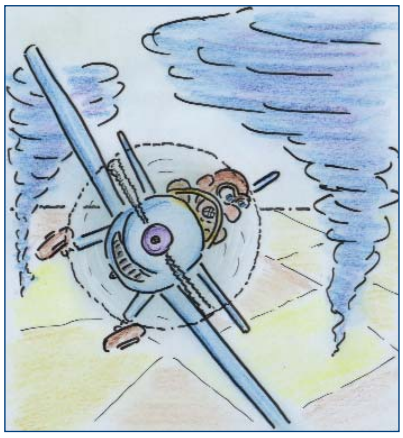
EUROCONTROL guidance notes for pilots

5. Using Meteorological Information for Planning

AIRSPACE INFRINGEMENT

Infringement of controlled airspace, danger and restricted areas etc. is a serious aviation hazard and occurs when an aircraft enters the airspace without permission. This happens several times a day in the busiest areas of European airspace. Careful planning, and accurately flying the plan, are the best means of avoiding such infringements.



This is one of a series of Guidance Notes (GN) intended to help you keep out of trouble. The others are listed at the foot of the next page.

GETTING PRE-FLIGHT INFORMATION

GN 4 gives guidance on getting weather information before flight. Using an aerodrome briefing facility, the internet, or a telephone, make sure you obtain the most appropriate recent forecast for your route and possible alternate aerodromes. However, also check that the forecasts do not change as take-off approaches, and that the actual conditions fit the forecast! You will need information about winds and temperatures along the route, as well as the cloud, visibility and surface winds. You must, however, always be prepared for worse weather than the forecast (stronger head- or cross-winds, lower cloud base).

PLANNING HEADINGS AND TIMES

For accurate navigation, you will use the forecast winds and temperatures at your planned altitude to calculate your required headings and times between turning points and fix points, which will also allow you to calculate how much fuel you will use. Most forecasts only provide information at set altitudes, which are unlikely to be the ones you intend flying at. For accurate calculations, you should interpolate between the figures for the altitudes above and below you, but for practical purposes it is often sufficient to use the figures for the next altitude above.

After gaining their licences, many pilots stop using a traditional navigation computer, relying instead on an electronic calculator, a personal computer, or perhaps their GPS software. While these are easy to use, there is always the possibility of making mistakes when putting in data. No matter what system you use, always carry out a "gross error check" of any computations.

True airspeed should never be less than indicated airspeed. If your calculation shows different, there has been a mistake, as there will be if the heading is downwind of the track! Note the wind speed you plan to use, and its direction. It is a good idea to draw an arrow on your chart showing the wind direction, its speed, and the maximum amount of drift you can expect (windspeed multiplied by 60 and divided by airspeed, or windspeed in knots divided by airspeed in miles per minute). You can then see what effect the wind will have on each leg of your route. For example, if the wind is blowing from directly ahead, there will be no drift but your groundspeed will be less than airspeed by the wind strength.

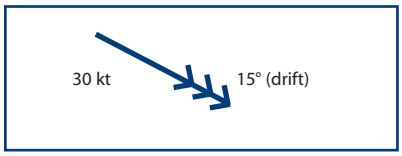


Figure 1 - Wind Arrow

DEAD RECKONING

As in figure 1, assume a wind from 300º at 30 knots, and a True Airspeed of 120 knots (2 miles per minute). Maximum drift is therefore 15 degrees.

Use the 'clock method' to decide how much of that maximum drift will affect you. If the wind is from the beam, or anything ***more than 60º*** from your track, you will have ***all*** that maximum drift. If the wind is along your track, there will be no drift, but if ***30º*** away you have ***half*** the

drift; if ***45º*** you have 3/4 of the drift, if ***15º*** you have 1/4, etc. (It is called the 'clock' method because the number of degrees the wind differs from track can be equated to the number of minutes on a clock, while the proportions are the same as the parts of the hour.) Remember to alter heading ***towards*** the wind.

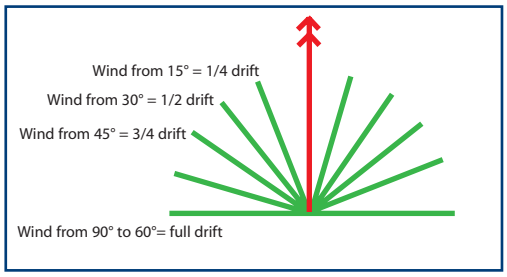


Figure 2 - Drift proportioning - the clock method

Tp calculate your groundspeed you can use the wind arrow and a similar technique to the clock system used in drift calculation. This time, if the wind is along your track or ***within 30º*** of it, the wind will have the full effect. Take your TAS and add or subtract the whole of the wind. If the wind is ***on the beam***, there is ***no*** speed effect. If ***30º from the beam***, it will affect you by ***half*** its strength. If ***45º*** from the beam, it will have 3/4 of the full effect, if ***15º*** from the beam, it will have 1/4 of the full effect.

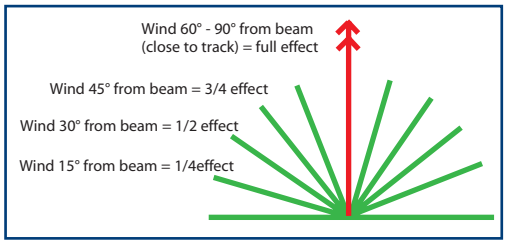


Figure 3 - Speed effect - clock method

If the aircraft track is 270º true (wind 30º right of the nose), the groundspeed will be 90 knots, and the drift 7.5º (use 8) to the left. The pilot should therefore make the heading 278º true. Add any westerly magnetic variation (subtract if easterly) to that to find the required magnetic heading. With practice, the dead reckoning technique can produce results almost as accurate as a dedicated navigation computer, and the system is very useful in the air if you have to make a diversion.

Sometimes, it may not be possible to obtain precise and reliable wind information for the planned flight altitudes along the intended route. Another example of limited applicability of dead reckoning is flying very light and ultra-light aircraft in variable wind. The good practice suggests using a simplified method in such conditions:

1. Verify the prevailing windspeed and direction along the route
2. If the wind can not be considered as tailwind along the most of the route, select the highest wind speed reported and assume it is headwind. Use these values for your calculations; by this you will be on the safe side.

USING AIRBORNE INFORMATION

The Flight Information Service (see GN 9) can provide aerodrome weather information, as can VOLMET and ATIS. Compare that information with the forecast you received before flight. If actual cloud base, visibility or crosswinds are worse than forecast, decide early whether you should continue the flight. Even if the aerodrome weather stays acceptable, an increased surface wind or one from a different direction can indicate similar changes in speed or direction at flying altitudes.

HAVE A SAFE FLIGHT

We hope you have found this useful. If you have any suggestions for improvement, please let us know.

OTHER GUIDANCE NOTES

1. Rules for VFR Flight
2. Flight preparation
3. Getting Aeronautical Information Before Flight
4. Getting Meteorological Information Before Flight
5. Using Meteorological Information for Planning
6. Visual Navigation
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9. Getting Aeronautical & Met Information In Flight
10. Entering Controlled Airspace
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Published by :

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