***NAVIGATION LOG PLANNING PROCEDURES***

The following list outlines a sequential process for the development of a VFR nav log sheet. Attached is a Log Sheet which corresponds to this breakdown.

Planning is divided into: Day before, Day of, In Flight, and Arrival Items

**TOOLS REQUIRED:**

VNC, VTA

E6B, CX2

PENCIL, ERASOR, HIGHLITERS

NAVIGATION RULER, PROTRACTOR

CFS, POH, AIM, FGU

NAVIGATION LOG SHEET

**INITIAL PREPARATION. DAY BEFORE**

**1. CALCULATE WEIGHT AND BALANCE**  Knowing the number of passengers and their actual or average weights, (winter begins when Standard time begins), baggage, and basic empty weight of the plane, we can figure FUEL ON BOARD (D) to stay under gross. Copy this value to the fuel analysis section, which we will finish later when we get the weather.

**2. PREPARE CHART** Choose your route. This may require more than one leg depending on landmarks, restrictions and anticipated fuel endurance. Record this on your nav log sheet FROM and TO slots.

**3. DETERMINE TYPE OF DEPARTURE** The type of departure procedure depends on many variables. Although not the most timely or economical, the **overhead / visual range method** assures getting on your track line and adjusting your compass heading with ease. In some cases a **remote set heading point** may be necessary due to control zone restrictions, a better track line with landmarks, or obstructions. The quickest and most economical method is the **45 degree intercept.** Only use this method in good visibility with good landmarks.

**4. DRAW TRUE TRACK LINES**. In pencil, draw a desired track line with consideration for fuel, time, landmarks, alternates, airspace, sparsely settled areas, restricted areas, water, type of departure, and anticipated weather. When you are sure that the track line selected is in agreement with all possible situations, Highlite so it stands out.

 Use your protractor at mid point to determine True Tracks and record these on your nav log sheet under TRUE TRACK

 **5. DRAW 10 DEGREE DRIFT LINES** Using your protractor, place the hole over departure point and measure 10 degrees on either side of track line. Use pencil to draw broken lines. Do the same at destination point. If accurate, they bisect at halfway point. Highlite with a different color.

**6. MEASURE TRACK DISTANCE** Using your navigation ruler, be sure to use proper scale for the chart you are using. Record this distance on the nav log sheet in the Enroute Dist slot.

**7. IDENTIFY HALFWAY POINT** Using the ruler again, mark an “x” at the halfway point.

**8. MARK 10 NM SEGMENTS**. Start from destination and work back to departure. These will aid in determining distances when actually flying to destination or to an alternate.

**9. DETERMINE LANDMARKS AND CHECKPOINTS ALONG ROUTE**. On your chart, select the best landmarks available and circle with pencil. Be careful so as not to obscure any vital information. Prefer to have these on your track line, but they may also be abeam the track with estimated visibility in mind. Avoid using small towers, towns, or streams, all of which may be completely missed during the flight in poor weather or high altitudes.

**Select check points for revising ground speeds and eta’s**. These should be minimum 15-20 nm apart to ensure accuracy. Fill in the nav log sheet in the, checkpoints, distances from SHP (set heading point) and distance to go slots.

**10 HIGHLITE ALTERNATES** These should be places adequate for landing, fuel, public facilities. Use another color that stands out. Consult your CFS for these requirements.

**11. DETERMINE MINIMUM ALTITUDE** This is accomplished by looking at the MEF (maximum elevation figure) along your route ( +/- 5 nm on either side) and adding 1000 ft to this to get the MOCA (minimum obstacle clearance altitude) By being at or above this altitude, this will ensure obstacle clearance. Record this on the nav log sheet in the MOCA slot.

**12. SELECT VARIATION** Use the closest Isogonal line mid- point along your route and record on the nav log sheet in the VAR slot.

**13. REVIEW DEPARTURE AND DESTINATION AIRPORT INFORMATION**. Using your chart and CFS, some things to look for are, elevations, procedures, restrictions, and anticipated runway data, which can be recorded in the take off and landing section. Radio frequencies and navigation aid facilities can be recorded in the radio frequency section.

**DAY OF PLANNING**

**1. WEATHER PACKAGE**  This can be obtained through the AWWS website, also may be faxed from FSS. We will need all METAR, TAF, GFA, and FD for our route. Also, any NOTAMS, PIREPS, SIGMETS, or AIRMETS. In other words, ALL available info for our flight. Call FSS for a personal weather briefing to confirm accuracy. Phoning ahead to destination is also a good idea if any doubt exists to conditions, fuel availability or facilities. If all looks good with the forecast, continue on.

**2. UPPER WINDS (FD)** Upper winds and temperatures may need to be interpolated for accuracy from several reporting stations and recorded on nav log sheet in the FD slots. (Wiarton, Toronto, Windsor ).

**3. SELECT A CRUISE ALTITUDE** Starting with the MOCA, other factors influencing this decision will be, cruising orders ( based on magnetic tracks, not headings) airspace restrictions, cloud base, visibility, good landmarks, favorable winds, turbulence, icing, performance capability, practicable to track distance. Record this in the ALT slot.

**4. CALCULATE PRESSURE ALTITUDES AND TEMPERATURES.** We will need these for departure, enroute and destination. Use Metars for departure and destination altimeter settings and temperatures. Interpolate if necessary for enroute settings. Record on the nav log sheet in the Pressure Altitudes / Temp table.

**5. DETERMINE SURFACE WINDS**. Again, we will need info from Metars for departure and destination to be able to compute headwind / crosswind components for take off and landing performance. Record on the nav log sheet in the take off / landing table.

**6. DETERMINE RPM, TAS.** Using your cruise performance charts in the POH, select a power setting at your desired altitude to give a good compromise of speed and fuel burn, (usually 65%). Record all three on your nav log sheet in the RPM, TAS and Enroute Fuel GPH slots. NOTE! Some manuals have small print regarding adding or subtracting speeds for fairings.

**7. AIRSPEED CALIBRATION.** Use your E6B or CX2 to convert TAS to CAS. Use the table in your POH to convert CAS to IAS. Record on your nav log sheet in the CAS and IAS slots.

**8. TRUE HEADING AND GROUNDSPEED.** Knowing the upper winds and true track, use your E6B or CX2 to find True Heading and Ground Speed. Record on nav log sheet in the True Hdg and G/S slots.

**9. MAGNETIC HEADING.** Add or subtract the variation to the true heading. (West is best, east is least) and record on the nav log sheet in the MAG HDG slot.

**10. COMPASS HEADING.** Use the deviation card in the plane or in the Journey Log Book to determine compass heading. Record on the nav log sheet in the COM HDG slots.

**11. COMPUTE TOTAL TIME.** This will be required in your flight plan form to determine search and rescue time. Using enroute distance and groundspeed, calculate with E6B or CX2 and record on nav log sheet in the Enroute Time slot. Climb time can be found in your Time, Fuel and Distance to Climb performance chart. Field elevation time will need to be subtracted for accuracy. Start and taxi time will be variable depending on the departure airport. At Brantford, 10 minutes is the norm but at busier places more time may be adjusted. Again, read the fine print regarding performance changes due to non standard temperatures. Add these together and record in the Start, Taxi and Climb slot. Descent time can be assumed as enroute time, however, time must be allotted at destination for taxi and shut down. At most places we can use 5 minutes, but again, at busier airports these times may be longer.(10 MIN ?) Record this in the Descent, Taxi slot. Add up the totals and record on nav log sheet in the TOTALS slots

**12. FUEL CONSUMPTION**. Start up fuel is also derived from the climb performance chart in the fine print. Enter this value in the Start Up Fuel slot. Climb fuel is also found here. Again, we will need to subtract the field elevation for accuracy. Enter this in the Climb Fuel slot. Enroute fuel is found using the cruise GPH and enroute time calculations. Use your E6B or CX2 and record these values in the appropriate Fuel Consumption slots. Add up the totals and transfer these to the fuel analysis chart on the nav log sheet. ( A, B, C )

**12. FUEL ANALYSIS** . Starting with Fuel On Board, we can calculate our **Endurance Start** using the Endurance performance chart in the POH. Be sure you have the correct chart which pertains to your plane. Also read the fine print! Enter this as hours and minutes in the Endurance Start slot. For more accuracy, take the percentage of full tanks and apply that to your endurance chart amount.

Enter your reserve fuel required in the Reserve slot. Depending if by day or night. (30 by day / 45 by night NOTE. BFC requires 1 hr reserve) Add all these up and enter at Sub Total. The 30 minute contingency is another way to ensure we do not run low on fuel. Some places call it “good airmanship” coming from the fact that maybe we are in an old plane, not leaning effectively, headwind change, or our power settings are not quite accurate, etc. Use cruise fuel burn values to figure how much and enter this in the Contingency slot.

This now adds up to a Total fuel required.

Subtract Fuel Used ( A,B,C) and we can record Fuel Remaining.

Remaining endurance in hours can again be calculated by taking the fuel as a percentage of full tanks and applying that same percentage to the start endurance. Enter this in the Remaining Endurance slot. This is important because if we ever get lost or need to divert, we can quickly come up with a plan B to safely get to an adequate landing spot. If refueling, we will need a complete new nav log. By now an updated weather report is probably out.

**13. FLIGHT PLAN / ITINERARY** Flight plan is preferred due to safety, especially in the colder seasons or in sparsely settled areas. . Flight plan forms are available at our front desk or on line. (AWWS) Consult your AIM or CFS for proper formats. FSS can assist you with filing.

**IN FLIGHT ITEMS**

**1.** **PRE FLIGHT INSPECTION.** Ensure fuel is as required as per your planning, all documents are on board, (AROWJILIC) Have charts folded properly, organize your cockpit so that everything you need is close at hand. Spare pencils, watch set. If glasses are required on your medical, ensure you have a spare. Proper clothing and survival equipment are adequate for each person for 72 hrs. Over water equipment on board if that is the case. Final walk around on the plane and yourself (IMSAFE)

**2. REVIEW.** Review track and expected landmarks, when to make radio calls, emergency checklists, passenger comfort.

**3. RECORD TIMES AND HOBBS.** Enter the Hobbs Start, Up Time, on nav log sheet in the Leg Times table

**4. OPEN FLIGHT PLAN.** In Canada, this is done automatically by FSS and is determined by the time that you gave them on your flight plan. If this time is going to be different, FSS will need to be called and amended, either by VHF or phone.

**5. CLIMB TO CRUISE.** Announce your intentions to ATC or traffic and fly your planned departure procedure. If an overhead departure is planned, allow a lot of space to get to altitude, set heading indicator to compass, set up for power, mixture, trim and get ready to note the time directly overhead the airport and make a radio call. Adjust heading for drift using the visual range method, and note compass heading on nav log sheet. Confirm outside temperature and performance.

**6. ENROUTE.** Maintain heading accurately; monitor the progress along the route using your chart and checkpoints. Revise ETA every 15-20 nm and record. Maintain eyes outside as much as possible. Monitor the proper frequencies and plan ahead for frequency changes. Make position reports on 126.7 as required. Monitor fuel and engine status. Monitor yourself and passengers for signs of fatigue, illness. (sickness, ear blockage, etc) Monitor weather changes.

15 minute cruise checks ( FREDA) Fuel, radio, engine checks. ( gauges, carb heat, power setting, mixture, ), DHI, altimeter setting

Advise FSS if flight plan needs to be revised. This may happen due to route changes, destination changes, speed changes, or maybe you just want to do some sight seeing. Remember, the whole point of flight plans, is to be found quickly in the event of an emergency.

**7. ARRIVAL.** Get the ATIS if available and, or an airport advisory. Call well ahead at busy airports. Prepare CFS in advance and get a mental picture how to join the circuit for the runway in use and announce your intentions. Plan your descent at a comfortable rate. (200-500 fpm)

Record Down Time, talk to ground control if available and plan for a spot to park. Record Hobbs Stop time. Close flight plan with ATC or FSS. Secure the plane as needed depending on forecast weather. **GOOD WORK!**