✈ *Navigation: Flight Planning Procedures* ✈

I. Non-Variable Factors

Non-Variable Factors refer to parts of the trip preparation – such as chart preparation – which will not change due to variables such as weather. These items can be done in advance of the flight – usually the night before.

1. Destination

- Suitability of Destination
  Number, direction and length of runways, and types of surfaces. Availability of services (tower, customs, fuel, lights, accommodations, fuel, etc.).
  Consult the current *Canada Flight Supplement* for this information.
- Check for any Class II NOTAMs (usually available by mail, or at the Flying Club) and for Class I NOTAMs (available by calling the local Flight Service Station).
- Call the Airport Operator if there is any doubt about the condition of the destination.

2. Aircraft

- Are you checked out and current on the type?
  How about for night flying with passengers?
- Are the documents in order?
  Do you have time to complete the flight before the next scheduled inspection?
- Perform a walk-around of the aircraft.
  Even if you are not leaving for a day or so, you might find a snag which can be fixed in time for your flight. Also, if you are leaving very early or very late in the day, you can make arrangements for fuel and oil if required.
- Do a preliminary Weight & Balance calculation.
  This allows you to determine the approximate amount of useable fuel.

3. Chart Preparation

- Obtain current Charts and other materials.
  The *Canada Flight Supplement* lists the dates and versions of all current charts for Canada.
- Review the Route.
  Check for bodies of water, and for mountainous or sparsely settled areas. Avoid restricted, danger or alert areas. Are there any special requirements such as survival equipment, life jackets, etc., required? Consult the CARs and the AIP for this information.
- Locations and Suitability of Refuelling Stops
- Decide on Departure Type
  Overhead / Enroute / Set Heading Point.
- Draw the Track Lines
- Draw the 10° drift lines (using dashed lines) and mark the midpoint.
- Place a distance mark every 10-nm along the track line from *destination*.
- Circle all obstacles and elevations within the 10° drift lines.
- Mark *ground speed checkpoints* along the track line.
  The first checkpoint should be with 10 to 15 miles from the set heading point, to give an early indication of errors in ground speed or in heading.

4. Flight Log Preparation

- *Route (From – To)*
  Each leg of your trip should have a separate line on the flight log.
- *Safe Altitude*
  You minimum en-route altitude should be 1,000 feet above the highest obstacle within the 10° drift lines. Record this value in the *MOCA* column on the *Flight Routing and Power Settings* section of the flight log.
- *True Track*
  Place the protractor close to the mid-point of the track. Make sure that the top of the protractor is pointing North (which is not necessarily straight up on the chart) – align the N/S line of the protractor with one of the meridians of longitude.
- *Variation*
  Determine the variation from the isogonic line that is closest to the mid-point of the track. Mark E or W.

- *Distance*
  Measure the distance in nautical miles.
- *Check Point Data*
  This information is entered into the *In-Flight Log and Groundspeed Calculations* section of the flight log. Enter the name of the checkpoint, the distance from the point of the last time recorded, and the distance to the destination for each ground speed check.
- *Other Aerodromes*
  Select alternate aerodromes in case of in-flight emergencies.
- *Other Information*
  Necessary communications frequencies and miscellaneous data can be recorded in the *Airport Information and ATIS Information* part of the flight log.

II. Variable Factors

These factors are calculated as close to departure as possible.

1. Obtain Current Weather

- Area Forecasts (GFA), Terminal Forecasts (TAF), Station Actual Forecasts (METAR), winds aloft (FD), and PIREPS.
- Are the winds at the destination suitable?
  Remember, the winds in FDs are in degrees true.

2. Complete the Flight Log

- *Altitude*
  Calculate your suitable Cruising Altitude taking into consideration the *Cruising Altitudes* (use the *Cruising Altitudes* chart on the flight log), the weather (winds and ceiling), length of the trip, aircraft performance, and terrain.
- *Wind Direction* and *Velocity*
  Use the FDs to determine the wind direction and velocity at cruising altitude. Do NOT use surface winds from the METAR – they only effect the aircraft for the first few hundred feet.

  Be prepared to interpolate:

  e.g. Cruising altitude of 4,500' FD Winds: 3000 6000
  3115 3317+11

  Use: 3216
- *Temperature*
  Use FDs and Standard Lapse Rate of 2° / 1,000' to calculate temperature at cruising altitude.
  Temperatures are not given on the FD if the altitude is within 3,000' of the ground. METARs may be consulted to average an obviously incorrect choice but they may be unreliable tue to inversions or to heavy daytime heating of the air close to the ground.

  e.g. 6,000' – 4,500' = 1,500' (or 3°).
  Temperature at 6,000' is 11°, therefore it should be around 14° at 4,500'.

- *Pressure Altitude*
  Use altimeter setting from the METAR for this calculation.

  e.g. Latest METAR altimeter setting: 30.23
  Standard: 29.92
  .31 = 310' altitude correction

  Therefore, use Pressure Altitude of 4190 for performance calculations.

3. Flight Log – Climb Portion

- Use *Time, Fuel, and Distance to Climb* table to find *Distance*, *Time*, *Fuel for Start/Taxi/Take-off*, and *Fuel for Climb* to climb to the equivalent Pressure Altitude.
  This table uses Indicated Airspeed, so assume that IAS = TAS.
  This table assumes zero wind. If there is a strong headwind or tailwind, use the wind side of the E6B to calculate True Heading and Ground Speed.

4. Flight Log – Cruise Portion

- *Cruise Performance* Table
  Use a power setting of between 60% and 75%. Pay attention to the temperature columns (is it at, above, or below standard), and be prepared to interpolate.
  Enter the *TAS* and *GPH* in the proper columns on the flight log, and the *RPM* on the *Flight Routing and Power Settings* table.
  Enter the *GPH* in the proper column of the flight log.
- *CAS*
  Use the E6B flight computer to convert from TAS to CAS. Use the *Airspeed Correction* window.
- *IAS*
  Use the *Airspeed Calibration* table in the POH to calculate the indicated airspeed.
- *True Heading* and *Groundspeed*
  Use the wind side of the E6B to calculate these.
- *Magnetic Heading*
  Add West variation or subtract East variation from the True Heading.
- Calculate *Time* – the Estimated Time Enroute – using the E6B
  Known factors are **Distance** and **Groundspeed**.
- Calculate *Cruise Fuel Required* using the E6B
  Known factors are **Time** and **Fuel Consumption per Hour** (GPH).

- Calculate *Fuel Required for Circuit and Landing*
  If this leg ends in a landing, use a time of **5 minutes** and the **Cruise GPH**.
- Calculate *Fuel Reserves*
  Use 30 minutes at Cruise GPH for daytime VFR, 45 minutes at night.
- Calculate *Total Distance* and *Total Time*
  Remember to include the time for circuits and landings in the Total Time figure.
- Calculate *Total Fuel* and the OFC's Safety Margin of 20%
  The Ottawa Flying Club has its students add an extra 20% to all fuel calculations for safety. Once you have calculated total fuel requirements, add an additional 20% under *Other Fuel Requirements*.

5. Other Calculations

- Calculate the *Take Off Roll Distance* at the point of departure.
- Calculate the *Landing Roll Distance* for the destination.
- Calculate the *Crosswind Component* for the destination.
- Calculate the *Weight and Balance*

6. Complete and File the Flight Plan

- Normally, the flight plan is filed with the local Flight Service Station. It can be filed in person, by phone, or in the air.
- Make sure to check Class I NOTAMS for destination and facilities enroute.

7. Perform the Aircraft Pre-Flight Inspection

8. Fill out the *Compass Heading*

- Use the Compass Correction Card from the Aircraft.

III. Enroute

1. Open your Flight Plan

- Don't forget to close it at destination

2. Set Heading Point

- Reach the Set Heading Point at altitude and on heading.
- Record your time when the point passes beneath your wheel. Check your heading indicator against the magnetic compass.

3. En Route Checks

- Every 15 minutes, perform a downwind check and check the heading indicator against the magnetic compass.
- Use the predefined check points to review your ETA and to determine your Track Made Good.
- If you are off-track, correct by using the *double track* or the *opening-closing angles* method, or by flying to an identified geographic point.
- Flight Service Stations should be used enroute to amend flight plans, transmit position reports and to provide current enroute and destination weather.

✈ *Summary: Flight Planning Procedures* ✈

1. **Check Weather Reports**
   (at point of departure, enroute, destination at estimated time of arrival)
   - METAR (aviation weather report)
   - TAF (terminal area forecast)
   - FD (winds aloft forecast)
   - FA (area forecast)

2. **Check NOTAMS**
   (contact the closest FSS)

3. **Go/No-Go Decision**
   (based on weather, x-wind component, NOTAMs, etc.)

4. **Select Track**

5. **Prepare the Charts**
   - Plot Track Lines
   - Plot 10° Drift Lines
   - Select checkpoints

6. **Possible Hazards**
   - towers
   - mountains
   - Danger, Restricted and Alert areas

7. **Determine MOCA**
   - Highest obstacle + 1,000'

8. **Select Alternate Aerodromes**
   (in case of emergency)

9. **Select Cruise Altitude**
   (as a function of winds, clouds, MOCA, magnetic track)

10. **Performance**

    Compute Density Altitude at:
    - Departure
    - Cruise Altitude
    - Destination

    Find:
    - Take-off Roll distance
    - T.A.S. (cruise)
    - I.A.S.
    - RPM (cruise)
    - Fuel consumption
    - Landing Roll distance
    - Landing x-wind component

11. **Prepare Flight Log**

12. **File Flight Plan**
    (or equivalent)

13. **Are all the Documents On Board?**

14. **Carry Out Pre-Flight Inspection**
    (check necessary equipment, oil supply, etc.)

15. **Have a Safe Flight!**