

Task Preparation and Flying

Warning:

There are many ways to tackle a task – this is the way I do it, it works for me.

Others will have different ideas, all equally valid, hopefully this brief will provide you with ideas to develop your own methods that you have confidence in.

Questions:

Please stop and ask questions at any point – this will work better if it is a two way discussion.

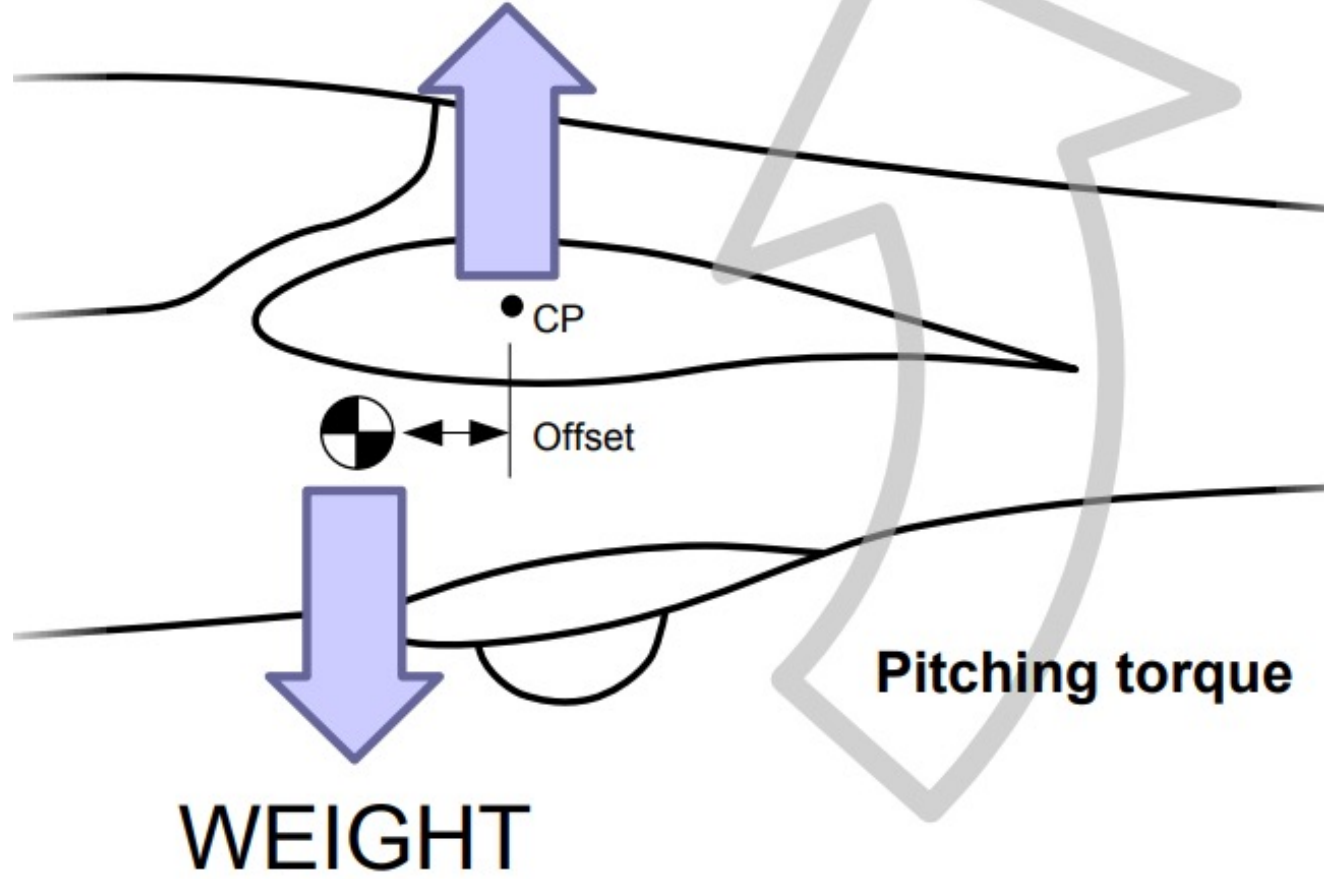
Pre-Season Preparation

Flying Cross Country well is predicated on confidence. Having my kit in top condition gives me a psychological advantage. Do not overlook your pre-season prep.

Aircraft:

- Spotlessly clean, ARC/insurance/maintenance in order
- Ensure everything is working and little niggles are rectified. Aircraft seals, tyre pressure's, Flarm updated, Computer updated with (Airspace and Turnpoints)
- Tow out Gear, Rigging Aids.
- Consider re-weighing – max performance and best handling with CofG towards rear of range. Know how much water can be carried
- Ballasting Kit/Cleaning kit

**Aerodynamic force
produced by glider's
wings**



Trailer:

- Fully serviceable, tyres good, lights working.

Personal:

- Confident with field landings and Nav – consider flight in Motor Glider
- Flight Equipment in good order
- Personal Nav computer (Phone/Oudie etc) updated and set up for your aircraft
- Parachute re-packed

Crew:

- Who will crew for you, mutual crewing etc

Equipment

- Drink system – hydration is **essential**:
 - Camelback – I use the bladder only.
 - Bottle etc.
 - Do not use fizzy drinks!
- Food: - really important
 - Tracker Bars (not chocolate!)
 - Sweets
 - Sandwiches
- Pee system - also **essential**:
 - Condom Catheters
 - Freezer Bags
 - Built in Pee Tube
 - Etc

Equipment

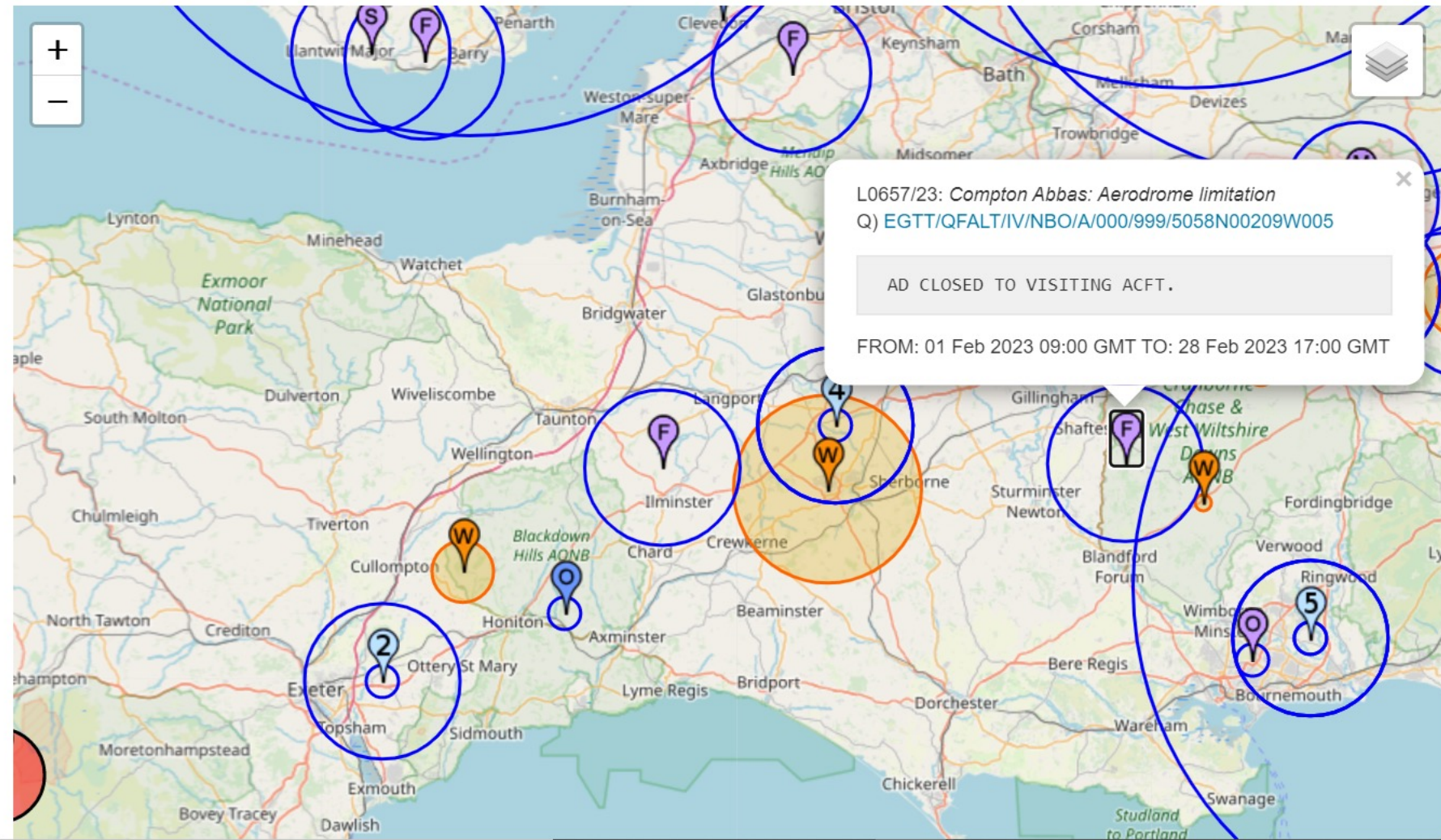
- 1/2 Mill Map – In date, (updated end March). Legal Requirement to have Airspace for your flight.
- Permanent fine line marker pens
- Navigation Ruler
- Protractor
- Cleaning kit – rag and solvent
- Oudie/Mobile Phone with Gliding Software:
 - I use XC Soar, it is free but only works on Android
 - Top Hat – XC Soar variant
 - SeeYou Navigator – works with I Phone, Android etc but requires subscription (£55 Annually)
- Mount and power supply for aircraft.
 - I use a Ram Mount suctioned to canopy – some clubs ban use of suction mounts.
 - Powerbank and lead

On the Day – Pre Flight Preparation

First Action:

- Get task from Alastair!
- Put task into Oudie/Mobile Phone
- Check Weather
- Check NOTAMS
- Mark Map
 - Circle Turn Points, I use the Oudie/Mob phone to accurately identify points
 - Join Circles with track line, mark with arrows direction of travel
 - Use Protractor and note Magnetic Heading
 - Put on Wind Arrow and strength at flying height
 - Radio Frequencies
 - Crew/Control Telephone numbers
 - Consider ½ Km Barrels or BGA sectors? (Comps use barrels)

Flight Planning Map: UK



L0657/23: Compton Abbas: Aerodrome limitation
 Q) [EGTT/QFALT/IV/NBO/A/000/999/5058N00209W005](#)

AD CLOSED TO VISITING ACFT.

FROM: 01 Feb 2023 09:00 GMT TO: 28 Feb 2023 17:00 GMT

- NOTAM details
- Show navigation warnings
 - Show en-route info
 - Show aerodrome NOTAMs
 - Show obstacles (149)
- Show NOTAMs for

- Airspace Details
- Show NOTAMs up to
- Ignore all those below

NOTAMs extracted at 03 Feb 2023 11:12 GMT

- Study Route and note:
 - Airspace that may be relevant – dependant on weather forecast altitude expected etc - I write heights in big numbers by the airspace
 - Notable Avoids – Danger Areas, Parachute Drop Zones etc
 - Airfields on route – potential Airspace or landing opportunity. Note frequency if likely you need to contact them, write in big numbers on map.
 - Mark on NOTAM info if applicable
 - Gliding sites - land out opportunity (Don't get suckered in)
 - Areas that may be tricky – how will you overcome the issue (e.g Otmoor Marsh)
 - Where is the wind, do I want to be Upwind side of track?
 - Turn points, think about wind direction and height you want to be turning, rule of thumb, into wind turnpoint turn low etc.
 - Time by which you need to be on final glide – i.e time day is set to start dying, ideally you will be on glide before this, helps assess whether you need to cut task short.

Task Information

Type: Polygon with 4 points

Task distance: 227.4km

11th August Waco Task A

| Style | Code | Points | Latitude | Longitude | Dis. | Crs. |
|---------|------|--------------------|------------|-------------|--------|------|
| Start | KEE | Keevil | N51°18'57" | W002°06'31" | | |
| 1.Point | CIR | Cirencester Church | N51°43'02" | W001°58'05" | 45.7km | 12° |
| 2.Point | AVE | Avebury | N51°25'10" | W001°52'29" | 33.8km | 169° |
| 3.Point | OXF | Oxford East | N51°45'47" | W001°11'49" | 60.6km | 51° |
| 4.Point | HUN | Hungerford | N51°24'55" | W001°30'56" | 44.5km | 210° |
| Finish | KEE | Keevil | N51°18'57" | W002°06'31" | 42.7km | 255° |

Observation zone description:

Start Keevil: [Style=To Next Point, A12=Auto, R1=5.0km, A1=90°, R2=0.0km, A2=0°]

1.Point Cirencester Church: [Style=Symmetrical, A12=Auto, R1=20.0km, A1=45°, R2=0.5km, A2=180°]

2.Point Avebury: [Style=Symmetrical, A12=Auto, R1=20.0km, A1=45°, R2=0.5km, A2=180°]

3.Point Oxford East: [Style=Symmetrical, A12=Auto, R1=20.0km, A1=45°, R2=0.5km, A2=180°]

4.Point Hungerford: [Style=Symmetrical, A12=Auto, R1=20.0km, A1=45°, R2=0.5km, A2=180°]

Finish Keevil: [Style=To Previous Point, A12=Auto, R1=3.0km, A1=180°, R2=0.0km, A2=0°]

Finish Ring 3km Minimum Height 500ft QFE

Additional Penalty:

Salisbury D123-128 Prohibited for competition

Brize Class D SFC - 3500AMSL

Advisory:

Lyneham - HIRTA - NOTAM Safe Distance 1NM radius

Exemptions:

D128 - Emergency landing UPAVON only

Raymill Farm for purposes of competition, 300M RADIUS, SFC to 500FT AGL

ATZ Frequencies:

Start 130.405

Launch/Finish/Ground 129.980

Membury 120.375

Kemble 118.430

Competition Airspace File: BRGC Airspace V1

Competition Waypoint File : BRGC23 Waypoints V2

First Launch Not Before: 11:30

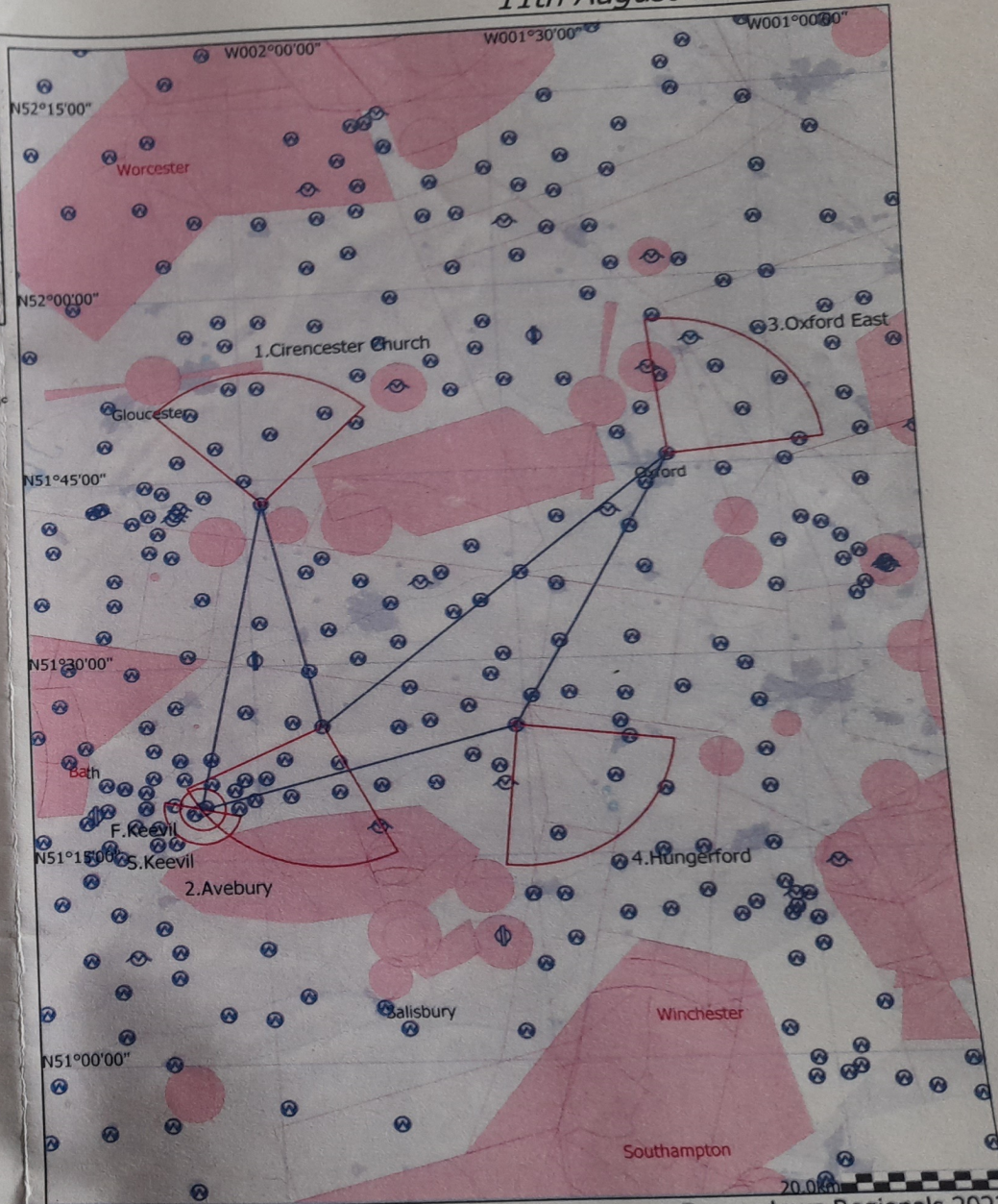
Last Launch Not After: 18:00

All times are local.

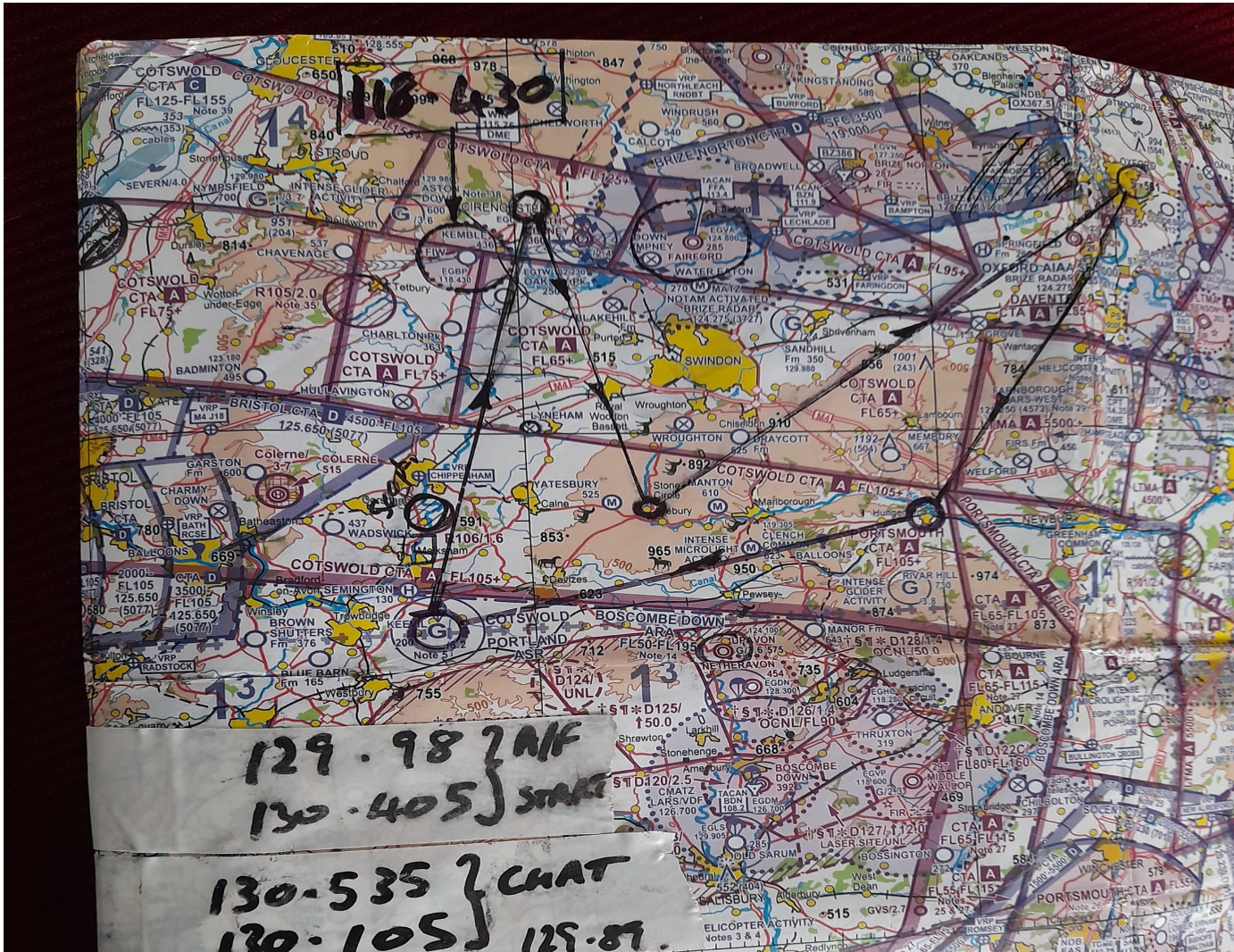
Telephone Control: 07958 570 587

bannerdown.robocontrol.uk

11th August Waco Task A



Bannerdown Regionals 2023



118.430

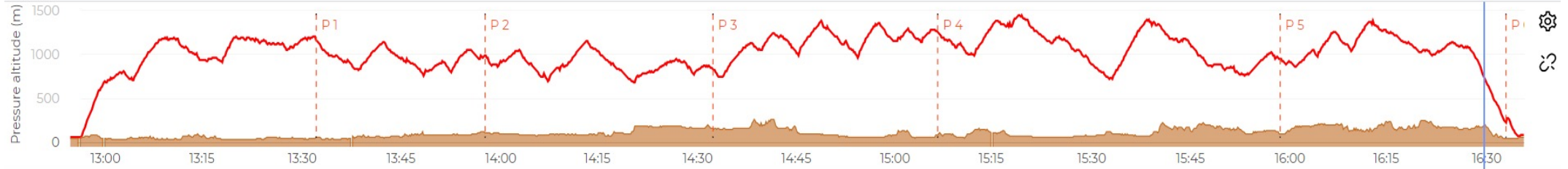
129.98 } AIF
130.405 } STAIR

130.535 } CHAT
130.105 } 129.87



UTC +1: 16:31:41 Pressure altitu... True air speed Gps speed

● ANDREW FARR 46 763m 228km/h 200km/h



Rig and Prep Aircraft

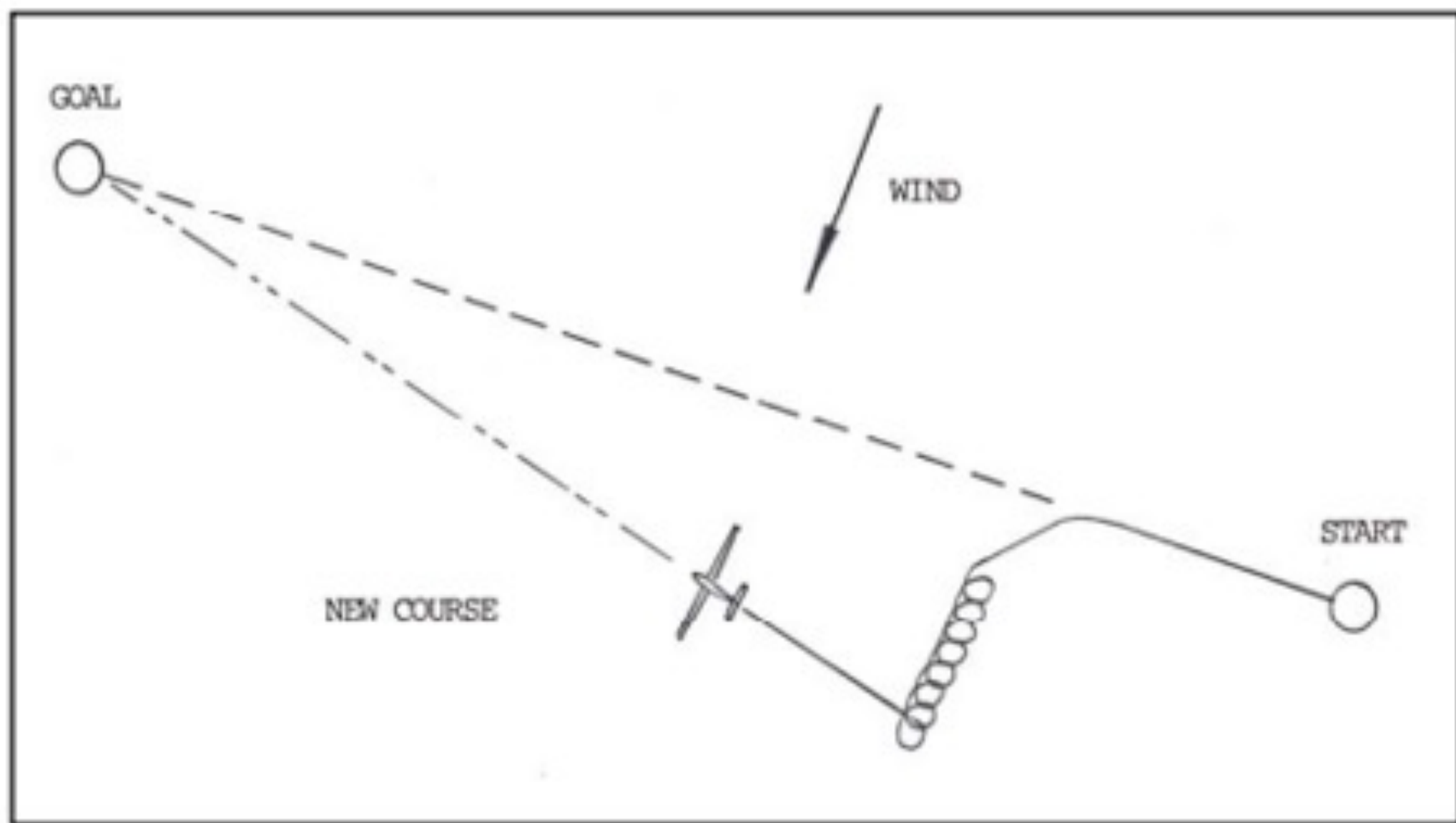
- Carefully rig and DI – consider documented Independent checks etc
- Load task into Glider Nav computer – check the distance correlates with your Oudie/phone.
- Be ready to launch early, but wait until gliders are clearly soaring
- Consider taking aerotow – should drop you in lift, will make getting away easier and less stressful. Avoid launching and falling down with associated time lost towing back and re-joining queue.

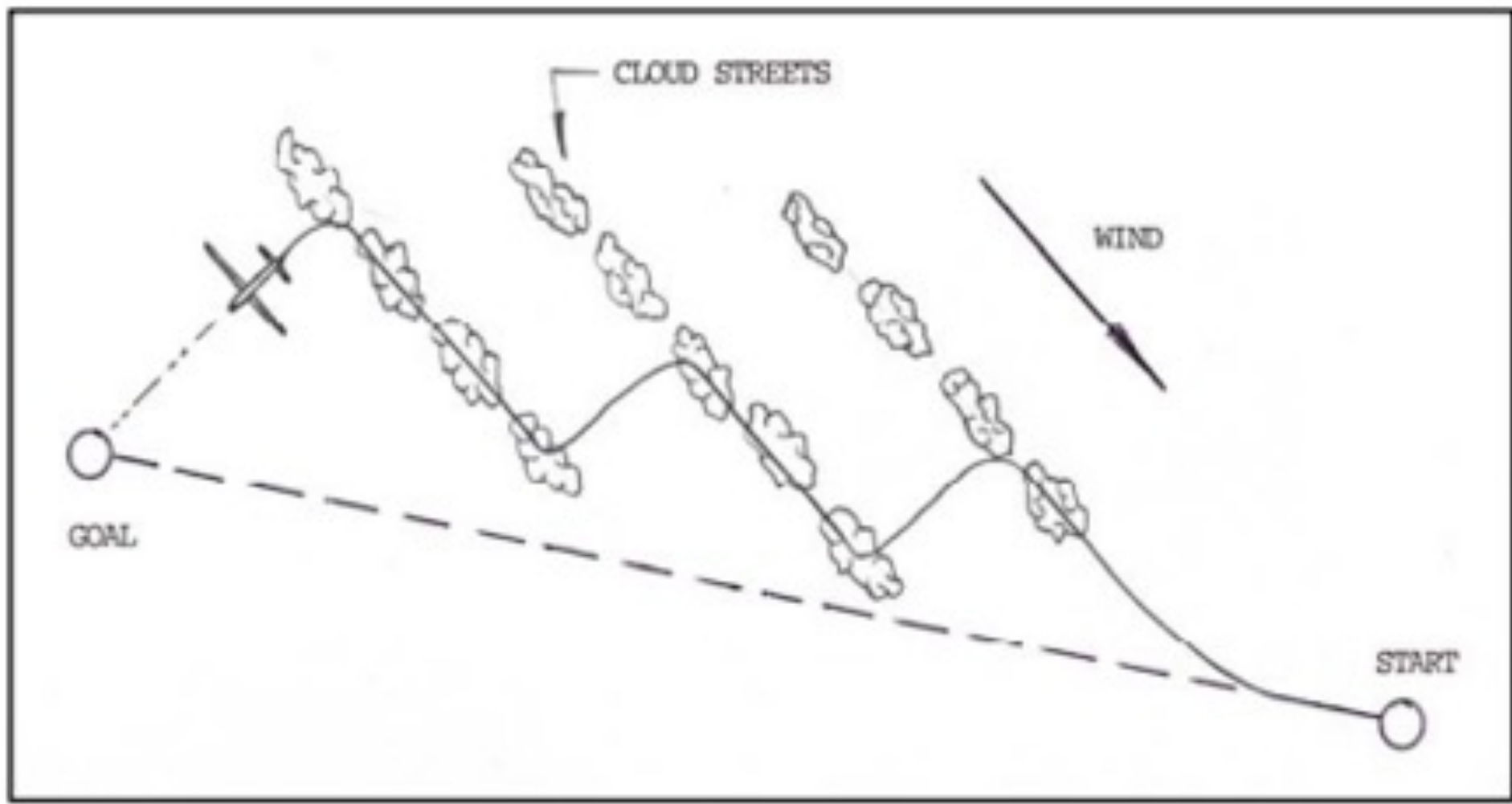
Launch...

- Once established in first climb settle down and take stock of the day:
 - Turbo pilots – run engine, have confidence it will start when needed
 - Work out where start line is – consider wind and which side of line to be (wind) (5K radius hemisphere for comps)
 - What is my initial track – pick a landmark. Is there an energy line to be seen
 - What is the lift like – how confident in the day are you
 - What is cloudbase – likely determines my speed to fly

Start Task

- 3 Rules for Competition Flying (equally applicable to task flying)
 - **Make a good start**
 - **Don't bust Airspace**
 - **Don't land out!**
- Make sure you are at or near cloud-base before starting
- Watch your Nav computers, acknowledge start
- Follow your initial track line but deviate to follow energy lines
 - **Rule of Thumb** – deviations up to 30 degrees from track cost very little
 - Always try and stay upwind side of track line – i.e. thermal drift will take you back onto track
 - Don't leave a thermal unless you can see your next soaring opportunity, it should be as least good as what you are in.





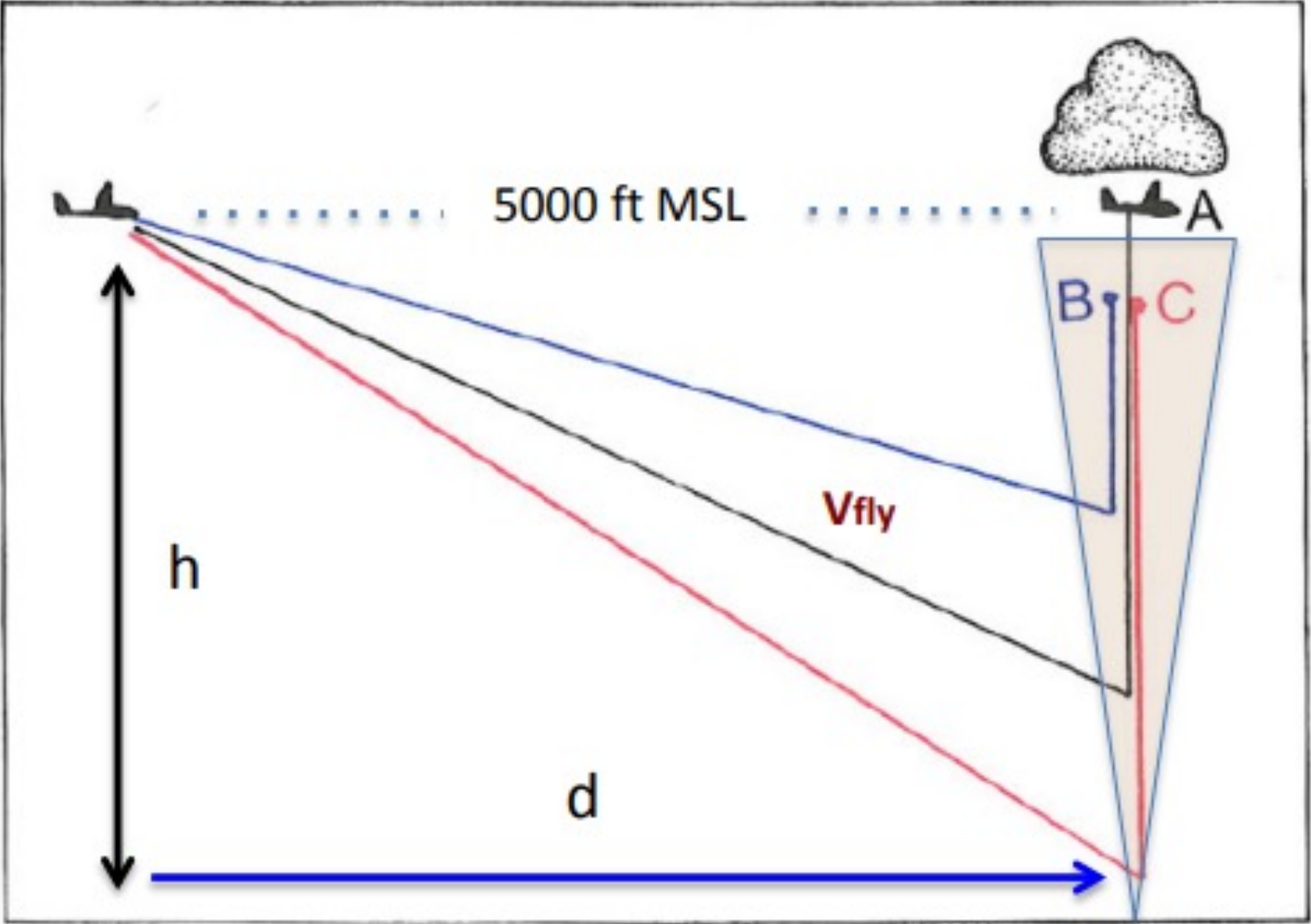
- Leave thermals Efficiently

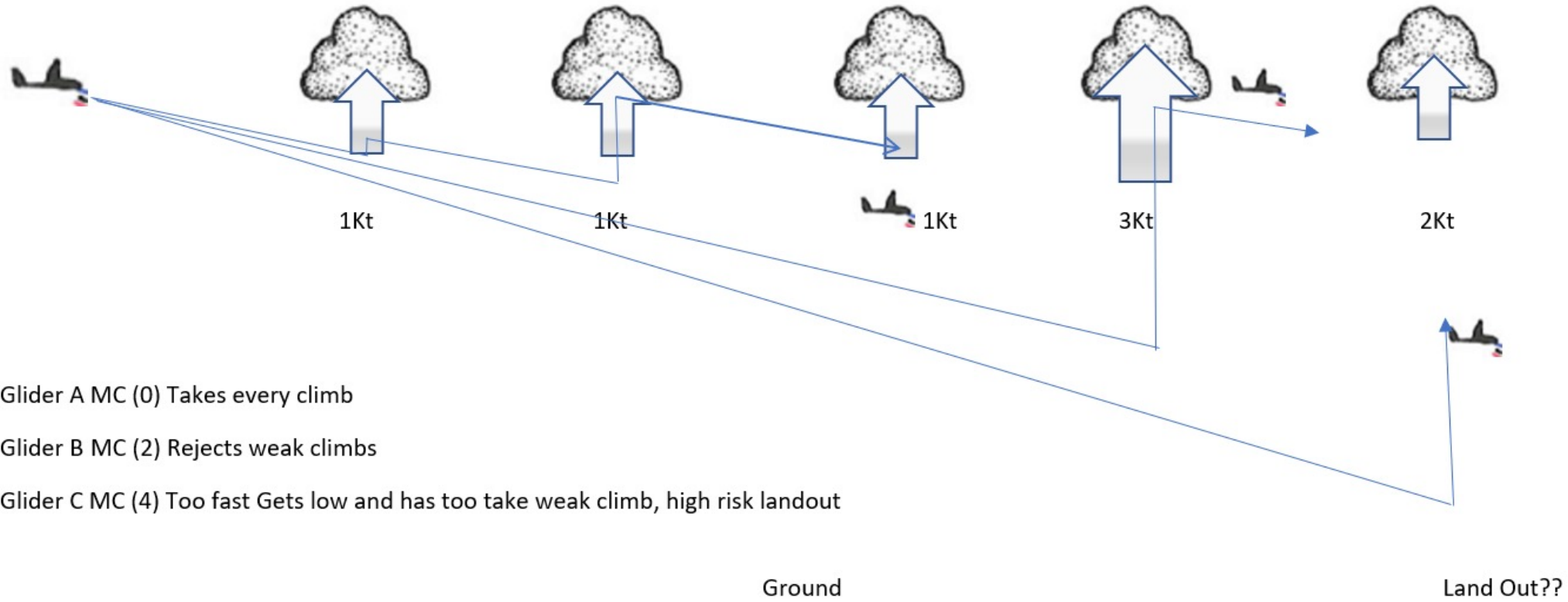
- Identify track out of thermal – pick a land mark. Always sink surrounding a thermal
- Accelerate to cruising speed whilst in lift (Block Speed). There is always sink surrounding a thermal therefore you want to punch through this area.
- Accelerating in sink is very wasteful
- Practice leaving the thermals as you would on a cross-country flight, making a sharp 180° when opposite the point of exit so as fly through the centre, picking up speed in the process. Remember, only practice this when you don't have company.

What Speed to Fly?

- Maximising XC speed is mostly down to climbing efficiently.
- Most club pilots do not turn tightly enough – use 45 degrees bank angle for majority of thermals.
- Being 10% too slow in the cruise has negligible effect on overall speed however 10% too fast has a large detriment.
- Classic Macready Theory:
 - Based on glider polar there is an optimal speed to fly for a given amount of lift/sink.
 - Based on your **next average** climb rate there is an optimal speed to fly to maximise the overall speed. If you expect a 2Kt average you set MC 2, this will result in faster airspeed and hence steeper glide.
 - However flying classic Macready will cause you problems.
 - Hardly ever do you want to fly at best glide speed - always fly faster as the polar for most gliders is flat in this region.

Principle of optimization



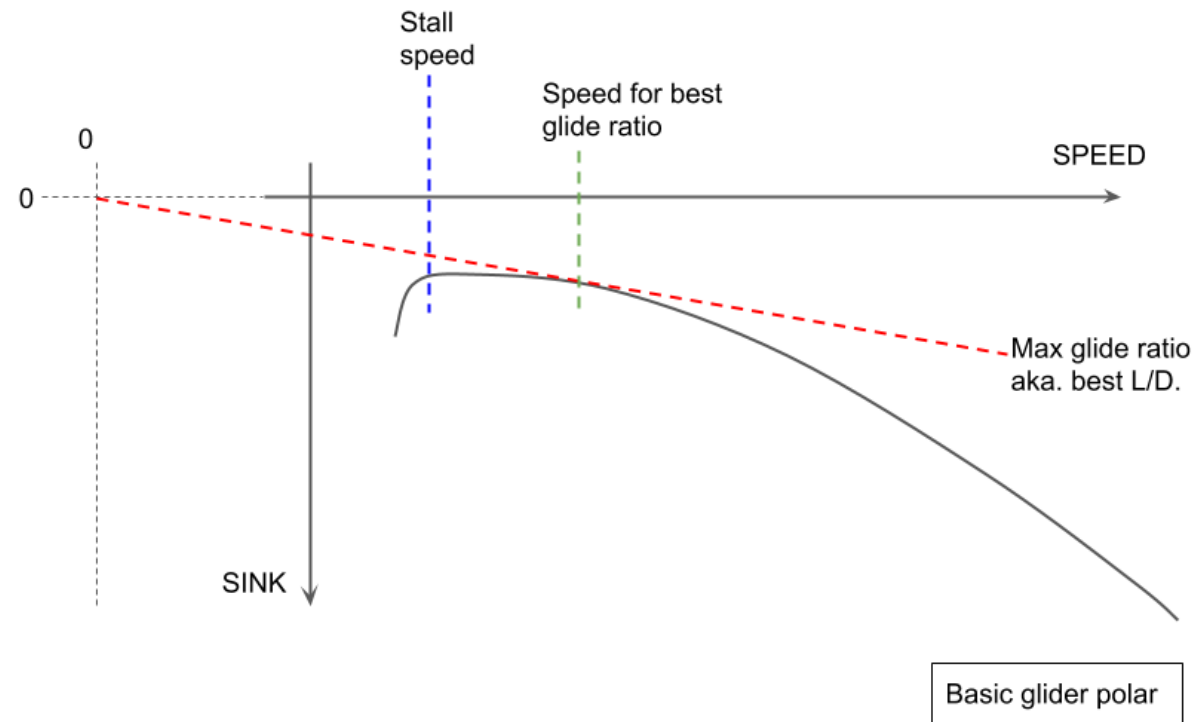


Glider A MC (0) Takes every climb

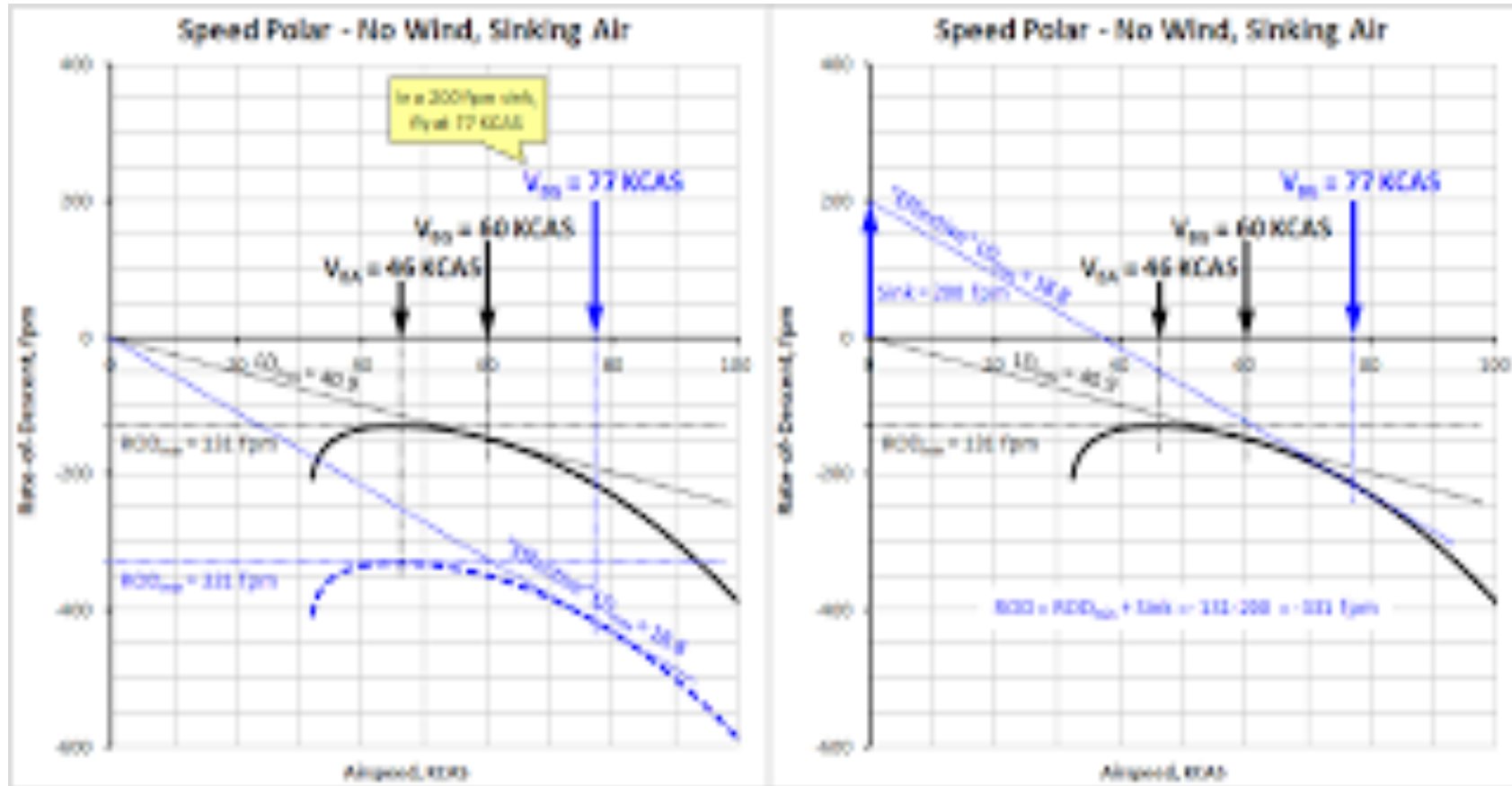
Glider B MC (2) Rejects weak climbs

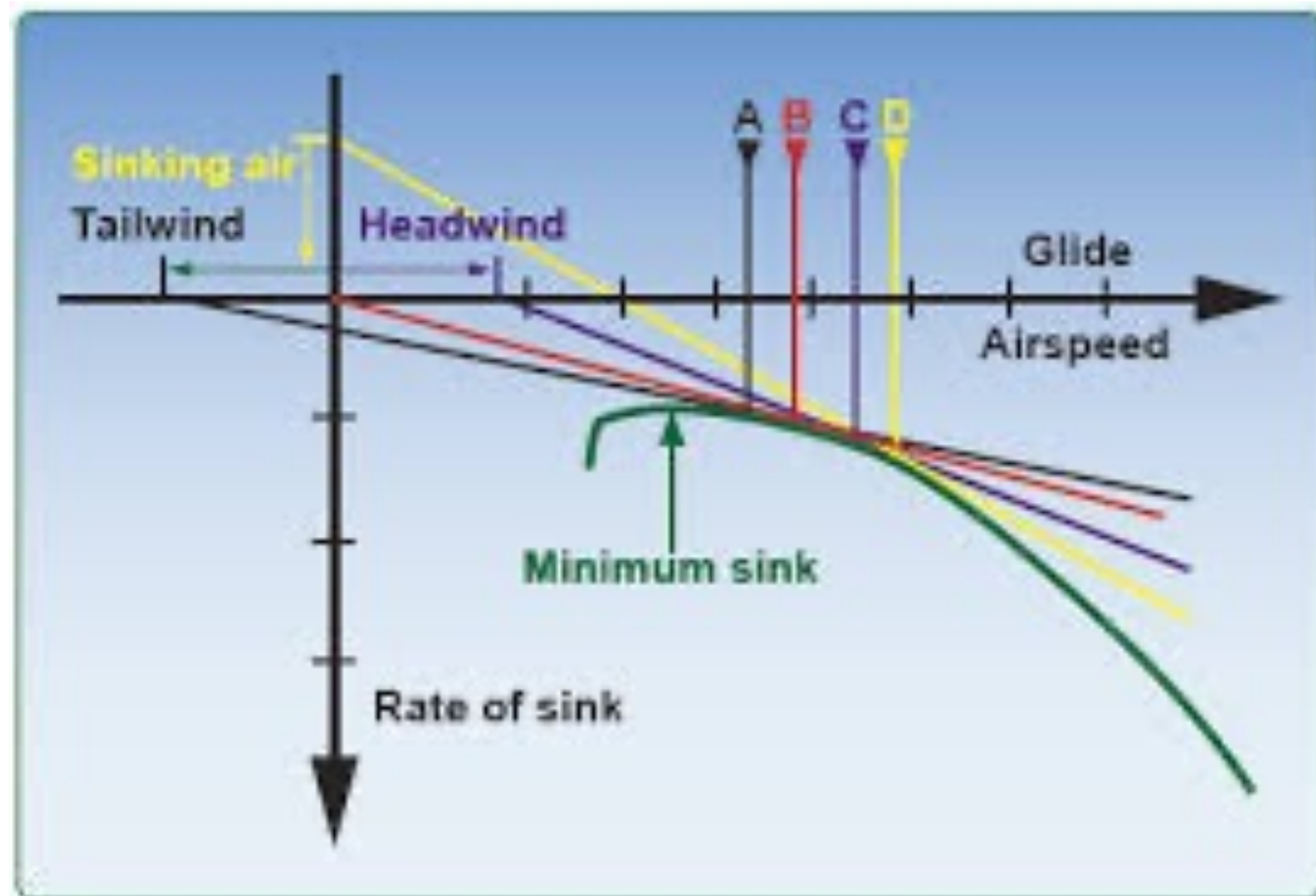
Glider C MC (4) Too fast Gets low and has to take weak climb, high risk landout

Glider Polar Curve

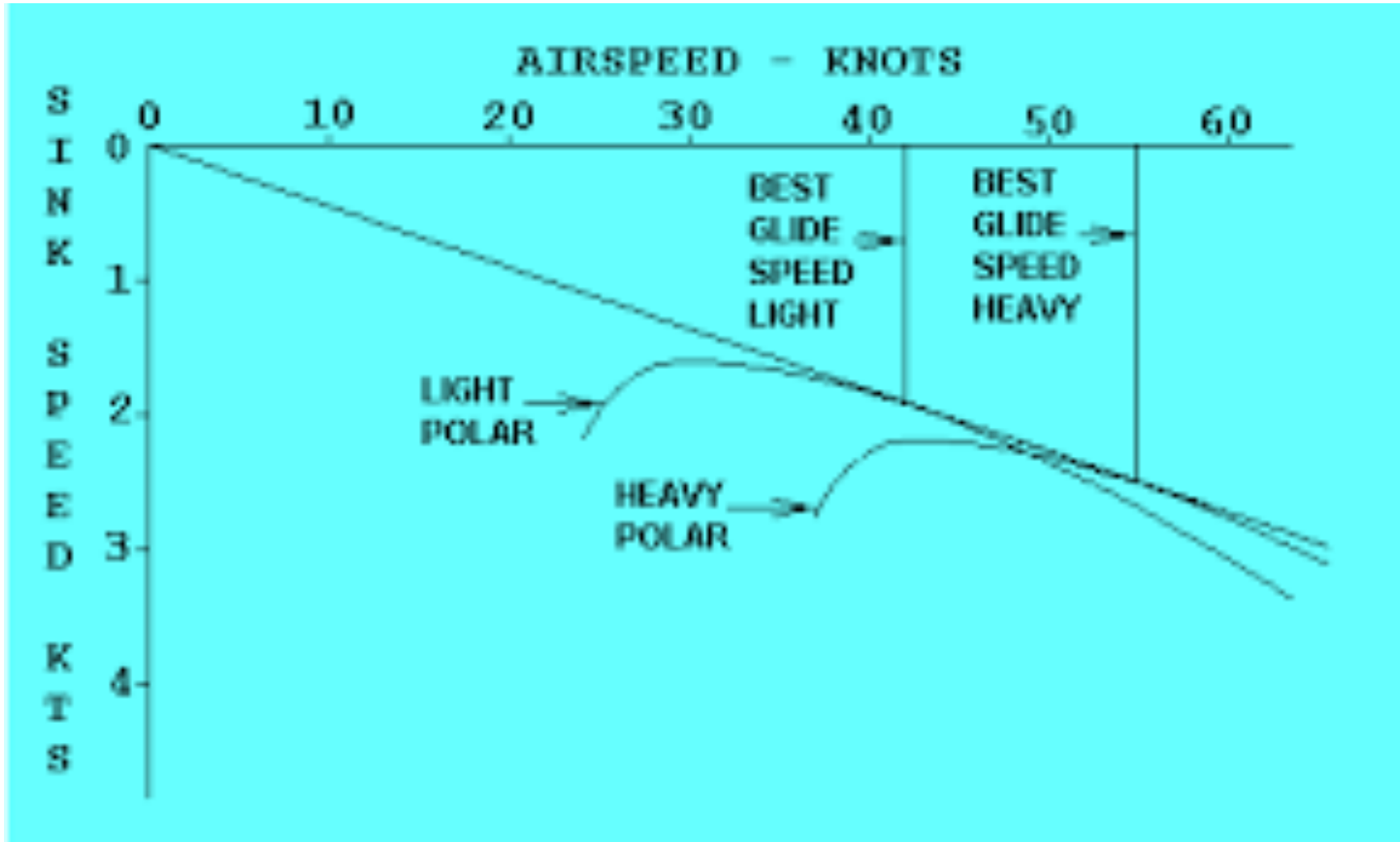


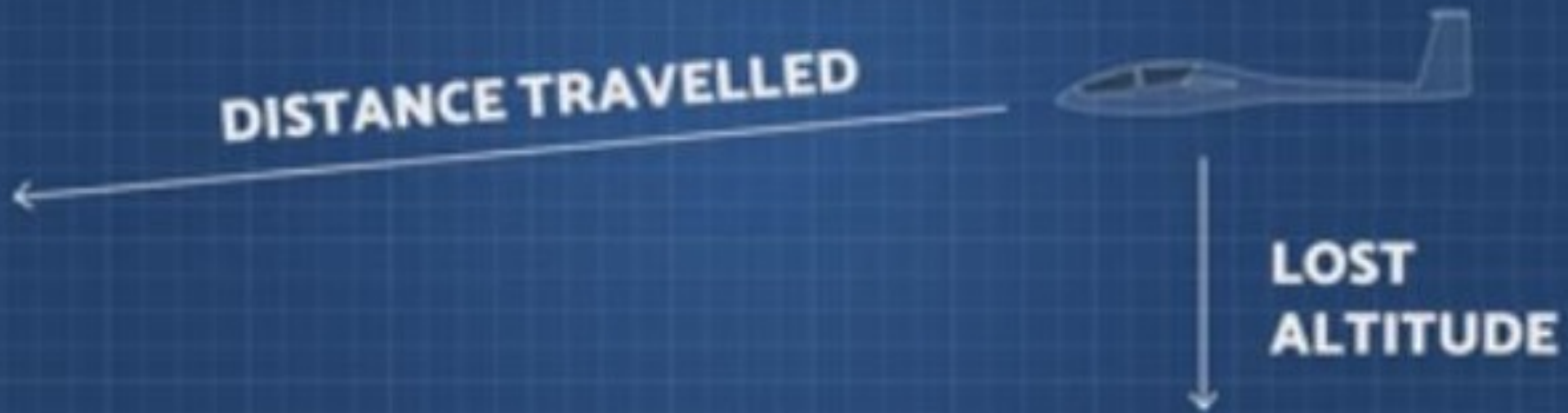
Glide Polar altered for Sink





Polar for a dry versus ballasted glider





Glide Ratio

Distance travelled over altitude lost expressed as a ratio e.g. 36:1
Glider will travel 6 NM per 1000ft - also referred to as the glide angle
Or Lift/Drag (L/D) ratio

- Most glide computers will calculate the sink rate against the polar and give you speed commands – push pull etc based on the Macready setting inputted.
- **Problem** – glider takes time to respond to lift/sink therefore the vario will take time to respond no matter how fast you think it reacts. In reality you are seeing what happened a two/three seconds behind you. This leads to pulling in sink and pushing in lift, the opposite of what you want.
- Often, you will see a burst of lift on vario but no associated surge in seat of pants – this is a gust.
- You can use the speed director as an indication of what speed to fly but do not just push and pull to keep the director happy.

I use Block Speed to Fly

- Over many years I have found block speeds are much better than following speed directors – particularly for final glides.
- I use three speeds dependant on the conditions, how high I am and how confident I am feeling. For my Ventus I use:
 - **Struggling 70Kts** – (Medium height or conditions look bad ahead)
 - **Happy 80Kts** – (Going OK, conditions as expected, press on)
 - **Booming 90Kts** – (Conditions really good)
- For a Discus class I bring the speed back by 10Kts, so 60,70,80 etc. For an Astir I drop another 5 Kts off so 55, 65,75.

Height Bands

- I always try and stay in the top third of the convective layer. Whilst in this band **anticipate** what you expect your next thermal average will be and don't stop to climb unless the thermal is at your expected value or better. Don't just take every scrap of lift that comes along! Always exceptions to rules, it is based on what conditions look like ahead, if a big blue hole I will always stop early, maximise chance of getting through and throttle back.

- Example:

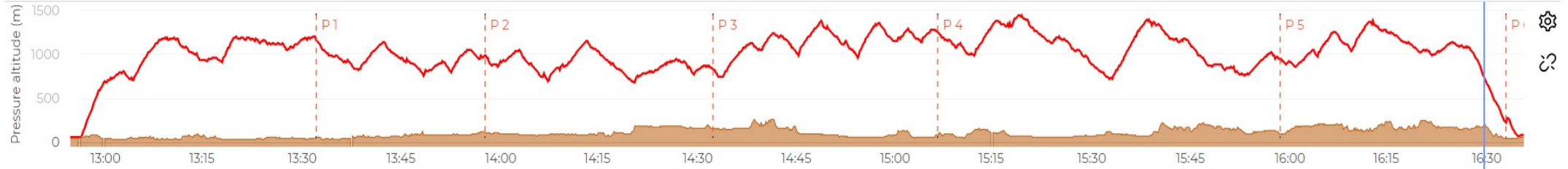
| | Top | Intermediate | Low |
|------------------------------------|-----------------|---------------------|------------|
| • Cloudbase 3000ft, operating band | 3000ft - 2000ft | 2000ft – 1500ft | < 1500ft |
| • Cloudbase 4000ft, operating band | 4000ft – 2700ft | 2700ft – 1500ft | <1500ft |
| • Cloudbase 5000ft, operating band | 5000ft – 3300ft | 3300ft – 1500ft | <1500ft |

- Once I drop out of the height band I start to get concerned, you do not want to lose touch with the clouds, block speed wise I will throttle back. I will stop in the next thermal if it is at **least half** of the value I am expecting. I will only climb enough at the reduced rate until I have enough height to get to a thermal I think will give me the expected climb rate.
- Once down to 1500ft I am in survival mode, I will take anything to stay airborne. I will have been looking at fields before I get to 1500ft, I will take large deviations from course and even possibly back track? It is useful to have a GPS derived AGL box on your Nav Computer. At this height you must be in field landing mode, you should already have a couple of fields picked but **don't give up** stay airborne, local soar your selected field, there is still time to get away – just like a winch launch.
- Those with Turbo's, make sure all switches are in the correct position, I select everything on bar the master switch. Dropping below a 1000ft AGL with a good field below I make the decision, and flip the Master – this instantly starts to raise the pylon etc. If no field below keep going downwind to find one, potentially reject engine start?



UTC +1: 16:31:41 Pressure altitu... True air speed Gps speed

● ANDREW FARR 46 763m 228km/h 200km/h



- Turn Points:
 - BGA Sectors
 - 1/2Km barrels – BGA Ladder
 - Showery Sectors - Competitions
- Rule of Thumb:
 - Into Wind Turn points - turn low
 - Down wind Turn Points – turn high, consider getting high significantly early, as much as 10-15Km ahead and stay high.
- You only need to clip the TP / sector, as soon as your Nav Computer beeps move onto next leg.
- Quite often you will not see the TP

Nav Computer Set Up

- Safety Factors:

- Arrival Height – 100ft (Such a small amount it is ignored)
- Polar Degradation – 5% (Glider will not perform as manufacturer claim)
- Safety Macready – 2.3Kt (Minimum Final Glide Calculation based on Safety MC)

- Warnings

- All Airspace on
- Time 45 seconds (If you continue you will infringe in 45 seconds etc)

- Glide Polar

- Select you're a/c

Info Boxes

- **ALT IGC** – So I know what altitude my logger is recording against airspace
- **AGL** – Useful when assessing L/O options
- **HDG** – Useful when talking to ATC / relaying messages
- **Dist to TGT** – Useful for working out TPs / High Low etc
- **Arr on Tgt** – If I don't climb I should arrive at TP/Airfield this height.
- **Remaining Dis** – self explanatory
- **Task Speed** – Idea of how well you are doing (not essential)
- **Radius** – try and keep your turns no more than 110m radius <100m ideally

- GR Cruise - Current Glide Angle
- Finish GR - Required Glide Angle to complete task

Nav Screen

Wind Arrow, Direction and Speed

Steering Arrow

Final Glide Bar:

- Macready Setting
- Arrival Height
- Glide Bar



Final Glides

- I use a combination of methods and built in safety margin
- I do not use a safety factor “Arrival Height”
- Macready setting affects the height required to fly Final glides. The greater the value the steeper the glideslope and hence safety margin. N.B I still fly **BLOCK SPEED**.
- I have a Safety Macready of 2.3 – the computer will calculate @2.3 unless the current Macready is set above this value.
- I will set off at a shallower Macready angle and aim to get progressively faster, and hence safer as I get closer to the airfield. Aim for a constantly steepening approach.
- **Follow and use energy en-route.**

How high to climb in last thermal?

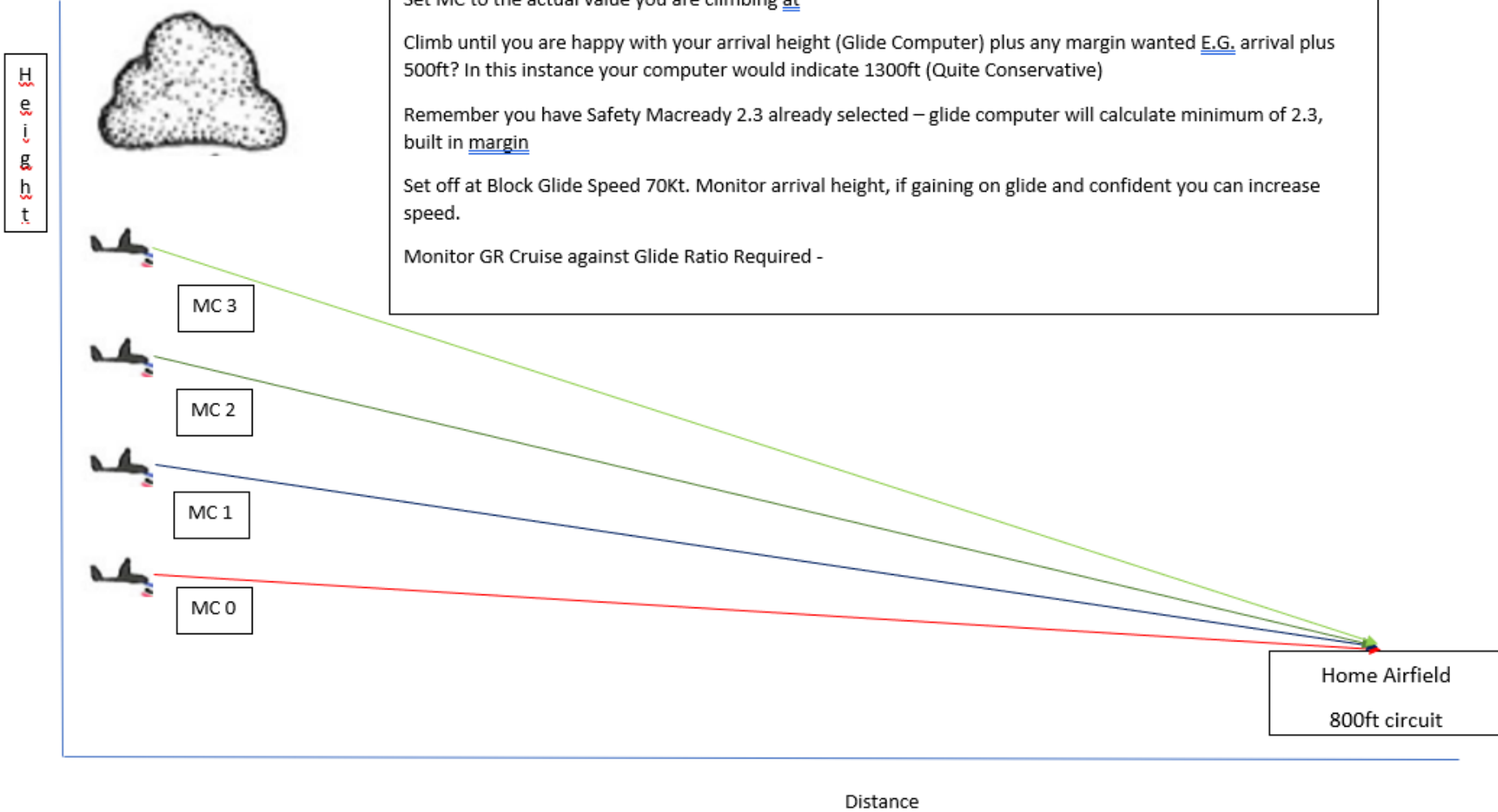
Set MC to the actual value you are climbing at

Climb until you are happy with your arrival height (Glide Computer) plus any margin wanted E.G. arrival plus 500ft? In this instance your computer would indicate 1300ft (Quite Conservative)

Remember you have Safety Macready 2.3 already selected – glide computer will calculate minimum of 2.3, built in margin

Set off at Block Glide Speed 70Kt. Monitor arrival height, if gaining on glide and confident you can increase speed.

Monitor GR Cruise against Glide Ratio Required -



Achieved LD

- Periodically during the day, I'll glance down at this to judge what speeds are giving what. For example, I may often see 35:1 for 90kt cruise speed, or 40:1 when I'm doing 80kts. To use this method effectively, you'll also need the 'Task LD required' navbox or similar, this one tells you what you need to achieve from this exact moment to finish the task. If it says 82:1 required, you know you need a few more climbs, 36:1 and you know that you're getting very close, 20:1 and you're almost certain to make it!

Required LD

- Let's go with 36:1 required. Have you often been getting 45:1 LD's for the day? If so, and if the sky looks similar to the day's flight, then you should have confidence that you'll also achieve 45:1 on the way home and slowly pick up the margin on glide. If you've been punching into a stiff wind all day and your Discus is only achieving 25:1, then you'll be needing to think about climbing again. Just keep the achieved LD greater than the task required LD and you'll be sure to get home - but monitor closely!

Monitor

- Check against your arrival height, if your glide is 30K and by 15K to run your arrival height has halved you are very marginal. Your GR LD against Req LD will be practically the same.

- When 10-15Km out it should be obvious you are going to make it.
Now is the time to tidy cockpit:
 - Stow maps, lunch water bottle etc.
 - Start Dumping Water (2-3 minutes per barrel) 80Kt = 150KPH At this speed 10Km will take 4 minutes
- Call Airfield:
 - Ask for wind direction and strength
 - Circuit traffic
 - Get a mental picture of what is going on.
- Join Circuit – WULF checks!!!!

Marginal Final Glide

- **Do not get into this position!**
- Sometimes you cannot help it and the air is now dead. You will have much less margin than normal – should still be Positive.
- Press on monitoring your numbers, both arrival height and GR. Once dropping below a 1000ft you have a decision:

Pick Field and land out

OR

Be sure you will get back

- Consider route to field:
- Terrain and landable fields on run in (Trees/Hilly Ground from North)
- Straight in or will have to do some circuit.

- FINAL GLIDES

- Just about everyone underestimate the distance which can be covered from any given altitude. Aside from final glides, knowing the performance of your sailplane is invaluable when crossing blue holes and hostile terrain.
- An excellent way to develop this judgment and fine tune Nav Equipment is to make a lot of final glides. Final glides can easily be practiced on local flights. In the beginning, start the final glides some 10 – 15Km upwind, and plan to get back with 2,000 ft. (Rule of thumb – 10K per 1000ft)
- As you gain experience and confidence, lower the arrival altitude and start the finals further out. You will be surprised how much practice it takes before you totally believe your sailplane's performance.
- Turbo gliders add complication:
 - Minimum 1000ft AGL to commence a start
 - Below 1000ft treat as pure glider
 - Stop early and climb or use engine

The End!

Any Questions.....