflight Planning

If your proposed departure time is 1700Z, how early can you receive your weather brief?

Weather information is given plus or minus what time of your arrival/departure?

If you receive a weather brief at 1400Z with a ETD of 1530Z, when will the brief become void?

Filing Minimums

Your destination is NPA with a forecast of 100-1. Can Eglin with a forecast of 2000-5 qualify as an alternate?

Your destination is NPA with a forecast of 800-2. Can Eglin with a forecast of 800-2 qualify as an alternate?

Your destination is PAM with a forecast of 3000-6. Can Eglin with a forecast of 600-2 qualify as an alternate?

Your destination is Moody with a forecast of 1000-2. Can Jekyll Island, Georgia with a forecast of 800-2 qualify as an alternate?

If weather at NPA is below 200-1/2, what weather must be at alternate?

Takeoff Minimums (Assume standard pilot)

What weather is required to takeoff on runway 25L at NPA (PAR not available)?

You are performing a section takeoff on runway 31 at Key West NAS. What is the weather you need?

What weather is required to takeoff on runway 36 at Hurlburt field?

What weather is required to takeoff on runway 25L at NPA?

Flying Approach Minimums

You are doing an enroute delay at Tyndall. What weather do you need to start the LOC 31R approach?

You plan on flying the PAR RWY 19 at NPA. What weather do you need?

What are the weather minimums for a section/formation approach to RWY 31R at Tyndall?

What is the DH for the PAR RWY 9 at Jacksonville NAS?

Wind Analysis

Guide number =
(Practice problems)

MC: 060, MH:065, TAS: 210, GS: 190. What are the winds?

AT: 020/20, Want: 080/55, TAS 210, Wind 060/30. FF 250 PPH. What is your HDG, ETE, and Fuel burned?

Ground Speed Checks

Your GS is 204 kts, where is your 2 minute prior call?

At FL 250, what is minimum DME for GS check?

Start: 25 DME, End: 29.3 over 1 minute. What is your GS?

GS: 3.5 NM/min, FF: 250 PPH, fuel on board: 700#, 28 NM left to point A, 1 hour and 10 min from pt A to IAF. What is fuel at IAF?

Mission Completion Feasibility

At the completion of your preflight planning, you estimate that you will arrive at your destination IAF with 205 pounds of fuel. You compute it will take 95 lbs to go from your destination IAF to alternate IAF. What is your spare fuel?

8-2 COURSE REVIEW

At the completion of your preflight planning, you estimate that you will arrive at your destination IAF with 240 pounds of fuel. You compute it will take 145 lbs to go from your destination IAF to alternate IAF. What is your spare fuel?

Flying Approaches

What is the MDA for the TACAN RWY 19 at Eglin AFB?

What is the DH for the ILS Y RWY 19 at Eglin AFB?

What is the HAT for the TACAN RWY 30 at Eglin AFB?

What is the HAA for the TACAN RWY 1 at Eglin AFB?

When would you execute a missed approach on the ILS RWY 11 at Dobbins AFB?

When would you execute a missed approach on the VOR RWY 17L at St. Petersburg-Clearwater INTL?

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CHAPTER NINE

END-OF-COURSE EXAMINATION/REVIEW

900. INTRODUCTION

The Instruments End-of-Course examination contains 50 objective type questions covering material from the Instruments and Flight Planning courses.

901. TIME ALLOCATION

Two and one-half hours are allotted for the End-of-Course examination.

One-half hour is allotted for the review.

Two hours and forty-five minutes are allotted for International Students.

To successfully complete the examination, you are required to correctly answer a minimum of 80% of the questions.

902. MATERIALS REQUIRED

The instructor provides all test materials required for the examination. Textbooks, class notes or other study aids are prohibited. CR-2s, plotters, and dividers may be utilized for the examination.

903. TESTING PROCEDURES

The examination begins on time. Students late by less than ten minutes are permitted to take the examination with their class; however, scheduled completion time remains in effect. Time extensions for late arrivals are prohibited. Students arriving in excess of ten minutes late are referred to the Academic Training Officer for disposition. All foreign students are given an additional 15 minutes to complete the examination.

The instructor provides an examination, answer sheet, and pencil to each student.

After commencement of the examination, students who leave the room are not permitted reentry until all students have completed and examination materials are collected.

Should questions arise during the examination period, students should raise their hand for instructor assistance.

Writing in the examination booklet is prohibited.

Upon completion of the examination, you are provided with a critique sheet. Constructive comments are encouraged.

904. REVIEW PROCEDURES

During the examination review, your instructor will read and provide the correct answer for each question. Upon your request, he/she will discuss any question or answer.

Taking notes of any type during the review is prohibited.

905. GRADING QUERIES

If in the opinion of the instructor a controversy exists over a test item, he/she will request that grading be suspended and a review initiated.

Do not ask questions about your examination to the personnel in the testing office. They are not permitted to provide information other than your percentage grade. If you have a problem with a grade, ask an instructor for assistance.

906. GRADE POSTING

When completed, grades are posted on the bulletin board, first deck, Griffith Hall. Examination results are posted within 24 hours.

If there are any failures, a note requesting the class leader to obtain "pink sheets" from the testing office is posted.

907. RE-EXAMINATIONS

If you fail the examination, you must schedule a debrief of the test with any Instruments instructor. Additionally, you are required to confer with one of your class advisors concerning your academic situation. Your final step is to confer with the Academic Training Officer. You are allotted three days, from the date of the examination, to complete "pink sheet" routing and return it to the testing office.

The scheduling of the End-of-Course Instruments re-examination is your responsibility. You must complete the Instruments End-of-Course re-examination within two weeks of the date of the failure.

908. TEST GRADING CRITERIA

For questions 41-45 you will be given a voice communication problem and for questions 46-50 you will be required to completely fill out a DD 175.

The grading criteria for the voice communication problem will be as follows:

FUELS +/- 5 pounds

HEADINGS/COURSES +/- 2 degrees

TIMES +/- 60 seconds

The grading criteria for the DD 175 will be as follows:

ETEs +/- 5 minutes

No omissions /errors for the rest of the form.

APPENDIX A
GLOSSARY

A100. NOT APPLICABLE

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A-2 GLOSSARY OF TERMS

APPENDIX B

VOICE CALLS PRACTICE PROBLEMS

B100. PRACTICE PROBLEM #1 (NPA-PAM)

Departure:	NAS Pensacola (NPA)
Destination:	Tyndall AFB (PAM)
Route of Flight:	MENTR 9 TRADR BFM V198 DEFUN BRUSE NANCY
Scenario:	You are flying eastbound on the SJI 081 radial at 38 DME.
Winds:	050 / 25
Time:	15+30 (min+sec)
TAS:	240 KTS
Fuel Qty:	660 lbs
Fuel Flow:	360 lbs/hr
Preflight Fuel Estimate:	at CEW was 570 lbs.
Time to the IAF:	from CEW (from jet card) is 25+30 (min +sec).

Write the following calls as you would report them to the pilot:

TWO-MINUTE PRIOR to CEW

We are two-minutes prior to _____ ;

Outbound heading is _____ for a course of _____ ;

I estimate _____ at time _____ ;

MARK-ON-TOP at CEW

Mark on top;

Turn _____ to a heading of _____;

Time is _____;

Place is _____;

Fuel is _____ lbs;

NAVAID _____.

WINGS LEVEL CALL outbound from CEW

Wings level;

We had _____ lbs of fuel;

I estimated _____ lbs of fuel;

We are _____ lbs _____ pre-flight;

I estimated _____ lbs at the IAF.

B101. PRACTICE PROBLEM #2 (PAM-VAD)

Departure:	Tyndall AFB (PAM)
Destination:	Moody AFB (VAD)
Route of Flight:	SZW V7 CODYS GEF MGR BELLE
Scenario:	You are flying outbound from SZW at 9 DME.
Winds:	080 / 40
Time:	07+00 (min+sec)
TAS:	240 kts
Fuel Qty:	705 lbs
Fuel Flow:	400 lbs/hr
Preflight Fuel Estimate:	at CODYS was 685 lbs.
Time to the IAF:	from CODYS (from jet card) is 28+30 (min+sec).

Write the following calls as you would report them to the pilot:

TWO-MINUTE PRIOR to CODYS

We are two-minutes prior to _____;

Outbound heading is _____ for a course of _____;

I estimate _____ at time _____.

MARK-ON-TOP at CODYS

Mark on top;

Turn _____ to a heading of _____;

Time is _____;

Place is _____;

Fuel is _____;

NAVAID _____.

WINGS LEVEL CALL outbound from CODYS

Wings level;

We had _____ lbs of fuel;

I estimated _____ lbs of fuel;

We are _____ lbs _____ pre-flight;

I estimate _____ lbs at the IAF.

B-2 VOICE CALLS PRACTICE PROBLEMS

B102. PRACTICE PROBLEM #3 (NPA-MEI)

Departure: NAS Pensacola (NPA)

Destination: Meridian Key Field (MEI)

Route of Flight: MENTR 9 TRADR BFM V11 SOSOE V455 MEI

Scenario: You are flying outbound from BFM at 10 DME.

Winds: 264 KTS / 322° (maintaining a course of 319°)

Time: 56+00 (min+sec)

TAS: 240 KTS

Fuel Qty: 700lbs

Fuel Flow: 385 lbs/hr

Preflight Fuel Estimate: at GCV was 650 lbs.

Time to the IAF: from GCV (from jet card) is 28+00 (min +sec).

Write the following calls as you would report them to the pilot:

TWO-MINUTE PRIOR to GCV

We are two-minutes prior to _____;

Outbound heading is _____ for a course of _____;

I estimate _____ at time _____.

MARK-ON-TOP at GCV

Mark on top;

Turn _____ to a heading of _____;

Time is _____;

Place is _____;

Fuel is _____ lbs;

NAVAID _____.

WINGS LEVEL CALL outbound from GCV

Wings level;

We had _____ lbs of fuel;

I estimated _____ lbs of fuel;

We are _____ lbs _____ pre-flight;

I estimate _____ lbs at the IAF.

B103. ANSWERS TO PRACTICE PROBLEMS #1

Groundspeed:	240 KTAS - 21 KTS HW = 219 KTS GS
ETE to CEW:	13+25
Fuel burned to CEW:	85 lbs (rounded - 81 lbs exactly)
ETE from CEW to DEFUN:	7+30 (rounded -7+38 exactly)
Fuel burned from CEW to the IAF:	155 lbs (rounded - 153 lbs exactly)
Fuel at the IAF:	660-85 (to CEW) - 155 (CEW to IAF) = 420 lbs

TWO-MINUTE PRIOR CALL:

We are two-minute prior to Crestview;
Outbound heading is 084 for a course of 088;
I estimate DEFUN at time 36+25.

MARK ON TOP CALL:

Mark on top;
Turn right to a heading of 084;
Time is 28+55;
Place is Crestview;
Fuel is 575 lbs;
NAVAID remains the same.

WINGS LEVEL CALL:

Wings level;
We had 575 lbs of fuel;
I estimated 570 lbs of fuel;
We are 5 lbs above pre-flight;
I estimate 420 lbs at the IAF.

B-4 VOICE CALLS PRACTICE PROBLEMS

B104. ANSWERS TO PRACTICE PROBLEMS #2

Groundspeed:	240 KTAS - 27 KTS HW = 213 KTS GS
ETE to CODYS:	3+56
Fuel burned to CODYS:	30 lbs (26 lbs exactly)
ETE from CODYS to GEF:	5+30 (5+44 exactly)
Fuel burned from CODYS to the IAF:	190 lbs
Fuel at the IAF:	705 - 30 - 155 = 420 lbs

TWO-MINUTE PRIOR CALL:

We are two-minute prior to CODYS;
Outbound heading is 046 for a course of 040;
I estimate Greenville at time 16+26.

MARK ON TOP CALL:

Mark on top;
Turn left to a heading of 046;
Time is 10+56;
Place is CODYS;
Fuel is 675 lbs;
NAVAID changes to Greenville - 109.0.

WINGS LEVEL CALL:

Wings level;
We had 675 lbs of fuel;
I estimated 685 lbs of fuel;
We are 10 lbs below pre-flight;
I estimate 485 lbs at the IAF.

B105. ANSWERS TO PRACTICE PROBLEMS #3

Tailwind:	264 KTS GS - 240 KTAS = 24 KTS TW
Crosswind:	3° right crab * 4 (Guide Number) = 12 KTS R-XW
Winds:	112 / 27
ETE to GCV:	6+08
Fuel burned to GCV:	40 lbs (39 lbs exactly)
ETE from GCV to SOSOE:	11+30 (11 +16 exactly)
Fuel burned from GCV to the IAF:	180 lbs
Fuel at the IAF:	700 - 40 - 180 = 480 lbs

TWO-MINUTE PRIOR CALL:

We are two-minute prior to Greene County;
Outbound heading is 312 for a course of 310;
I estimate SOSOE at time 13+38.

MARK ON TOP CALL:

Mark on top;
Turn left to a heading of 312;
Time is 02+08;
Place is Greene County;
Fuel is 660 lbs;
NAVAID remains the same.

WINGS LEVEL CALL:

Wings level;
We had 660 lbs of fuel;
I estimated 650 lbs of fuel;
We are 10 lbs above pre-flight;
I estimate 480 lbs at the IAF.

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APPENDIX C
REVIEW QUESTIONS FOR FLIGHT PLANNING

C100. FLIGHT PLANNING QUESTIONS

1. What are the rounding rules for distance, time, and fuel on a Jet Log? On a DD 175?
2. Requirements for emergency field.
3. Wind triangle.
4. Review TWO-MINUTE PRIOR, MARK-ON-TOP, WINGS LEVEL Calls.
5. Requirements for GS check.
6. Min time for GS check – 1 min.
7. How often to do groundspeed checks – Once per leg.
8. At FL270 how far from TACAN must you be before starting GS check?
9. Revising ETA/EFR.
10. 3710 fuel requirements.
11. What is on WX depiction chart?
12. How long is 175-I WX brief good for?
13. When can you fly into a WW?
14. Can you fly in a CAWW?
15. Who do AIRMET/SIGMET apply to?
16. If there is a cow on a taxiway what must you do besides avoid it?
17. Review approach criteria and mins for section T/O/approach.

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C-2 REVIEW QUESTIONS FOR FLIGHT PLANNING

APPENDIX D

T-6A FLIGHT PLANNING DATA

D100. T-6A PLANNING DATA

Total Fuel	1100 lbs
Start/Taxi/T/O	50 lbs
Penetration/Approach (20 minutes)	50 lbs
Reserve (20 min @ 10,000 feet)	125 lbs
Holding (10 min)	60 lbs

CLIMB ALT	TIME	FUEL	DISTANCE
5,000	2	20	5
10,000	4	40	10
15,000	6	60	15
20,000	8	80	20
25,000	10	100	25
30,000	15	130	50
31,000	16	135	55

CRUISE ALT	FUEL FLOW 240 TAS	FUEL FLOW 300 TAS
S/L	600	N/A
5,000	525	N/A
10,000	450	N/A
15,000	375	550
20,000	325	475
25,000	300	425
31,000	275	350

Bingo Data can be extracted for Figure A5-27 Diversion Range Summary.

DISTANCE TO BASE NM	FUEL REQUIRED POUNDS (1)	TIME REQUIRED MINUTES	COURSE ALTITUDE FEET	DESCENT DIST NM (2)
50	224	15	10000	22
60	242	18	11000	24
70	259	21	12000	27
80	277	25	13000	29
90	294	28	14000	32
100	312	31	15000	34
110	314	33	18000	35
120	315	35	21000	37
130	317	37	25000	38
140	318	39	28000	40
150	320	41	31000	41
160	335	44	31000	49
170	349	47	31000	57
180	364	49	31000	65
190	378	52	31000	73
200	393	55	31000	81

STANDARD DAY, ZERO WIND, DEFOG OFF, GEAR AND FLAPS UP.
1. INCLUDES 105 POUNDS FUEL RESERVE
2. MAX RANGE DESCENT - CLEAN CONFIGURATION, POWER SET FOR 1500 FPM DESCENT AT 180 KIAS

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APPENDIX E

T-6A 2B47 PROFILE DATA

E100. GENERAL INFORMATION

For each TP session, you will need to prepare the following:

One Jet Card for the Route of Flight

Three DD 175 Flight Plans:

A **single-leg** DD 175 for the first Route of Flight, with an approach to a full stop at the first Destination.

An **enroute delay** DD 175 utilizing the first Route of Flight to reach the first Destination where one practice approach will be conducted, followed immediately by flying the Return Route of Flight to the second Destination for an approach followed by a full stop. On this DD 175, there should only be one airport listed as a full stop destination (in the "TO" block), and only one set of fuel and alternate data, which should appear in the blocks provided for that purpose. (Note that this alternate data should be that applicable to the Return Route of Flight, because the second Destination is the *only* full stop destination on this DD 175.)

A **stopover** DD 175 utilizing the first Route of Flight to reach the first Destination, followed by one approach to a full stop landing and 1+00 on deck. The second leg will consist of the Return Route of Flight to the second Destination. The first part of this DD 175 should be identical to the single-leg version. (Note that the second route of flight must be followed by a second set of fuel and alternate data in parentheses, since the blocks provided for that purpose will have already been used for the first leg.)

The winds for TP-6 ET are given in this workbook. **The winds for TP-6 thru TP-8 will be provided by your instructor in class.** The enroute times to the Destination and Alternate for the first leg should be obtained from your Jet Log. This data is given for the return leg, so you will not have to calculate it for the purpose of completing the second leg on the stopover and enroute delay DD 175's.

Your DD 175's and Jet Card will be collected during each TP session and graded by your instructor, so ensure that they are complete and accurate. There should be no blanks in any appropriate areas of either, save for the signature block on the DD 175. This means that the bottom half of the reverse of the Jet Log needs to be filled out, for instance.

Please ensure that your Jet Log so that you may receive credit for it.

Enter TP begins with the MENTR9 departure out of NPA. Although this procedure requires a TACAN in real life, at the beginning of TP-6 ET your instructor will show you how to set up the GPS in the T-6 to act as a TACAN for the purpose of practicing the MENTR9. Don’t get wrapped up in the details of flying a TACAN departure with a GPS - except for the "GPS" annunciation on your EHSI, the needles will behave exactly as if the NPA TACAN was a VOR/DME or VORTAC during the departure. **Note that it is not legal to use a GPS in place of a TACAN in the real world, although it is a legal substitute for DME or ADF.** Therefore, you will never fly the MENTR9 in this aircraft, but you may see VOR-based departure procedures at airfields other than NAS Pensacola, so do not disregard this training.

E101. T-6A FLIGHT PLANNING DATA (TP-6 ET)

Administrative Data (DD 175)

A/C TYPE / CALL SIGN:	T-6 / BUCK/KATT ___ (use station number)
BUREAU NUMBER:	160351
SQUADRON:	VT-4 / VT-10
PILOT IN COMMAND:	U.R. Lost, 456-78-9123, LT, USN, VT-4/10
SNFO:	You
WX BRIEF NUMBER:	2571

Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	Keesler AFB
ALTERNATE:	Hattiesburg-Laurel Regional
ROUTE OF FLIGHT:	MENTR9•TRADR BFM AXSIS GVC WIGGO GPT
APPROACH:	VOR/DME-A at Keesler AFB LOC RWY 18 at Hattiesburg-Laurel Regional
ALTITUDE:	14,000 FT
TAS:	240 KTAS
EST TIME OF DEP:	0715 local

Return Flight Route/Profile

POINT OF DEPARTURE:	Keesler AFBMeridian (Key Field)
DESTINATION:	NAS Pensacola
ALTERNATE:	Eglin AFB
ROUTE OF FLIGHT:	ROMMY PLEBE TRADR SIDNY
APPROACH:	GPS RWY 7L at NAS Pensacola ILS-Y RWY 30 at Eglin AFB
ALTITUDE:	13,000 FT
ASSUME:	0+25 ETE from BIX to SIDNY 0+20 ETE from SIDNY to BOBOE Stopover: 1+00 on deck at BIX Stopover and Enroute Delay: 0+20 for 1 Approach at BIX

Meteorological Data

CLIMB WINDS:	Calm
WINDS AT 14,000:	350 / 25
WINDS AT 5,000:	350 / 10

E-2 T-34C PLANNING DATA

E102. T-6A FLIGHT PLANNING DATA (TP-6)

Administrative Data (DD 175)

A/C TYPE / CALL SIGN:	T-6 / BUCK/KATT____(use station number)
BUREAU NUMBER:	160151
SQUADRON:	VT-4 / VT-10
PILOT IN COMMAND:	I.M. Shakey, 123-45-6789, Capt, USMC, VT-4/10
SNFO:	You
WX BRIEF NUMBER:	3566

Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	Meridian (Key Field)
ALTERNATE:	Maxwell AFB
ROUTE OF FLIGHT:	MENTR9•TRADR BFM V454 STETS GCV V11 PICAN V222 LBY V455 MEI
APPROACHES:	VOR-A (full procedure turn) at Meridian (Key Field) ILS RWY 15 at Maxwell AFB
ALTITUDE:	10,000 FT
TAS:	240 KTAS
EST TIME OF DEP:	1015 Local

Return Flight Route/Profile

POINT OF DEPARTURE:	Meridian (Key Field)
DESTINATION:	NAS Pensacola
ALTERNATE:	Eglin AFB
	ROUTE OF FLIGHT:MEI V455 SOSOE PICAN GCV BFM TRADR SIDNY
APPROACH:	ILS-Y RWY 7L at NAS Pensacola ILS-Z RWY 30 at Eglin AFB
ALTITUDE:	9,000 FT
ASSUME:	1+01 ETE from MEI to SIDNY 0+20 ETE from SIDNY to TUFER Stopover: 1+00 on deck at MEI Stopover and Enroute Delay: 0+20 for 1 Approach at MEI

Meteorological Data

CLIMB WINDS:	Calm
WINDS AT 10,000:	Given by instructor in class
WINDS AT 5,000:	Given by instructor in class

E103. T-6A FLIGHT PLANNING DATA (TP-7)

Administrative Data (DD 175)

A/C TYPE / CALL SIGN:	T-6, BUCK/KATT____(use station number)
BUREAU NUMBER:	160522
SQUADRON:	VT-4 / VT-10
PILOT IN COMMAND:	U.R. Lost, 456-78-9123, LT, USN, VT-4/10
SNFO:	You
WX BRIEF NUMBER:	3865

Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	Montgomery Regional (Dannelly Field)
ALTERNATE:	Meridian (Key Field)
ROUTE OF FLIGHT:	MENTR9•ENSLY CEW V198 MAI V521 RRS V241 EUF V323 MGM
APPROACHES:	VOR-A (full procedure turn) at Montgomery Regional VOR-A at Meridian (Key field)
ALTITUDE:	9,000 FT
TAS:	240 KTAS
EST TIME OF DEP:	0800 local

Return Flight Route/Profile

POINT OF DEPARTURE:	Montgomery Regional (Dannelly Field)
DESTINATION:	NAS Pensacola
ALTERNATE:	Eglin AFB
ROUTE OF FLIGHT:	MGM RUTEL UIA CORKY CEW BAKOS PENSI NPA SIDNY
APPROACH:	GPS RWY 7L at NAS Pensacola ILS-Z RWY 30 at Eglin AFB
ALTITUDE:	8,000 FT
ASSUME:	1+20 ETE from MGM to SIDNY 0+20 ETE from SIDNY to TUFER Stopover: 1+00 on deck at MGM Stopover and Enroute Delay: 0+20 for 1 Approach at MGM

Meteorological Data

CLIMB WINDS:	Calm
WINDS AT 9,000:	Given by instructor in class
WINDS AT 5,000:	Given by instructor in class

E-4 T-34C PLANNING DATA

E104. T-6A FLIGHT PLANNING DATA (TP-8)

Administrative Data (DD 175)

A/C TYPE / CALL SIGN:	T-6 / BUCK/KATT____(use station number)
BUREAU NUMBER:	160275
SQUADRON:	VT-4 / VT-10
PILOT IN COMMAND:	E.Y. Moon, 987-65-4321, LT, USN, VT-4/10
SNFO:	You
WX BRIEF NUMBER:	1422

Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	NAS Pensacola
ALTERNATE:	**Choose a suitable alternate from the list below**
ROUTE OF FLIGHT:	MENTR9•TRADR SAINT SCALY HAZEY BRATT NUN
APPROACHES:	VOR RWY 19 Circle to 7L at NAS Pensacola Specified Approach at the Appropriate Alternate (See Below)
ALTITUDE:	8,000 FT
TAS:	240 KTAS
EST TIME OF DEP:	0900 local

Return Flight Route/Profile

POINT OF DEPARTURE:	NAS Pensacola
DESTINATION:	Tyndall AFB
ALTERNATE:	Tallahassee Regional
ROUTE OF FLIGHT:	CEW DEFUN REBBA BRUSE NANCY
APPROACH:	ILS RWY 13L at Tyndall AFB LOC RWY 36 at Tallahassee Regional
ALTITUDE:	7,000 FT
ASSUME:	0+40 ETE from NPA to NANCY 0+20 ETE from NANCY to ADDAX Stopover: 1+00 on deck at NPA Stopover and Enroute Delay: 0+20 for 1 Approach at NPA

Meteorological Data

CLIMB WINDS:	Calm	
WINDS AT 10,000:	Given by instructor in class	
WINDS AT 5,000:	Given by instructor in class	
NAS Pensacola	DEST FCST is 400-1	(VOR RWY 19)
Mobile Regional	ALTN FCST is 300-1	(ILS RWY 14)
Keesler AFB	ALTN FCST is 400-2½	(VOR/DME-A to RWY 3)
Eglin AFB	ALTN FCST is 400-¾	(ILS Y RWY 30)
Panama City Bay County	ALTN FCST is 900-2	(VOR RWY 14)

APPENDIX F

2B47 GRADING CRITERIA

TP-6: Jet Log, DD 175, Course Control and Time Estimates

TP-7: Jet Log, DD 175

TP-8: Jet Log, DD 175, Course Control and Time Estimates

Grading standards can be found in the Master Curriculum Guide. TPs will be graded as PASS/FAIL. Students may not be able to achieve the standards in the MCG and still be able to pass the TP. The instructor will make the determination if the student passes the TP.

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APPENDIX G

ACRONYMS AND ABBREVIATIONS

A/C – Aircraft
ACM – Air Combat Maneuvering
ADB – Aircraft Discrepancy Book
ADF – Automatic Direction Finder
ADIZ – Air Defense Identification System
AFD – Airport Facility Directory
AFT – Aviation Training Form
AGL – Above Ground Level
AIA – Aircraft Inspection and Acceptance Record
AIGT – Advanced Instrument Ground Training
AIM – Aeronautical Information Manual
ALT – Altitude
AOA – Angle of Attack
AOB – Angle of Bank
AOPA – Aircraft Owners and Pilots Association
AP – Area Planning
A/P – Autopilot
APPR – Approach
APPROX – Approximate
APU – Auxiliary Power Unit
ASR – Airport Surveillance Radar
ATA – Actual Time of Arrival
ATC – Air Traffic Control
ATF – Aviation Training Form
ATIS – Automatic Terminal Information Service
ATJ – Aviation Training Jacket
ATM – Advanced Tactical Maneuvering
AUTO – Automatic
AWL – Above Water Level
AWOS – Automated Weather Observing System
BC – Back Course
BDHI – Bearing Distance Heading Indicator
BI – Basic Instruments Stage
BRT – Bright
BUNO – Bureau Number
CAS – Calibrated Airspeed
CB – Circuit Breakers
C-CRP – Corpus Christi
CDI – Course Deviation Indicator
CDPU – Control Data Processing Unit
CE – Collector Emitter
CFL – Critical Field Length in Feet
CG – Center of Gravity
CHOP – Change of Operational Procedure
CLR – Clear
CNATRA – Chief of Naval Air Training
COMM (S) – Communication
CP – Copilot
CPT – Critical Path Technique
C & R – Challenge and Response
CRP – Corpus Christi International
CRS – Course
CSP – Commence Search Point
CTAF – Common Traffic Advisory Frequency
CTW – Command Training Wing
DA – Density Altitude
DEMO/INTRO – Demonstration/Introduction
DF – Direction Finder
DH – Desired Heading
DME – Distance Measuring Equipment
DR – Dead Reckoning
DSBL – Disable
DSP – Descent Speed
D-U-D – (D) Release the DME HOLD pushbutton
(U) Depress the USE pushbutton on the CDPU
(D) Depress the DME HOLD pushbutton
EADI – Electronic Attitude Direction Indicator
EFAS – Enroute Flight Advisory Service
EFC – Expected Further Clearance
EFIS – Electronic Flight Instrument System
EHSI – Electronic Horizontal Situation Indicator
EFR – Estimated Fueling Remaining
EPR – Engine Pressure Ratio
ETA – Estimated Time of Arrival
ETE – Estimated Time Enroute
FAA – Federal Aviation Administration
FAC – Final Approach Course

FAF – Final Approach Fix
FAM – Familiarization Stage
FAP – Final Approach Point
FAR – Federal Aviation Regulations
FD – Flight Director
FF – Fuel Flow
FIH – Flight Information Handbook
FL – Flight Level
FLIP – Flight Information Publication
FOB – Fuel on Board
FOD – Foreign Object Damage
FORM – Formation Stage
FPM – Feet Per Minute
FSS – Flight Service Station
FT – Feet
FTI – Flight Training Instruction
G/S – Glideslope
GCA – Ground Control Approach
GCI – Ground Controlled Intercept
GP – General Planning
G/P – Geographical Point
GPM – Gallons Per Minute
GPS – Global Positioning System
GPU – Ground Power Unit
GS – Ground Speed
HAA – Height Above Aerodrome
HAT – Height Above Touchdown
HDG – Heading
HG – Half Gross
HIRL – High Intensity Runway Lights
HIS – Horizontal Situation Indicator
HRS – Hours
HWD – Horizontal Weather Depiction
IAF – Initial Approach Fix
IAP – Instrument Approach Plate
IAS – Individual Airspeed
IAW – In Accordance With
ICAO – International Civil Aviation Organization
ICS – Intercommunication System
ID – Identification/Identify
IFF – Identification Friend or Foe
IFM – Instrument Flight Manual
IFR – Instrument Flight Rules
ILS – Instrument Landing System
IM – Inner Marker
IMC – Instrument Meteorological Conditions
IMN – Indicated Mach Number
INTEL- Intelligence
IP – Instructor Pilot
IR – Ice on Runway
ITO – Instrument Takeoff
ITT – Inlet Turbine Temperature
IVSI – Intervoice Communication System
KCAS – Kts Calibrated Airspeed
KEAS – Kts Equivalent Airspeed
KIAS – Kts Indicated Airspeed
KTAS – Kts True Airspeed
KTS – Knots
LL – Low-Level
L/R – Left/Right
LBS – Pounds
LBS/HR, PPH – Pounds per Hour
LBS/HR/ENG – Pounds per Hour per Engine
LBS/MIN – Pounds per Minute
LEIS – Law Enforcement Information System
LIRL – Low Intensity Runway Lights
L/O – Level Off
LOC – Lines of Communication
LOM – Locater Outer Marker
LORAN – Long Range Navigation
LPA – Amphibious Transport
LPP – Life preserver
MA3 kit – Sea Rescue Kit
MAD – Magnetic Anomaly Detector
MAF – Maintenance Action Form
MAP – Missed Approach Point
MC – Mission Commander
MCF – Mission Completion Fuel
MCT – Maximum Continuous Thrust
MDA – Minimum Descent Altitude
MEA – Minimum Enroute Altitude
MIN – Minute(s)

I-2 ACRONYMS AND ABBREVIATIONS

MIRL – Medium Intensity Runway Lights
MKR – Marker
MM – Middle Marker
MOA – Military Operations Area
MOT – Mark-On-Top
MPH – Miles Per Hour
MSL – Mean Sea Level
MSU – Message Switching Unit
MTR – Military Training Routes
MUNI – Municipal
MVFR – Marginal Visual Flight Rules
MWA – Military Weather Warning Advisories
N1 – Compressor Turbine Rotation Speed
N2 – Propeller Speed
NAS – Naval Air Station
NATOPS – Naval Air Training and Operating Procedures Standardization
NAV – Navigation/Navigator
NAV1 – Navigation 1
NAV2 – Navigation 2
NAVAIDS – Navigational Aids
NCR – No-Carbon-Required
N-CRP – Navy-Corpus Christi International
NDB – Non-Directional Radio Beacon
NFAM – Night Familiarization Stage
NGP – Navy Corpus Christi
NGW – FAA 3 letter identifier for Cabaniss Field
NM – Nautical Mile(s)
NPA – Pensacola
No. – Number
NORDO – No Radio
NOTAMS – Notice to Airmen
NW – North-West
OAT – Outside Air Temperature
OBS – Observer
OLS – Optical Landing System
ONAV – Overwater Navigation Stage
ONC – Operational Navigation Chart
OP – Operational
OPARs – Optical Path Aircraft Routing System
OSC – On-Scene Commander
P – Pilot
P.A.T. – Power, Attitude, and Trim
PAC – Pilot At The Controls
PADRA – Pass to Air Defense Radar
PADS – Parachute Air Delivery System
PAPI – Precision Approach Path Indicator
PAR – Precision Approach Radar
PC – Plane Captain
PCL – Power Control Lever or Pocket Checklist
PIC – Pilot-in-Command
PIREP – Pilot Report
PIW – Person(s) In the Water
PMSV – Pilot-to-Metro-Service
PNAC – Pilot Not At The Controls
POD – Probability of Detection
PPNM – Pounds Per Nautical Mile
PPR – Prior Permission Required
PROPS – Propellers
PRRU – Progress Remote Readout Unit
PS – Parallel Search Pattern Single
PSI – Pounds Per Square Inch
PSR – Packed Snow on Runway
PT – Procedure Turn
PWR – Power
QA – Quality Assurance
RADALT – Radio Altimeter
RAT – Ram Air Temperature
RCC – Rescue Coordination Center
RCR – Runway Condition Reading
RDO – Radio
RI – Radio Instruments Stage or Radial Instrument
RIO – Radar Intercept Officer
RKT – Rocket
RMI – Routine Manual In
RNAV – Area Navigation
RPM – Revolutions Per Minute
RTB – Return to Base
RWY – Runway
RVR – Runway Visual Range
SA – Situational Awareness
SAP – Search Action Plan

SAR – Search and Rescue
SC – SAR Coordinator
S-CRP – South Corpus Christi
SDO – Squadron Duty Officer
SEL – Select
SID(s) – Standard Instrument Departure(s)
SITREPs – Situation Reports
SMC – SAR Mission Coordinator
SNA – Student Naval Aviator
SNFO – Student Naval Flight Officer
SOP – Standard Operating Procedure
SQ – Squelch On
SRT – Standard Rate Turns
SRU – SAR Units
SSE – Simulated Single-Engine
SSN – Social Security Number
STARs – Standard Terminal Arrive Routes
STBY – Standby
TAC – Total Air Control
TACAN – Tactical Air Navigation (System)
TAS – True Airspeed
TC – True Course
TCAS – Traffic Collision Avoidance System
T/O – Takeoff
TOF – Takeoff Factor
TOGW – Takeoff Gross Weight
TRS – Trackline Single Unit Return
TRSA – Terminal Radar Service Area
TRT – Take-Off Rated Thrust
WEPS – Weapons
WX – Weather
UA – Unusual Attitude
UHF – Ultra-High Frequency
UNICOM – Unit Command
VASI – Visual Approach Slope Indicator
VDC – Volts Direct Current
VDP – Visual Descent Point
VFR – Visual Flight Rules
VGI – Vertical Gyro Indicators
VHF – Very-High Frequency
VIDS – Visual Information and Display System
VMC – Visual Meteorological Conditions
$\mathbf{V_{mca}}$ – Airspeed below which directional control cannot be maintained.
$\mathbf{V_{mcg}}$ – Minimum Control Speed on the Ground
VNAV – Visual Navigation Stage
VOR – Visual Omnidirectional Range
VORTAC – VHF Omnidirectional Radio and Tactical Air Navigation
VSI – Vertical Speed Indicator
$\mathbf{V_{so}}$ – Stall Speed
$\mathbf{V_{sse}}$ – Airspeed below which an intentional engine cut should never be made.
$\mathbf{V_x}$ – Best Angle of Climb
$\mathbf{V_{xse}}$ – Airspeed giving the steepest angle-of-climb with One engine out.
$\mathbf{V_{yse}}$ – Airspeed giving the best single-engine Rate-of-climb (or the slowest loss of altitude).
W/O – Without
WR – Wet Runway, Standing Water
WT – Weight
WW – National Weather Service
WWs – Willy-Willy
X/C – Cross County
ZFW – Zero Fuel Weight
ZZZZ – To be used when no field identifier exists when completing "yellow sheet" data

I-4 ACRONYMS AND ABBREVIATIONS

APPENDIX H

FLIGHT PLANNING REVIEW PROBLEMS (NEED LOW VOL-15)

PREFLIGHT PLANNING

- If your proposed departure time is 1700Z, how early can you receive your weather brief?
- Weather information is given plus or minus what time of your arrival/departure?
- If you receive a weather brief at 1400Z with a ETD of 1530Z, when will the brief become void?

FILING MINIMUMS

- Your destination is NPA with a forecast of 100-1. Can Eglin with a forecast of 2000-5 qualify as an alternate?
- Your destination is NPA with a forecast of 800-2. Can Eglin with a forecast of 800-2 qualify as an alternate?
- Your destination is PAM with a forecast of 3000-6. Can Eglin with a forecast of 600-2 qualify as an alternate?
- Your destination is Moody with a forecast of 1000-2. Can Jekyll Island, Georgia with a forecast of 800-2 qualify as an alternate?
- Weather at NPA is below 200-1/2. What weather must be at alternate?

TAKEOFF MINIMUMS (Assume standard pilot)

- What weather is required to takeoff on runway 25L at NPA (PAR not available)?
- You are performing a section takeoff on runway 31 at Key West NAS. What is the weather you need?
- What weather is required to takeoff on runway 36 at Hurlburt field?
- What weather is required to takeoff on runway 25L at NPA?

FLYING APPROACH MINIMUMS

- You are doing an enroute delay at Tyndall. What weather do you need to start the LOC 31R approach?
- You plan on flying the PAR RWY 19 at NPA. What weather do you need?
- What are the weather minimums for a section/formation approach to RWY 31R at Tyndall?
- What is the DH for the PAR RWY 9 at Jacksonville NAS?

WIND ANALYSIS

Guide number =

(Practice problems)

- MC: 060, MH:065, TAS: 210, GS: 190. What are the winds?
- AT: 020/20, Want:080/55, TAS 210, Wind 060/30. FF 250 PPH. What is your HDG, ETE, and Fuel burned?

GROUND SPEED CHECKS

- Your GS is 204 kts, where is your 2-minute prior call?
- FL 250. What is minimum DME for GS check?
- Start: 25 DME, End: 29.3 over 1 minute. What is your GS?
- GS: 3.5 NM/min, FF: 250 PPH, fuel on board: 700#, 28 NM left to point A, 1 hour and 10 min from pt A to IAF. What is fuel at IAF?

MISSION COMPLETION FEASIBILITY

- At the completion of your preflight planning, you estimate that you will arrive at your destination IAF with 205 pounds of fuel. You compute it will take 95 lbs to go from your destination IAF to alternate IAF. What is your spare fuel?
- At the completion of your preflight planning, you estimate that you will arrive at your destination IAF with 240 pounds of fuel. You compute it will take 145 lbs to go from your destination IAF to alternate IAF. What is your spare fuel?

FLYING APPROACHES

- What is the MDA for the TACAN RWY 19 at Eglin AFB?
- What is the DH for the ILS Y RWY 19 at Eglin AFB?
- What is the HAT for the TACAN RWY 30 at Eglin AFB?
- What is the HAA for the TACAN RWY 1 at Eglin AFB?
- When would you execute a missed approach on the ILS RWY 11 at Dobbins AFB?
- When would you execute a missed approach on the VOR RWY 17L at St. Petersburg-Clearwater INTL?

J-2 FLIGHT PLANNING REVIEW PROBLEMS

APPENDIX I

FLIGHT PLANNING STUDENT TEST REVIEW

NAVAIDS and ROUTES

- Where can you enter or exit an airway?

- Does slant range error increase when you get closer to the NAVAID?

PREFLIGHT PLANNING

- DD 175-1 briefing void times are: _____
- Which points are required to be on a jet card?
- What are the definitions of mission completion fuel, reserve fuel, and spare fuel?
    - MCF:

    - RF:
- What is spare fuel?
- What is the minimum spare fuel to legally fly a mission as planned?
- Bingo fuel profile distance is measured from where to where?
- Can you proceed to the alternate if you are below bingo at the MAP?
- How are fuels and times rounded on the jet log?
- With alternate required, we need fuel from: _____
- How to select emergency airfields: _____

WEATHER - SIGMET, AIRMETS, PIREPS

- When are PIREPS necessary?
- SIGMETS apply to what type of aircraft? AIRMETS?
- What are examples of weather found in convective SIGMETS?
- Can you file to a field under a CAWW?
- What constitutes a ceiling?

FILING MINIMUMS

- Can you file to a destination with weather of 0/0?
- Memorize chart from OPNAVINST 3710.7
- Weather at NPA is below 200-1/2, what weather must be at alternate?

TAKEOFF MINIMUMS

- What are the T/O minimums for special instrument rated pilots?
- What are the T/O minimums for standard instrument rated pilot?

GROUND SPEED CHECKS

- How often should you do GS checks?
- What 5 requirements need to be met to accomplish a GS check?
- What 4 items are frozen after a GS check to update your ETA and fuel?
- When must you update time and fuel estimates?

FLYING APPROACH MINIMUMS

- The minimum WX to start an approach at your destination is: _____
- May a single pilot start an approach for practice with weather below mins?
- What are the absolute minimums for a single piloted aircraft?
- What are the weather minimums for a section/formation approach?
- What do you do if published PAR HAT is below 200?
- If pilot holds a special instrument rating, can he shoot an approach at destination with weather below minimums?

FLYING APPROACHES

- What is the lowest MSL altitude for a non-precision straight-in?
- What is the lowest MSL altitude for a precision straight-in?
- What is the lowest AGL altitude for a straight-in?
- What is the lowest AGL altitude for a non-precision circling?
- The MAP for a precision approach is: _____
- The MAP for a non-precision approach is: _____

K-2 FLIGHT PLANNING STUDENT TEST REVIEW

MISC

- Test standards: +/- 5#, 2 degrees, and 60 seconds for voice comm. +/- 5 min for 175.
- Will be given: L17/18, planning data, approach plates, 175, jet card, scratch paper.
- You can bring a whiz wheel or calculator (no palm pilots or small computers).
- 2.5 hours total.
- READ THE QUESTION!

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