THE GLIDING FEDERATION OF AUSTRALIA INC.

Cross Country Pilot's Handbook

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Cross Country Pilot's Handbook

Brief Document Description: Handbook of theory, key skills and exercises for cross country pilots

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This handbook introduces the early pilot to the key elements of the world of cross-country flying.

Use this handbook as a starting point and fill in the gaps by talking with a coach and reading any of the excellent books available from Go Soaring.

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Part A Preparation

Glider preparation

Theory

- To be sure that when the pilot launches, the glider is ready to go
- Different people have different opinions, but with check lists you cannot go wrong

Key skills

- Prepare the same every time so that you have a routine
- Have a check list for you and your glider to prepare for each type of event
- Continually fine tune the check list
- Have all items that are or may be required in a box that will help you through the unexpected
- Make the unexpected expected
- Examples of check lists can be seen on www.jamescooper.com.au

Dual flying exercises

- Prepare the glider with the pilot using your check list and get them to create their own check list

Lead and follow exercises

- Do a DI on the pilot's glider to see that the glider is prepared

Pilot preparation

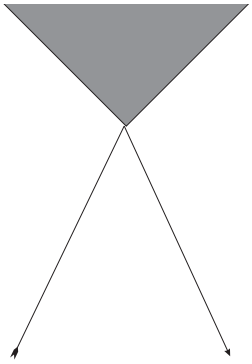
Theory

- The pilot needs to be mentally and physically well prepared for any flight from short or long, single flight or championship week
- Pilot preparation includes food eaten and drinks drunk, or not as the case may be
- Alcohol in any form will reduce the pilots ability to perform at peak ability
- When a pilot desires to compete at the top level, their single mindedness will assist their ability to perform at a high level
- From the time you wake up to the time you go to sleep will help you towards performing at a high level
- Go to bed on time, prepare before it gets too hot, and have time to plan the tasks in air-conditioned comfort
- One of the best assistants to the pilot is to have a book that records flights how it was flown and what lessons were learnt, this book should be re read on a regular basis

Flight planning

Theory

- KISS plan the route looking at the big picture, major lakes roads and ground features
- To see if a task can be achieved work backwards from arriving home at a given time from final glide based on launch height, then calculate using MacCready the time to arrive at each turn point thus giving the time to leave
- Put track on map together with car pin stripe tape, this does not rub off, also arrow indicating wind



Advanced level

- Work best time to leave for maximum speed
- Have a number of courses available to suit different conditions

Flight Analysis

- Look at predicted turn point time and actual, remembering that height of arrival should be bought into consideration

Assigned area tasks (AATs)

Task description

- An AAT consists of a start point and two or more areas that must be visited in order
- The area is a circle around a waypoint

Task time

- A minimum task time is set
- This time is usually the time it is likely to take to complete the scratch distance
- The scratch distance is the distance from point to point

Calculation of points

- Points are based on average cross-country speed given task time and distance
- The task time is actual time on task or, if you finish under time, the task time used is the set minimum task time

Strategies

- Avoid finishing within the minimum task time
- Plan to be over time – 10-15 minutes
- The disadvantage of being under time is significantly greater than being over time
- Keep task time to a minimum – don't go too much overtime to keep the final glide as great a proportion of the distance as possible.
- The exception to this is when conditions are so good that making more distance is justified
- Make distance in the first area to leave more latitude for adjusting distance in later areas
- Keep tracks straight and not curved so that you don't travel extra distance that doesn't count

Calculating time under or over

- Calculate and sum the time it takes for climbing and for cruising for distance to go
- Adjust distance to be about 10 minutes over time

Water ballast

Theory

- Increases the speed down a given glide path.
- Speed increases at a cube root of wing loading therefore the 1st kg of water is of great assistance and the last kg of water is of little assistance
- Speed in the thermal has to increase due to higher stall speed
- Higher angles of bank can not be achieved
- Manoeuvrability is reduced therefore rough thermal conditions are better lighter
- Therefore in thermalling conditions water has not as much advantage as in streets

Key skills

- Knowing when to dump
- Being able to fly heavy in weak conditions early in the morning
- Knowing when to start dumping on final glide

Dual flying exercises

- Find a twin that carries ballast!
- Demonstrate the difference in feel in a thermal at different wing loadings

Lead and follow flying exercises

- Compare one glider with another without water.
- Be aware of lack of manoeuvrability of the wet glider in the thermal

Solo practice

- Make a note of the different speeds and angles of bank for different wing loadings
- Make a chart for your glider of wing loading vs. dump time

Advanced level

- Fly early morning full and try to keep it up.

Flight Analysis

- Compare MacCready theory with actual at different wing loading.

Oxygen

Theory

- Lack of oxygen or hypoxia is insidious, there is no way for the pilot to be able to judge if they are suffering from hypoxia as the brain is not able to function well enough to judge the matter
- Pilots are legally required to have oxygen for flights that go above 10,000 ft
- Pilots should wear oxygen for flights that are consistently above 8000 ft
- The body's ability to give oxygen to tissues drops dramatically as height is gained
- This is called the oxygen cascade
- Perhaps the biggest danger is that a pilot who goes above their safe height will no longer be able to make the decision to stop going higher and will therefore continue to climb into the danger zone!

Key skills

- Not to listen to pilots who say that they are able to fly above 10000 ft
- Have an oxygen system in your glider or club glider, know how to use it and have it full at launch

Lead and follow

Theory

- To allow the pilot to see how it is done
- Perform the task in a single seater, although there is nothing stopping a twin leading or following
- Pilot to see how to fly in pairs

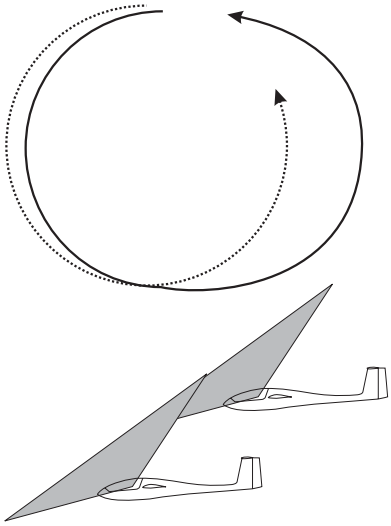
Key skills

- Lookout
- Keep reasonable radio communication
- Joining up, the best is for the coach to launch first then join the pilot
- Where required the pilots job is to follow and see what is being done, not try to show the coach how to fly
- Pair thermalling
- Having their own cut off height and sticking to it
- The coach must stay at the at the same height as the pilot, this reduces anxiety

Dual flying exercises

- Twins can lead and follow either with the coach in the twin or even 2 pilots in the twin

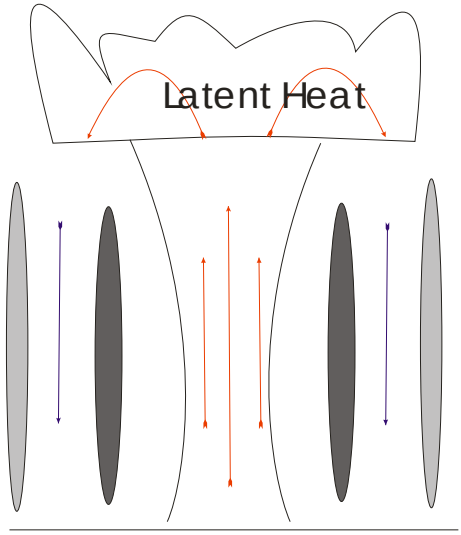
Pre flight check



- Brief on who pays for the coaches flight
- Agree on a coaching frequency usually 122.5 or 122.9
- The coach will launch first
- Once the pilot is established in a thermal the coach will come down and thermal up
- If there is a second pilot once the second pilot has launched and become established in a thermal the coach will come down leaving the first pilot to stay put even if the thermal runs out, and wait for the coach to come up
- Once all are together and above CTAF the coach will say “Change frequency to channel 9” on the assumption that this is the agreed channel
- The pilots will once changed channel say “XIF on Channel” where that is the glider call sign
- When leaving the thermal the coach will say on the last turn “Leaving at 80 knots”
- Pilot will say “Following”
- The coach will always come down to the level of the pilot, this is vital for both morale and safety. Do **not leave a** pilot below you looking up at you
- Do not cut inside another pilot

Part B Thermalling

Thermal structure and feel



Theory

- Surge and wing lift
- Explain the sensations by comparing them with being in a lift
- Explain pre thermal buffet

Key skills

- Find the core on the first turn
- Understand that surge = acceleration, therefore the best part of the climb is when the surge is dropping off, when the climb rate is at its maximum
- Be decisive
- Slow down a little in the pre thermal buffet, to say 60 knots, so that you do not shoot through the thermal, but fast enough to have good control response

Dual flying exercises

- Clearly brief in advance the sensations that we expect then talk through the sensations when flying, this helps dispel the belief that we found the thermal by "bumping into it"
- See that the pilot has the maximum opportunity to do the initial part of the climb. So the pilot may do the second half of the glide, find the thermal and climb the first half of the climb, then rest whilst the coach flies the next half of the sequence.

Lead and follow flying exercises

- Maximum number of 1000 ft climbs in a period of time, this can be a competition.
- The rules state that a 2000 ft climb is worth only one climb

Solo practice

- See that turns are 50/50 right and left, if not they are probably not feeling the wing lift
- If the above is true, spend a day flying the other way

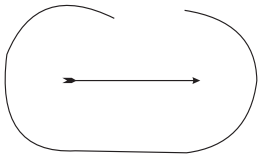
Advanced level

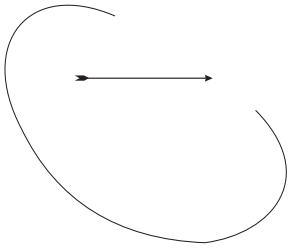
- Constantly try to get the core on the first turn
- Examine traces
- Fly without any instruments and audio

Thermal centering

Theory

- Maintain accurate speed and angle of bank as a basis of the thermal climb
- Make decisive changes towards the surge and decisive roll back into the thermalling turn
- The surge is the movement towards the thermal, it indicates increase in lift not maximum lift
- Tighten turn when increasing sink is approached to turn away from it
- Open up in lift, to move towards the lift
- Opening out a turn rather than straightening will not always move the glider where you expect as shown in the diagram below





Key skills

- Decisiveness and aggressive control movements
- Picture the thermal
- Open in lift, tighten in sink without thinking
- Use feel not instruments

Dual flying exercises

- Demonstrate full decisive control movement
- The difference between surge = acceleration, and best rate of climb = loss of surge
- Demonstrate tightening of turn in sink

Lead and follow flying exercises

- For safety. see that the pilot knows that when the coach flattens out the turn, the pilot does the same otherwise conflict will arise
- Show how the other glider in the turn will act as an advanced vario

Solo practice

- ALWAYS concentrate on maximizing climb

Advanced level

- Thermal without instruments
- Listen to the thermal

Bank and speed control

Theory

- Thermal radius increases dramatically with a small decrease in bank and an increase in speed
- The movement of position of the glider relative to the core is increased more if the angle of bank is low
- 45° will give the best diameter for most thermals
- Yaw string position a little to the outside of the turn will greatly assist speed control
- Without accurate flying the thermal will never be able to be cored
- Accurate turning is the no 1 to being able to thermal
- Use the tables on the following page to clarify

Key skills

- To be able to maintain accurate 45° bank and speed, by attitude
- ASI speed may fluctuate with horizontal wind gusts, so don't try to chase the ASI, use attitude
- Be able to move the thermal by rolling out of the turn and back into the desired angle of bank and speed

Dual flying exercise

- Straws, a set square or wires above the instrument panel, or the instrument screws give a clearly visible reference to show 45°
- Demonstrate how a little top rudder will make speed control easier

Lead and follow flying exercises

- See that you are not catching up to the pilot in the climb, if so the pilot is probably not using enough bank
- Before the flight let the pilot know that if the rate of climb decreases, it is probably because the angle of bank has reduced
- When it happens, point out that you will in one circle be about 100 ft above the pilot
- A glider without the yaw string in the correct position can clearly be seen to be flying with the nose pointing to the centre of the turn

Solo practice

- Maintain skills and view logger traces
- Always have 45° straws or reference markers on the glider
- Measure average seconds per turn on the logger and compare to the chart

Advanced level

- Expect that all climbs achieve good accurate rates of turn
- Thermal without an ASI

Turning Circle Radius in Metres

	40	45	50	55	60	65
	21	23	26	28	31	33
5	494	625	772	934	1111	1304
10	245	310	383	463	551	647
15	161	204	252	305	363	426
20	119	150	186	224	267	313
25	93	117	145	175	209	245
30	75	95	117	142	168	198
35	62	78	96	117	139	163
40	52	65	80	97	116	136
45	43	55	68	82	97	114
50	36	46	57	69	82	96
55	30	38	47	57	68	80
60	25	32	39	47	56	66

Turn time in seconds

	40	45	50	55	60	65
5	151	170	188	207	226	245
10	75	84	94	103	112	122
15	49	55	62	68	74	80
20	36	41	45	50	54	59
25	28	32	35	39	42	46
30	23	26	29	31	34	37
35	19	21	24	26	28	31
40	16	18	20	22	24	26
45	13	15	16	18	20	21
50	11	12	14	15	17	18
55	9	10	12	13	14	15
60	8	9	10	10	11	12

Thermalling with other gliders

Theory

- Other gliders are the best thermal markers and varios
- Move the circle so that it will be shifted towards the rising glider and away from the sinking glider

Key skills

- Lookout
- Look out for the glider that you have not seen
- Recognise the body language of other gliders one in a flat turn may not be worth visiting
- Recognise if a glider in an adjacent thermal climbing slower or faster and stay put or move to visit them
- Don't get psyched out by other gliders in the area, if you are climbing well stay there
- Try to fly 180° from the other glider if there are 2 of you

Dual flying exercises

- Lookout
- Demonstrate advanced vario, i.e. the other glider

Lead and follow flying exercises

- Pre brief is vital in demonstrating advanced thermalling and how to shift the circle towards the faster climbing glider
- Try to keep the gliders 180° apart

Solo practice

- As lead an follow
- Lookout for other gliders you have not seen

Advanced level

- Fly in pairs of other friends of similar standard
- Cover instruments and fly by thermal feel

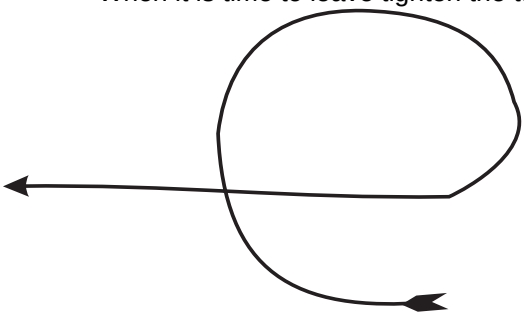
Thermal Leaving

Theory

- Have speed up to cruse as you leave the lift
- Speed is hard to gain as glider passes into sink, but lots of height can be lost
- When it is time to go forward go and be decisive

Key skills

- When it is time to leave tighten the turn and increase the speed in the thermal



Dual flying exercises

- Demonstrate in thermal 1 pilot demonstrates in thermal 2
- From then on let coach do the first part of the climb and the pilot do the top then leave
- Inform the pilot the turn before you are about to leave that you are going to demonstrate

Lead and follow flying exercises

- Inform the pilot the turn before you are about to leave that you are going to demonstrate

Solo practice

- As with thermal entry see that max 1000 ft climbs are left at speed
- For practice see that thermals are left at perhaps higher speed than the norm to enforce the concept

Advanced level

- Know when you are going to leave, before the lift drops off
- See that traces show that speed is up as the thermal is left (it may be a good idea to have a template to compare to for given wing loadings)

Part C Cruising

MacCready

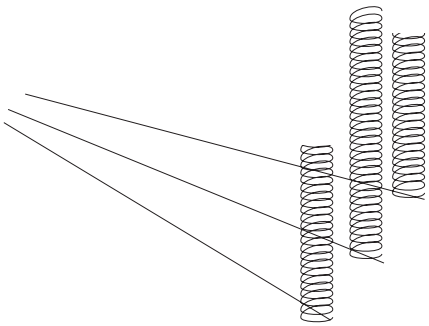
Theory

- The stronger the next thermal the faster you fly to it
- Fly slower in lift, to stay in it longer
- Fly faster in sink, to get out of it
- You can be punished for flying too fast as you increase the probability of not getting to the next thermal and therefore increase the risk of outlanding
- You are not excessively punished by flying slow
- You are punished by flying much too slow as the average speed drops off
- A guide to the proportion of the speed to fly relative to MacCready theory

	Experienced pilot	Inexperienced pilot
Reliable conditions cu	3/4	1/2
Unreliable conditions blue	1/2	1/4

Key skills

- To judge the strength of the next thermal
- To know the actual rate of climb achieved
- Fly an accurate speed between thermals without too much variation



Dual flying exercises

- Ask what strength of next thermal
- Ask what was the strength of the last thermal and note the time to examine it on the logger trace later

Lead and follow flying exercises

- To demonstrate, the leader goes out at 80 knots the follower at 70, join at the same thermal and see who is highest when the second glider leaves
- Repeat at 90 and 80 knots
- Note deliberate streeting will affect the results so fly block and no diversions
- Pilots need to have flown together to confirm that the performance of the gliders are the same

Solo practice

- Get speeds on and off early enough to try to get cross country speeds up to near MacCready expectations

Advanced level

- Try flying at different percentages of MacCready and compare cross country speed theoretical to actual

Block speed

Theory

- Although the MacCready theory is correct in principle, it does not take into account energy lost while accelerating and decelerating, pilot delay, the excessive workload in maintaining the changing speed and the poor lookout achieved

Key skills

- To judge the next thermal strength
- Fly a constant speed between thermals
- Be prepared to slow a little in streets
- To slow down a bit once below the desired height band

Dual flying exercises

- Demonstrate block speed and the lower workload required to do so

Lead and follow flying exercises

- Leader leaves thermal at block speed follower at MacCready and see who gets to the next thermal higher
- Note it is safer that the leader goes block as there is less probability of mid air with the follower altering altitude continuously
- Perhaps better to do it flying side by side

Solo practice

- Just stick to the block without temptation to change speed continually

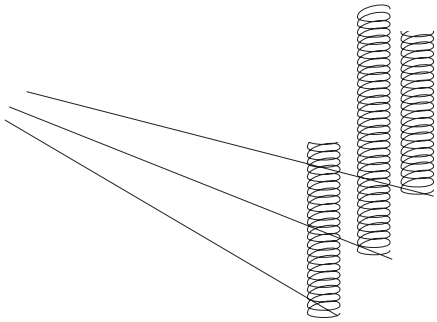
Advanced level

- Examine different block speeds and compare to theoretical cross country speed predicted by MacCready

Speed to fly

Theory

- That a glider that flies too fast will arrive before a slower glider, but lower
- That a glider that flies too slow will arrive higher than a faster glider, but later
- That a glider that flies just right arrives at a height higher than the faster glider despite the latter's time in the thermal, and having had time in the thermal will have soared higher than the slower glider that arrived late



Key skills

- To judge the speed that is most efficient to fly considering the conditions ahead in addition to reducing the probability of outlanding

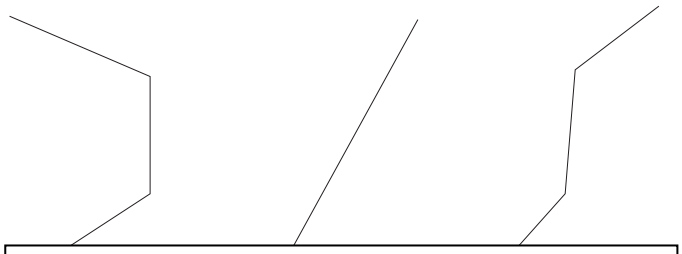
Flight Analysis

- Examine the theoretical MacCready speed compared to the actual achieved for the average rate of climb for the day, note that the flight needs to have had a reasonably constant rate of climb otherwise the average does not work

Height band

Theory

- The average rate of climb determines the cross country speed
- Between the top and the bottom of the thermal the strength is not consistent
- Therefore if the pilot can stay in the height band with the best rates of climb the best cross country speed will be achieved



Possible profiles of lift strength with height

Key skills

- To judge the most efficient height band for the day, and monitor its changes
- To monitor the speed that will keep the pilot within the height band
- Recognise the conditions that will give different lift profiles

Dual flying exercises

- Recognise that the decrease in strength of the thermal is not necessarily the ability of the pilot but more likely that of the thermal profile

Flight Analysis

- Analyse average rate of climb in 1000 ft height bands

Selecting a pathway through the air

Theory

- A small amount of energy gained in the cruise is worth a lot.
- If for example 1/3 of the flight time is climbing and 2/3 is cruising then, 1/2 a knot gain in the cruise is worth 1 knot of climb
- The diagram indicates that the polar curve is lifted if the cruise is done in rising air and therefore the cross country speed is increased

Key skills

- To feel the air
- Use small movements to keep in the street
- Fly a little slower in lift to have more time in rising air and improve the pilot's feel of the air
- Fly cross wind when the street runs out and at a higher speed
- Streets being long are narrow
- Be very aware of wind direction

Dual flying exercises

- Demonstrate slight movement of wings to keep in lift
- Demonstrate how to calculate wind direction by taking note of drift between the start and finish of the thermal
- Measure the height loss v distance flown

Lead and follow flying exercises

- Pilot to see the sensitive movement to remain in the thermal
- Pilot to fly a few meters to the side to see the loss of height in a glide

Solo practice

- Always practice streeting, it is as important as thermalling

Advanced level

- Fly slightly to off the wind direction, say 5° right so that if lift goes then move 10° left to get back in street

Flight Analysis

- Compare actual x country speed to MacCready theory

Meteorological navigation

Theory

- To see ahead the weather that will give the glider pilot the best weather conditions that will generate the best energy to move along track

Key skills

- To look not only at the next cloud but at the track ahead that will make best use of the conditions on the day
- Divert to gain the best energy and least risk

Dual flying exercises

- Continually discuss the weather well ahead

Lead and follow flying exercises

- Continually discuss the weather well ahead

Bugs and Rain

Theory

- Bugs or rain on the leading edge reduce the laminar flow on critical aerofoils
- This changes to polar and thus the glide angle of the glider

Key skills

- To have lookout that sees the wing
- Fly more conservatively particularly on final glide

Dual flying exercises

- See that pilot recognizes bugs and mentions it
- Change style to compensate

Flight Analysis

- Note how much the glide angel deteriorates with bugs

Final glide

Theory

- Final glide is calculated on the absolute MacCready speed with no safety reduction, whereas modified MacCready theory suggests that you fly at a slower speed than the predicted next rate of climb
- The speed to fly is based on the strength of the top of the last climb

Key skills

- Reduce speed a little at the start of the glide and increase towards the end, this puts the speed on when the arrival is guaranteed
- Too fast too early can lead to a low grovel
- Continue looking for good air to fly through
- Don't give up looking for paddocks
- Mentally rehearse the circuit well in advance
- Begin dumping water
- Call 10k
- Fly the same circuit as you would when racing, this prevents the pilot turning back on track to follow the standard circuit pattern when racing
- Be aware of problems picking paddocks gliding into the sun in the evening

Dual flying exercises

- Talk over outlanding options
- Continue looking for lift sources
- If the pilot flies the circuit be sure that they have mentally rehearsed the circuit

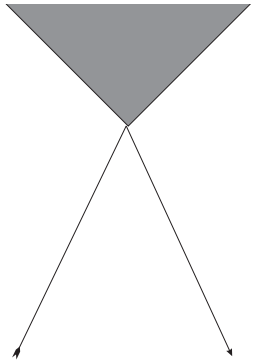
Lead and follow flying exercises

- On final glide it may be better that the pilot flies adjacent to the coach, this allows the coach to see the height of the pilot whereas in the follow you can not be sure of height loss
- Don't push the height below that that the pilot is comfortable with.
- Radio that the pilot is keeping aware of landing options
- Radio that the pilot is mentally rehearsing circuit

Solo practice

- Gradually bring the finishing height to lower levels

Part D Navigation



Using GPS

Theory

- Use the GPS to guide you to the turn point, keeping exactly on track is not vital
- Use the GPS to fly around an FAI sector
- Use the GPS to fly to a beer can turn point
- Flying on track with GPS and cross wind will create a curved flight path

Key skills

- Use the GPS to set the track but then revert to flying to a ground feature
- Don't be concerned if 30° off track is flown to go to thermal source
- If flying FAI sectors have the track and course about 10° different, this will guide around the turn point
- Be aware of the sector angles at an FAI turn point as pilot may need to fly into sector well away from turn point if storm exists
- Lookout

Dual flying exercises

- See that pilot is not fixating on GPS

Lead and follow flying exercises

- Pilot may be overloaded following and may not need to use the GPS, better just follow.

Map reading

Theory

- North up or on track
- Look at the big picture

Key skills

- Don't panic when getting low, concentrate on climb then look
- Don't try to make the map fit the terrain
- Read map with minimal loss of lookout
- Know location well before turning point to prevent head down in congested zone

Dual flying exercises

- Overload the pilot then when low see if they know were they are, then see how easy it is once height is gained
- Get the pilot to map read when the coach is flying the leg

Lead and follow flying exercises

- It is often hard to concentrate on lead and follow in addition to map reading so it may be wise to leave this exercise out of lead and follow
- Radio location so at least the pilot can briefly look at location without major map reading

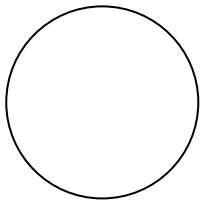
Solo practice

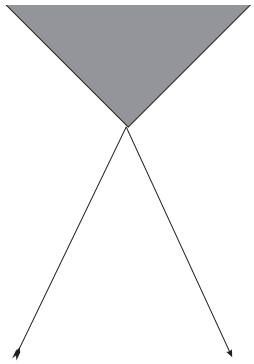
- No GPS
- Practice on Google earth where you can fly a virtual task, get low and see at what virtual height you can recognize were you are

Turn points

Theory

- The logger has to make a fix within the turning point zone
- There are three types of turning point:
    - FAI sector
    - cylinder of 500m radius
    - thistle, a combination of the two
- A badge flight course can use either an FAI sector or a cylinders
- If cylinders are used the declared course length is reduced by 1 km per turning point





Key skills

Cylinder

- Fly towards the turning point
- Look out
- Keep a constant look out and maintain usual flying techniques, looking for lift etc
- As soon as the logger confirms the 500m point has been reached turn to the next turning point

FAI

- One of two techniques
- Look out
- Fly up the reciprocal and as soon as the logger shows that the point has been passed and sufficient time has been taken to log the fix
- Or fly around with the track and the bearing differing by about 10° until the zone has been passed

Dual flying exercises

- Follow the sequence as above

Lead and follow flying exercises

- Don't be cramped around the turn point. I.e. don't be too close to the pilot when rounding the turn point

Solo practice

- Practice at the home airfield.

Advanced level

- Try to minimise the time going around the turning point, with a guaranteed fix

Part E Outlanding

Break off

Theory

- Be on downwind at an agreed height above ground
- NO MORE TURNING from this point
- A turn in 5 knots sink takes you from 500 to 250 ft in one turn

Key skills

- Knowing when to pull the plug
- Staying with the decision
- Judging height with the eye
- Being in the correct position for circuit at the cut off height, the cut off height may need to be higher if there is distance to be flown to start the circuit
- Be aware of decaying conditions that would suggest an inevitable outlanding,
- Pushing on to get nearer to home may get a less accessible paddock, if inevitable in after the next climb better to look for a good accessible paddock than a difficult one close to home

Dual flying exercises

- Agree on the cut off point before the flight and stick to it
- There may be a different cut off height for the pilot and the coach, if so then the coach takes over
- Stay with the decision and set an example
- Decide who will land but be absolutely sure that you are clear what paddock you are going into
- Don't hand over too low as pilot may not be switched on to the landing
- Cover the altimeter

Lead and follow flying exercises

- Fly by the pilot's cut off height
- Lead into the paddock by pulling brake and going in first leaving room for them to come in to the left or right of you
- Radio what side they are to land of you

Solo practice

- Look at logger traces to see that pilot has stuck to the correct decisions

Advanced level

- Look at the option of straight in approaches particularly after having been drifted downwind from paddock

Paddock selection

Theory

- To arrive on the ground safely
- Retrieve is secondary
- Land into wind
- Up hill
- Be aware of wind shear as head wind virtually goes to nil below hill top height
- If it looks as if it has a slope in the air it is steep
- The ability to aero retrieve IS NOT AN ISSUE

Key skills

- ALWAYS have a field / some paddocks / an area in mind
- Look on track and down wind, particularly in strong winds for potential paddocks, no need to look underneath.
- Don't run over deep ruts with full wheel break, the nose will get broken
- Look for the OTHER power cable that you have NOT seen
- Look for power cables that lead to houses and sheds
- Power cables with stiffeners could have a cable running at 90°
- Look at crop all the time i.e. in the car
- Never turn your back on the aiming point, the circuit should be made to allow for this
- Make it clear that it is not a failure to land out. In fact on the contrary you will not find the maximum without learning to push on and potentially land out

Dual flying exercises

- During flight continually ask pilot to point out paddocks
- If pilot is doing landing too much talking may put them into overload

Lead and follow flying exercises

- Radio expected paddocks but be aware it is virtually impossible to describe a paddock by words alone
- If the group lands out take the lead into the paddock by pulling brake and going in first, give room for the pilot to land to the right or left and advise which side they should come in

Solo practice

- Always be aware

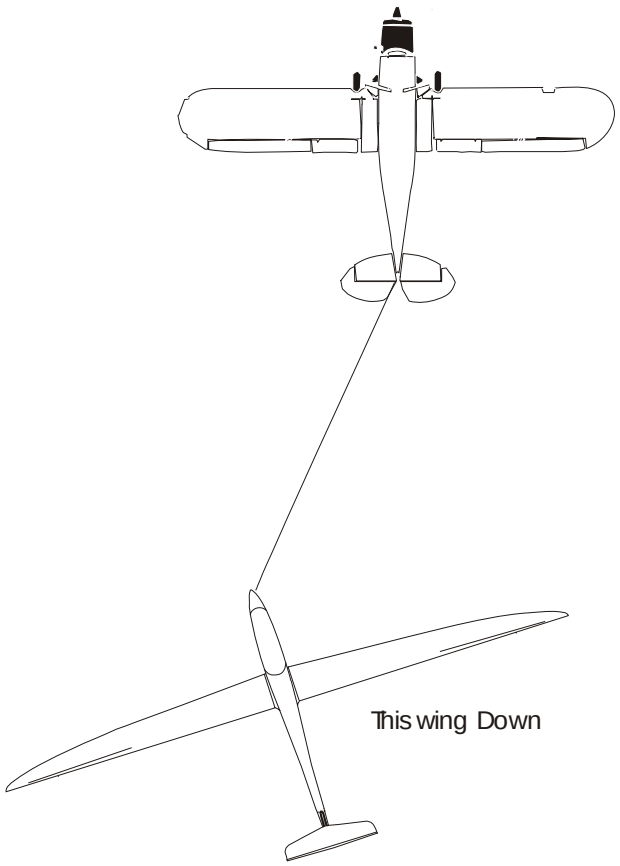
Advanced level

- A pilot should always be advanced at this

Aerotow retrieves

Theory

- Be Aware of height altitude issues related to the tugs power
- Be aware of longer ground run up hill
- Be aware of longer ground run on rough or wet ground
- Be aware of likelihood of ground loops or cartwheels if wing is caught by long grass or obstacles
- Prop draft will lift wing so set the tug to blow prop draft over the lower wing.
- The glider will rotate around the wing dragging on the ground so set the glider up so that it will point in the line of take off after this consideration.
- Road retrieves should be used if in any doubt



Key skills

- Walk the paddock first and count steps
- Look beyond the expected ground run for rope break options
- Things can go wrong quickly so have hand near release
- Spend time with tug pilot discussing the launch, you are a team
- Text long and lat to crew as this will not get distorted as would voice

Dual flying exercises

- Set an example make pilots walk the paddock with you

Lead and follow flying exercises

- Set an example make pilots walk the paddock with you

Solo practice

- Have check list for outlandings

Part F Analysis

Flight analysis

Theory

- To examine how the flight was flown as apposed to how they thought is was flown
- To examine the actual rate of climb or cross country speed perhaps studying different flying techniques

Key skills

- Be aware that taking averages over long flights will not give meaningful results as the Rate of climb and thus x country speed will be different at the beginning and end of the day compared to the middle
- Look at spread of climb rates, the aim is to have climbs as constant or grouped in one strength
- See that climbs are about 50/50 right and left
- See that climbs have good saw tooth tops not rounded
- Look at average rate of turn to measure angle of bank and speed Use the Chart on Bank and speed control
- Examine the actual speed with average rate of climb v MacCready prediction

Part G FAI Badges

The soaring performances required to qualify for the FAI badge standards of achievement are:

Silver Badge

The Silver badge is achieved on completing the following three soaring performances:

a. SILVER DISTANCE a flight on a straight course of at least 50 km. Any leg of 50 kilometres or more of a longer declared course may qualify, subject to the requirements of 4.4.3 on altitude difference applied to the whole course flown.
Note: the Silver distance flight should be flown without navigational or other assistance given over the radio (other than permission to land on an airfield) or help or guidance from another aircraft.

b. SILVER DURATION a duration flight of at least 5 hours.

c. SILVER HEIGHT a gain of height of at least 1000 metres.

Gold Badge

The Gold badge is achieved on completing the following three soaring performances:

a. GOLD DISTANCE a distance flight of at least 300 kilometres.

b. GOLD DURATION a duration flight of at least 5 hours.

c. GOLD HEIGHT a gain of height of at least 3000 metres.

Diamonds

There are three Diamonds, each of which may be worn on the Silver or Gold badge, and the badges for flights of 750 kilometres or more. NACs should maintain a register of these badges and, on notification by a NAC, the FAI will enter the names of pilots attaining the three Diamond award in an international register.

a. DIAMOND DISTANCE a distance flight of at least 500 kilometres.

b. DIAMOND GOAL a goal flight of at least 300 kilometres over an out-and-return course (1.4.6a) or triangular course (1.4.6b).

c. DIAMOND HEIGHT a gain of height of at least 5000 metres.

National Coaching Panel

2011