

EUROCONTROL guidance notes for pilots

6. Visual Navigation



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.



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.

A major cause of airspace infringement is navigational error. This briefing note contains some advice on visual navigation and map-reading to help you avoid such error.

CHOOSING A MAP

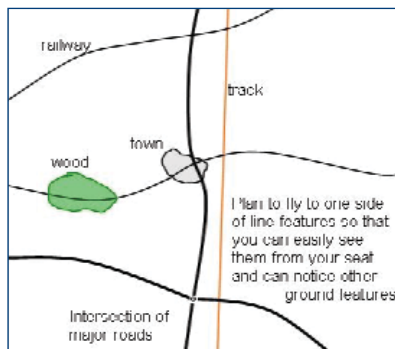
GN 2 gives guidance on selecting the correct chart, as well as other advice on pre-flight preparation. The map must show sufficient detail to enable you to identify important landmarks, but must not be too large scale to make use in an aircraft cockpit difficult. Depending on the speed of your aircraft, a scale of 1:500,000 or 1:250,000 is recommended.

The map must have an overlay of airspace information, and may be bought from a pilot shop, or ordered on-line. Make sure

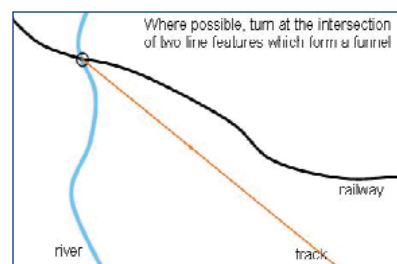
you have the latest edition: topographical information will not change very often, although woods are sometimes cut down and new roads built; but details of airspace reservations often change. Be aware of the chart's upper and lower altitude limits.

PLANNING YOUR ROUTE

Plan your route so that it lies well away from any hazards (including airspace reservations that you do not intend to enter). Aim to follow easily recognised ground features, even if that means travelling further than the shortest distance. Study the lie of the land - features on ground sloping away from you will be difficult to see. Line features such as rivers, high-speed railway lines, motorways or major roads can usually be seen quite easily if they lie almost parallel to your track, so make good features especially when combined with others. Plan to fly a little to the right of selected ground features so you can easily see them from your seat and recognise them. It is a legal requirement to follow line features in that way.



When selecting turning points, make sure they are large enough to be seen, even if visibility is not ideal. And make sure they or their surroundings are unique: look around on the map for similar features; two lakes can look very similar from the air! Tall masts or towers can make good reference points, but avoid using them as turning points, especially in bad weather. Where possible, turn at the intersection of two line features which form a natural funnel (e.g. a railway line and a river). Choose other features at about 5 minute intervals as "fix points", so you can make heading and ETA adjustments.



Measure your tracks and distances, and complete a simple flight plan showing magnetic headings and times to your turning and fix points too. That way, you will know when to look ahead for a feature and if you don't see it, you will know roughly where to turn. Mark the Minimum Safe Altitude on your flight plan or map too. Then study your fix and turning points so you will recognise them, remembering you will not be looking vertically down but at a shallow angle. Finally, if you have a GPS, load the route into it, and activate it before take-off. Do not rely on using "Direct to" function!

FLYING THE ROUTE

Before you leave, fold your map so that you can easily use it in the cockpit, and so that it unfolds naturally to follow your route. Draw a well visible line on the map indicating your intended route, put marks on the line corresponding to each 5 or 10 minutes flying time. Doing this before you leave the briefing room will save you time and frustration in flight. It is easiest (and correct) if you hold your map so that the direction you are going is at the top. That way, left on the map corresponds to left on the ground, and map reading will be much easier.

Once airborne and settled on your planned heading, look well ahead for features to help you maintain that heading. Be aware of the time, and look well ahead for your fix and turning points so you can stay close to your planned track. Try to stay a bit to the right of the track so that from the left chair you are able to see and recognise the waypoints. Be aware that if you are more than 0.5 to 1 NM right of your track you might enter controlled or other type of regulated airspace without having the permission to do so. Keep your ETAs up to date as you go along. Always be aware of your minimum safe altitude and airspace reservations - above and below as well as on either side of track. In an emergency or if the weather turns bad you may need to make a rapid departure from your planned route while you sort things out.

Keep a good look-out for other aircraft - microlights and gliders too. When you are approaching a turning point, look careful-

ly along your new track for other aircraft, obstacles or rising ground, or bad weather too.

IN-FLIGHT NAVIGATION

The easiest way to navigate visually is by selecting and studying features on your map, looking ahead for them on the ground, and altering your track to position yourself correctly in relation to them. If the weather is fine, you should have no difficulty doing this provided your chosen features are prominent and unique. But if there is cloud below or the visibility is poor it may be difficult to find these features.

In poor weather, you need to either plan the route at a safe altitude using radio aids or GPS (see GNs 7 & 8) or use them to back up your visual navigation (which is always a good idea anyway). If that is not possible, do not continue into awkward conditions. If you do find yourself having to navigate visually in poor weather, accurately flying a well planned route should keep you close to track, so turn at your most recently calculated ETA and continue to look well ahead for each fix point.

UNCERTAIN OF POSITION

Apart from cloud or visibility, light conditions may make ground features difficult to see. Failure to recognise a fix or turning point can not be considered a loss of orientation, but it may put you in an unsafe situation if you are close to controlled airspace or another hazard. If you miss another fix point, however, or you are close to a hazard, or short of fuel, and you cannot see any obvious unique major

ground feature to either confirm you are close to your planned track or able to return to it, ask for help! See GN 9.

CROSSING AIRWAYS

As GN 10 suggests, if you plan to cross an airway, try doing so at a navigation aid or reporting point and make your track cross at right angles so that you spend the minimum time in controlled airspace. Ask for clearance early and know your ETA to the edge of controlled airspace.

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
7. VOR / DME / ADF Navigation
8. GPS Navigation
9. Getting Aeronautical & Met Information In Flight
10. Entering Controlled Airspace
11. Getting the Most out of your Transponder

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EUROCONTROL Headquarters

General Secretariat Directorate

96, rue de la Fusée

B - 1130 Brussels, Belgium