



As you progress through gliding, there are badges you collect to add to your qualifications. Today, you are going to attempt your first cross-country flight to gain your Silver Distance badge by flying 50km. Your challenge is to fly from your home gliding club at Sandhill Farm to Bicester – that's 50.9km in a straight line.

We'll explain in the video about two important concepts that you need to know before you can complete your Challenge:

- **glide ratio**, or how far the glider will travel for a given height loss
- **controlled airspace** – parts of the sky that you are not allowed to fly through, or are only allowed to enter under certain circumstances, for example when authorised by Air Traffic Control.

What you need to know:

- Your glider has a glide ratio of 50:1 at your flying speed of 110 kph
- You start directly overhead Sandhill Farm at 1500m and must arrive at Bicester at 500m
- You can climb in thermals whenever you find them – for today's exercise they are marked on the map as green stars. Each thermal gives a climb rate of 100m/minute to 1500m. While you are circling to climb, you stay in the same place.
- You don't have to take every thermal along your route but:
 - You must avoid forbidden controlled airspace – with a 100m vertical safety margin in case you find sinking air on your chosen route
 - You must stay higher than 500m – if you get down to 500m you must pick a suitable farmer's field and land! Challenge over!!!

Good luck with your Glider Pilot Navigation Challenge!!

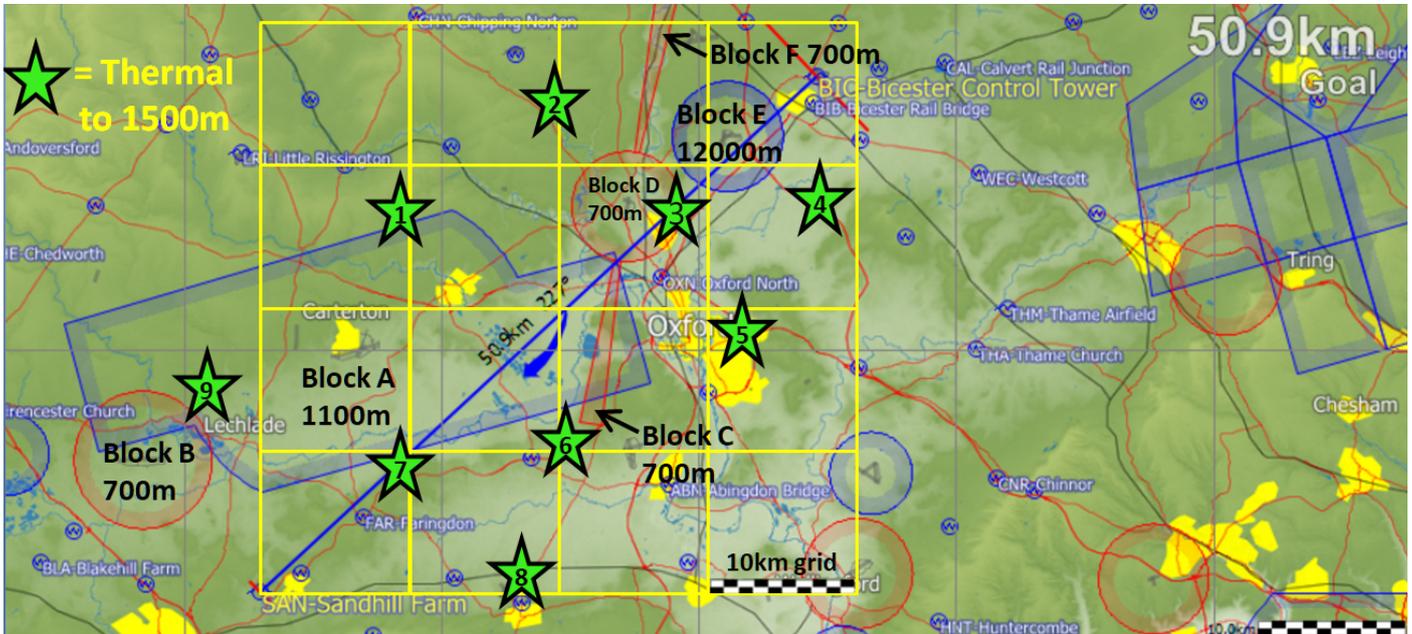
Navigation Challenge Section 1 - Glide ratio calculation

1. If you glide from your start point at 1500m over Sandhill Farm, how far can you go before touching down? Construct a chart showing this with height on the y axis and a start height of 1500m, distance in km as the x axis and a 50:1 glide angle.

>>> Now watch the second part of the video and learn about Controlled Airspace before going to section 2.

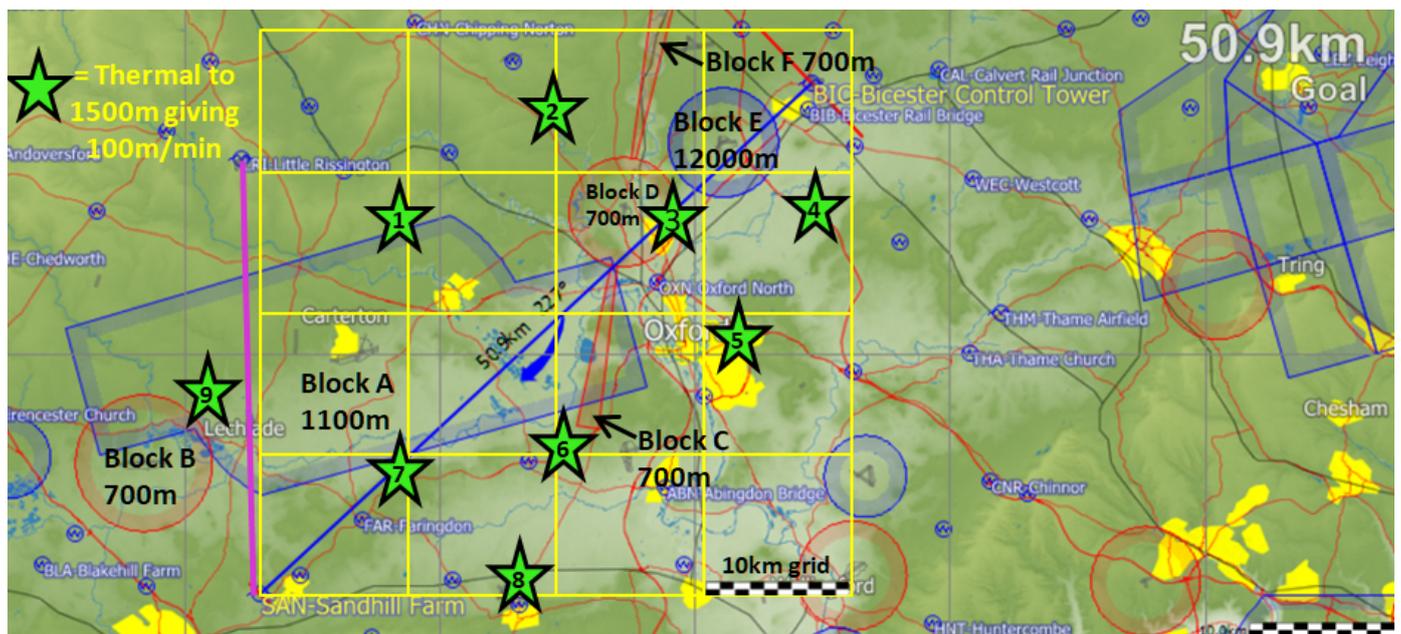
Navigation Challenge Section 2 – Avoiding airspace

Here's your air map with the task drawn on. You can scale distances from this map – the grid is 10km squares:



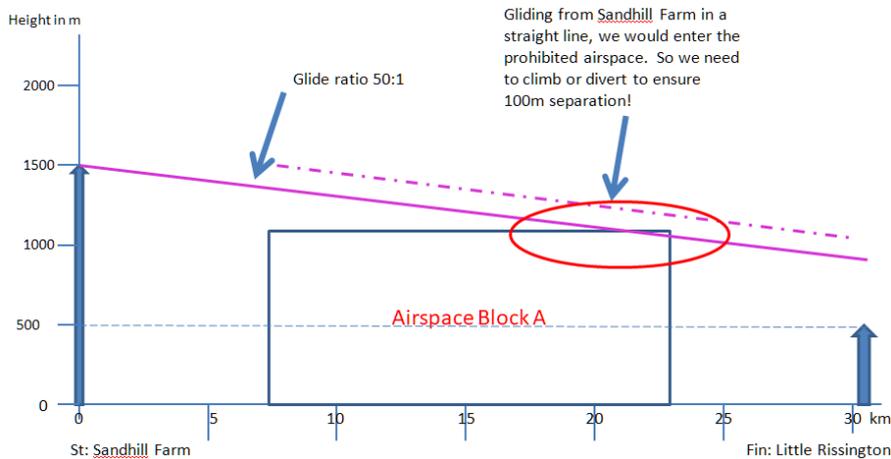
To help you answer the questions in this section, you'll need to interpret what your potential route would look like if you flew along it, bearing in mind the glide angle of your glider and where along that route you will encounter thermals and airspace.

For example, let's plot a route north from Sandhill Farm to another airfield, Little Rissington – along the pink line shown on the left below:



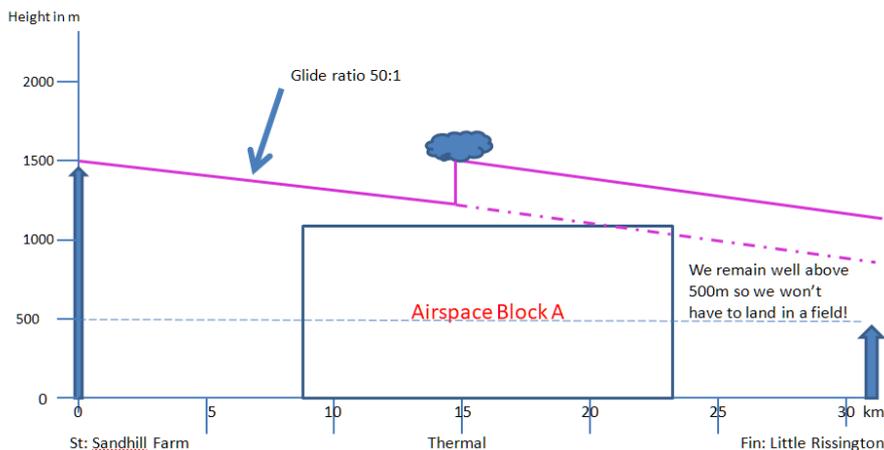
If we construct a vertical view along the route, what would that look like?

It would look like this:



Note that the diagram has **actual distance flown along your route on the X axis** whether or not your planned route is a straight line. Remember to stay at least 100m above any airspace you need to cross, and always above 500m to avoid having to land in a field. This diagram shows that we can't fly there direct – we certainly don't remain 100m clear shown by the dashed line, we actually go into the airspace.

So let's fly via Thermal 9. That gives us a plot like the one below – the distance is a little further so the baseline changes, and we meet the airspace at a different distance along our route:

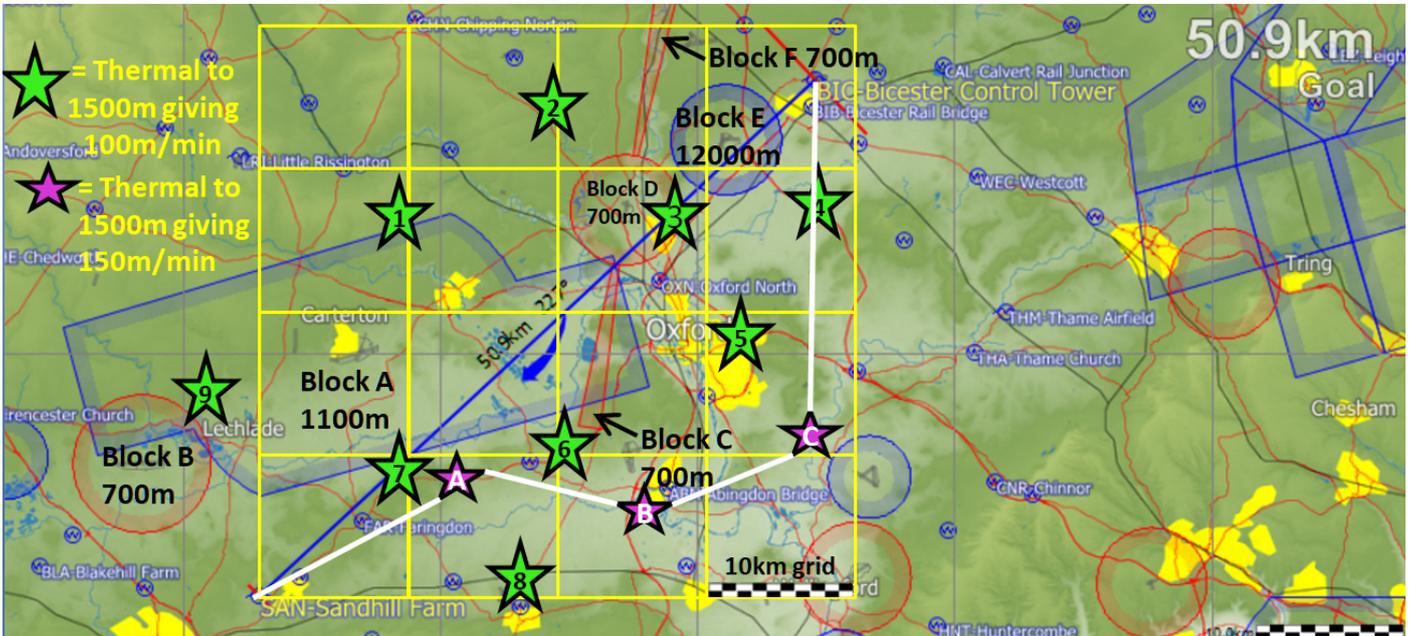


Navigation Challenge Questions Section 2:

2. Given the airspace considerations, can you fly in a straight line along the track marked in blue on the map?
3. Work out a route that you can fly that will take you clear of forbidden airspace
 - a. How far will you fly?
 - b. How long will it take you to complete your course?
4. Construct a route diagram (like the example above) showing your height against your distance along the route and plot the airspace on the diagram
5. If you had been able to climb to 2000m in each thermal, would it have changed the course you are able to fly?
 - a. If yes, what is the distance and how long will it take you to arrive at Bicester?

Extension Tasks

6. Another pilot flies the route below and finds stronger thermals on her way, giving climbs of 150m/minute to 1500m – shown in purple.
 - a. How long does she take to complete the course?
 - b. Can you find a quicker route than she took?



We hope you had fun learning about gliding and airspace!

Find out more about GLIDING at the links below, all types of AVIATION at airleague.co.uk & CAREERS at stem.caa.co.uk/careers-in-aviation-and-aerospace

Why not Go Gliding?

Find your nearest gliding club at <https://www.gliding.co.uk/club-finder/>

We hope to see you on an airfield soon!