

## CHAPTER 12

### **CROSS-COUNTRY NOTES FOR THE GPL EXAM**

#### INDEX

##### **PREPARATION.**

Pilot - Personal.  
Glider & Ancillary Equipment  
Retrieve Equipment.

##### **TASKS.**

FAI Badges:  
Silver C, Gold C, Diamonds.  
Records  
Competition.

##### **MAPS**

Map Preparation  
Task Lines

##### **DOCUMENTING THE FLIGHT**

Camera Procedure  
Barograph  
Flight Loggers

##### **THE FLIGHT.**

Navigation: Map Reading.  
GPS.  
Thermals: Thermal Selection.  
Height Band selection.  
Speed to fly.  
Taking Turn Point photos.  
Final Glide.  
Field selection.  
Lost ?

##### **AFTERWARDS.**

Tie down procedure.  
Farmers  
Equipment

##### **ADDENDA.**

Check lists. Declaration form.  
Landing certificate.

##### **PREPARATION.**

###### *GENERAL:*

Good preparation is the key to successful cross-country flying. Often failure to achieve a goal can be attributed to a breakdown of preparation. Preparation starts long before the flight and continues right up to take off. Preparation can be considered under a number of headings that are considered below. The careful pilot does not rely on an often faulty memory for preparation but uses a series of check lists. A suggested series of checklists is included at the end of these notes.

*1) Pilot - Personal.* You should be in good health before you fly. Have all your personal items ready for use. These might include sunscreen, lip salve, edible items for flight and most importantly drinking water. Do not allow yourself to become dehydrated. Sunglasses, spare glasses, a light weight anorak or pullover for use after outlanding are useful. A book to read while awaiting the retrieve.

###### *2) Glider & Ancillary Equipment.*

Ensure that your glider is ready to go. Riggered correctly, controls checked, oxygen in and on.

Ancillary equipment: - Declaration forms, barograph, camera, GPS, data logger, landing certificates.

Barograph - preparation signed and sealed by 'OO', wound, securely stowed and switched **ON**. Removal - Open by 'OO' only. (Official

Observer)

Declaration forms. Declare task.  
Details Turnpoints glider etc.

*NB. OO is the Official Observer.*

3) Retrieve Equipment. Car ready to go, petrol in tank, keys with crew person or in ignition, torch in car for retrieves in the dark.

Trailer ready for the road. Rigging aids supports etc. as needed stowed in trailer. Tyres inflated.

Crew notified of intended course, car details, trailer details etc.

### **TASKS.**

The tasks that the new cross-country pilot is likely to attempt will be those for the FAI badges as a first effort. These become rapidly more difficult as they advance from Silver to Gold and then the 3 Diamonds and ultimately the FAI 1000 Km diploma.

As a reminder the FAI Badges comprise the following:

**Silver C:-** Distance of 50 Kms, Duration of 5 hours, Height gain of 1000 metres.

**Gold C:-** Distance of 300 Kms, Duration of 5 hours, Height gain of 3000 metres.

**Diamonds:** A diamond is added to the Gold or Silver badge for each of the following: - A Goal flight of 300 Kms, a Distance flight of 500 Kms, and a Height gain of 5000 metres.

The rules are not overly complex but must be correctly followed otherwise although you have completed the flight the award may not be made. See above rules re barograph, cameras and declarations.

Records

Competition

### **MAPS.**

Even though GPS is now widely used pilots should use a map and become familiar with it's use. The GPS may fail or the satellites may be off and then the pilot with no map reading skills may be in trouble.

*Map Preparation* - Look carefully at a map of the area in which you are planning to fly. Decide where you will go for the task that you wish to fly. Look for suitable turn points (TP) and measure the distances. Look for prominent features so that you will know what to look for as you fly. Features which are marked on the map include rivers and from the contours hills or mountains. These are good features to follow. Note that although power lines are very prominent on the map they are difficult to see from high up and hence not good landmarks. Be very aware also of the high ground -- good thermal sources often over high ground. Always look at the airways and air traffic markings on the map these will show prohibited areas, danger areas as well as airways etc. Be aware of these and do not fly into controlled space without the controller's knowledge and approval.

*Task Lines.* Draw the lines of your courses on the map. Write in the course and it's reciprocal. Use arrows to identify which is which. Mark up the lines with distance intervals of 10 or 20 Kms. Thus you can follow your progress, and average speed. The lines also give you a good idea of your position. If you have even a vague idea of your average speed it helps work out where you are.

### **DOCUMENTING THE FLIGHT**

It is very important to provide adequate documentation of your flight to show that you have completed the

flight. Clearly this is essential for **FAI** Badge flights, record flights and in competitions. It is often worth documenting your other cross-country flights, not to prove anything to anybody else but to enable you to carefully analyse your flight, particularly the barogram from which you can learn a great deal about your performance. The methods of documentation are basically either the old style camera & Barograph method or using a GPS based flight logger.

*1) The camera & barograph data recording.*

**Camera:** The camera should be as simple as possible. Autofocus cameras are not satisfactory, since they will focus on the wing tip and the ground will be blurred. Autowind is OK but manual wind is fine if you remember to do this. Mount the camera on the glider. This is mandatory for 500 Km flights but is strongly recommended for all flights for which you will take photos. The Official Observer (OO) will mark the canopy at the point through which you take the pictures.

**Photographs:** Take 2 pictures of each item as backup. Photo the declaration (see attached example of declaration form), through the canopy, with the mounted camera. Then fly and take 2 pictures of each turn point. (TP). On landing take a picture of the declaration and then the glider showing the tail numbers. Note that when taking a photo of the Declaration form it should have been filled in with a thick “Koki” pen and the writing should be large and clear.

TP and the photo sector. (see below.)

**The Barograph.** This must be loaded and wound or for electric barographs set according to the maker’s CGC – CLOUDBASE

instructions. It must be checked, signed and sealed in the presence of an OO and placed in the glider. **DO SWITCH IT ON** before take off. After you have landed you may switch the barograph off, but **DO NOT** break the seal. This must be done by the OO who will then sign and complete the information needed on the barogram. This is Pilot name, Flight date, Place of take off, and landing, Glider type and type of launch. The make and manufacturers number of the barograph must appear on the barogram. The OO should mark release point, low point and high point on the barogram, especially if a height claim is to be made. A different OO may open the barogram, provided he is satisfied with the seal.

By carefully analysing your barogram you can calculate the time spent climbing, the achieved climb rate, the time over various sectors of the flight, the total height climbed, the glide ratio achieved and much other information. From this analysis it is possible to learn a great deal about your flight performance.

**The Flight Data Logger** - These electronic devices use GPS technology to record the flight path of the glider as well as the height. These need to be prepared and set up according to the manufacturer’s instructions. The OO will still need to enter his secret code number. Any tampering with the logger will be shown up on the trace, and the only way to open it without loss of the trace is with the code number. The club’s Filser “Colibri” logger may be hired – contact the CFI.

**THE FLIGHT.**

**Navigation:** It is important to know where you are. Being lost is to be

slow. Navigation is based on map preparation and map reading. Before the flight spend time with the map(s). Look for prominent features such as rivers, mountains and lakes and so on. Work out your course and look at it in relation to these landmarks. Work out the compass heading of each leg as well as the reciprocal and write them onto the map alongside the course lines. Map reading depends on identifying land features and correlating them with the map. Also bear in mind that you may be able to identify ground features that are associated with lift areas.

**GPS.** The Global positioning system has revolutionised navigation and these little gadgets have become cheaper and are very accurate. Unfortunately they are dependant on satellites and thus may fail so you should still be able to map read.

**Thermals:** Thermal Selection.

Height Band selection

Selecting the best thermals and using “lines” of lift gives you the best flight. Assess the thermal height for the day and divide this into 3 bands. Upper, middle and lower thirds. Once you get into the lower third slow down and take anything to climb. In the upper third fly MacCready speed set on about 1/2 to 1/3 of the rate at which you think you were climbing. And in the middle third take the first thermal that meets the days value.

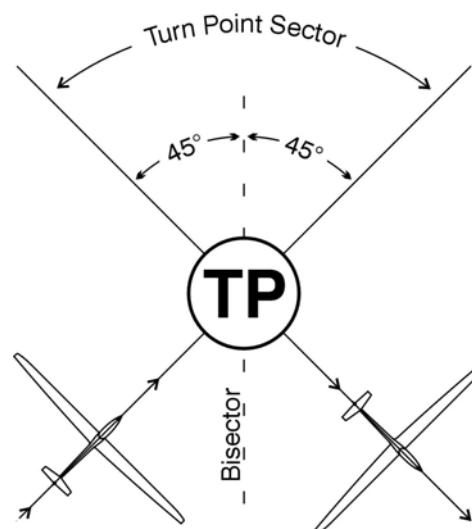
*Speed to fly.* MacCready ring. See Reichman. - *Cross-Country Flying.*

Note that we are all too optimistic in our assessment of thermal strengths. Set about half what you think is happening. Slow down if below about halfway down the height band. In the upper third slow in lift but don't stop to circle unless the thermal is well CGC – CLOUDBASE

above the average strength for the day. A large setting error makes little difference to achieved speed. For example setting 1 m/s in place of 3 m/s results in about 10% increase in time on course. Conversely if we set 3 m/s in place of 1 m/s flight time increases by 10%. Small differences as you can see. What is however important is that a too high setting reduces the chance of finding lift and increases the chance of landing out. Conversely flying to a slow setting increases the chance of getting lift and reduces the chance of landing out. It is therefore better to err on a slow rather than a fast setting.

*Taking Turn Point photos.*

Draw course into and out of turn point. Bisect this angle. Extend the bisector through the angle. Draw in a right angle (90°) centred about the bisector – this 90° arc is the turn point sector. Your photo must be of the TP from within the sector.



**Final Glide.** The final glide is the last segment of the cross-country. This is that part of the flight where you have achieved sufficient height to glide to

the destination without using any further thermals. You should plan to get back at about 1000' AGL so that you have time to plan a proper circuit. Simple circular slide rules are available to do this calculation, or the more sophisticated glide computers will do this for you. You fly at MacCready speed.

**Field selection.** We usually try to return to base or have as a destination an airfield. However an outlanding is going to happen sooner or later. Of utmost importance is to select a good field, fly a good circuit and make a good fully stalled landing. Always remain in gliding range of suitable fields. The higher you are the further you can range. At a minimum of 2000' AGL (but maybe much higher if terrain is rough) select your field. You can then hang about trying to find a thermal and at about 1000' AGL start your circuit. Remember your pre landing check. The "Committed to Land" is critical - don't change your mind from this point. Always land gear down. Fly your approach at the normal speed for the wind conditions.

When looking at the field consider the following factors.

**SIZE:** Length of run into wind. Obstacles at the end shorten the field by 10 times their height. A 10 m obstacle shortens the field by 100 m.

**WIND.** This greatly effects the effective length of the field and you should land into wind or nearly so if at all possible. (cf slope & surface.)

**OBSTACLES.** Be especially aware of power or telephone lines. All farms have power

&/or telephone lines. Identify these or **assume** them to be present on the edges of every field.

**SLOPE.** Any slope visible from the air is too steep. Always land up hill. Look for water, rivers and general terrain to assess slope.

**SURFACE.** A cultivated field is best. Always land along the furrows (**Never** across.) Roads are not suitable for landing.

**STOCK.** Consider any animals in the field. Horses are bad news. A single "bovine creature" is a bull. Sheep are reasonable.

**SUN.** All else being equal, land out of the sun. Visibility may be poor and landing difficult.

Access to field. A field with good easy access from the road is helpful but this is a low priority in your selection. A good safe field far from the road is far better than a bad field close to the road.

**Lost ?** What to do if you get lost. Remember that the aviation priorities are *Aviate, Navigate Communicate*. Keep flying and find a good thermal and get up high. Look at the map, what was the last clearly identified landmark. Look at the map in the direction in which you have been travelling. Try to identify what you see below you on the map. Beware the crime of *Procrustes*.

**Afterwards.**

**Tie down procedure.** Once you have landed tie the glider down carefully. Some tie down stakes or a bag to fill with earth should be carried to secure the glider. Make sure that the aircraft is safe before getting sorted out.

**Farmers.** You are trespassing in the farmer’s field. As an uninvited guest be extra polite and thank the farmer for the use of his field. Close all gates behind you and do as little damage as possible. A glider landing in the field will do no damage to small young crops. Hoards of onlookers can cause havoc.

**Contact your base and crew.** They will need to know where you are and directions of how to get there. Arrange with the crew where you will meet. Wait at the side of the road for example. Give the crew the number of the farmer’s phone so that they can phone you back if your directions prove inadequate.

**Equipment.** Start de rigging once you have established contact with your crew. Remove all tapes. Undo safety locks and pins. It is usually advisable to await the crew before removing tail or wings.

**Bibliography.**

- Cross-Country Soaring. Helmut Reichmann.
- New Soaring Pilot. Welch & Irving.
- Gliding Competitively. John Delafield.
- Cross-Country Flying. Bill Scull.

*(SEE Appendix under “FORMS” for full size forms)*

**DECLARATION.**

*(Appendix [ i ] form-b)*

Date   /  /    
 BAROGRAPH: \_\_\_\_\_ No. \_\_\_\_\_  
 PILOT: \_\_\_\_\_  
 AIRCRAFT: \_\_\_\_\_  
 REG. :ZS-\_\_\_\_\_. WINGSPAN: \_\_\_\_\_  
 AIRFIELD: \_\_\_\_\_  
 ELEVATION \_\_\_\_\_ ft AMSL.  
 TASK: \_\_\_\_\_  
 TURNPOINTS:  
 1) \_\_\_\_\_  
 2) \_\_\_\_\_

3) \_\_\_\_\_  
 SIGNATURES: \_

PILOT: \_\_\_\_\_-Witness (OO) \_\_\_\_\_

**LANDING OR FINISHING CERTIFICATE**

*(Appendix [ I ] form- a)*

This is to certify that on : \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 \_\_\_\_\_ (name of pilot)

flying a \_\_\_\_\_ (type of glider)

Registration No \_\_\_\_\_.

Landed/Finished the declared task at: \_\_\_\_\_ (time)

At \_\_\_\_\_ (location)  
 \_\_\_\_\_ East \_\_\_\_\_ South (co-ordinates)

Witnesses (2)  
 Name \_\_\_\_\_

Signature: \_\_\_\_\_

Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Address \_\_\_\_\_  
 \_\_\_\_\_

Telephone No (\_\_\_\_\_) \_\_\_\_\_

Official Observer:  
 Name .....

DATE ...../...../ 20.....

Signature .....

NB. In the case of fly-over remote finishes, only the official observer is required to complete and sign this form.

### **GLIDING CHECK-LIST**

Suggested lists for Club Members going on camps. Adjust as suitable for each aircraft etc.

### **TO BE DONE BEFORE LEAVING ON CAMPS OR COMPETITIONS.**

**CAR:** (Whatever is needed for your car)

- Service if necessary.'
- Check oil, tyre-pressure.(Inc Spare).
- Tools & Tool-box.(Include gliding goodies).

### **TRAILER:**

- Tyre-pressure & tyre pump
- Check wheel bearings & other for grease.
- Jack & Wheel brace
- Check lights & spare bulbs
- Spare tyre (Aerosol inflater? & or pump)
- Tie-downs, heavy hammer.
- Rigging aids & tow-out equipment.
- Water ballast equipment.

### **GLIDER:**

- Battery & charger
- Spare battery (& Charger).
- Ground set & accessories
- Oxygen mask & Full bottle oxygen
- LS1 documentation, in Glider log book.
- Glider Hand-book.
- Barograph, paper, ink etc.
- GPS.

**PILOT.** (Personal items)

- Pilot log-book.
- Glider pilots Licence
- FAI Certificate.
- Hat
- Block-out (Factor ?)
- Lime Juice.(or whatever)

- Sweets to suck.
- Spare glasses &/or sunglasses.
- Maps, & Water bottle.
- Camera & Film. (NB for Badge flights colour film OK)
- Declaration charts & landing certificates.

### **PERSONAL COMFORT ITEMS**

- Mosquito repellent
- Insect spray.
- Umbrella
- Bath plug (Universal)

### **BEFORE FLIGHT - ON THE DAY.**

#### **PILOT:**

- Good health
- Suitable clothing.
- Sunglasses, Glasses.
- Sun-screen.
- Lip salve (Beware with Oxygen).
- Outlanding water. (To drink)

#### **GLIDER:**

- Rigged & positive control check.
- Water ballast
- Battery(s) in & Master **ON**.
- Radio check
- Drink & Food stowed.
- **Do DI.** (Do not leave to crew).

#### **TASK.**

- Briefing
- Maps prepared & in cockpit.
- Barograph set, sealed IN glider & ON.
- Camera: Film In
- Camera: IN MOUNT.
- Control photo taken.
- Or Flight Logger in place and set.

#### **FINAL PRE. FLIGHT CHECKS.**

- Switch radio ON & Set correct frequency.
- Switch electric instruments ON. Set as needed.

- Check cushions for comfort,
- Empty bladder
- Get in and make yourself comfortable.
- “B C S I F T B C E” checks. .
- Enjoy flight.

**POST FLIGHT**

- Secure Glider; Adequate tie down
- Get camera/film secured.
  
- Get Barograph secured.
- Battery(s) on Charge.

Mike Pascoe.

Graphics by David Starke

*See Appendix (ii) for suggested reading*

